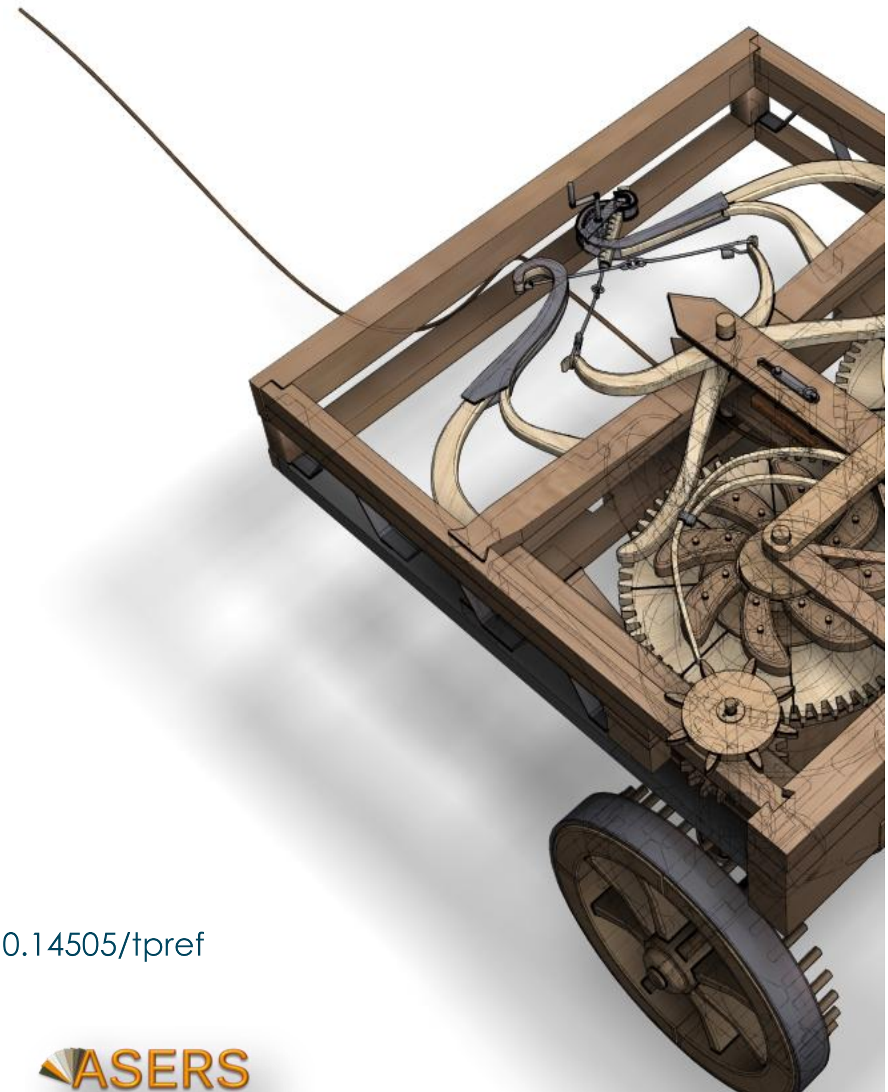
Theoretical and Practical Research in Economic Fields



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The Economics of a VAT Cut in the Standard Keynesian Framework: A Possible Anti-Crisis Measure?

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Abstract: The standard textbook treatment of expansionary fiscal policy at intermediate macroeconomics level (and specifically implemented via a tax rate reduction), *e.g.*, Blanchard (2021), Burda and Wyplosz (2023), or even at an advanced level, *e.g.*, Romer (2018)- only considers income tax cuts affecting the economy through the consumption function, by increasing the level of disposable income. In this paper we introduce VAT in the Keynesian cross framework and study the effects of a cut in the VAT rate. Under certain conditions, such as a relatively high pre-existing level of the VAT rate, a relatively low (proportional) income tax rate, and a sufficiently high MPC (marginal propensity to consume), a cut in the VAT rate has a positive effect on output and thus can be potentially used as a short-term anti-crisis measure. Interestingly, we find that the stimulus effect dissipates once we allow for an open economy, as people spend a substantial part of their income on imported products, *i.e*, when the MPI (marginal propensity to import) is high. Our findings are novel in literature and could be of interest both to policy makers, as well as economists interested in economic education and teaching.

Keywords: Keynesian framework; expansionary fiscal policy; tax cut; stimulus effect.

JEL Classification: A23; E62; E12; C61.

Introduction and Motivation

In this paper we consider a possible stimulus effect via a cut in consumption taxation, a policy that is of interest to policy-makers in Bulgaria, in Central and Eastern European countries, as well as any developing countries with a public finance model organized around consumption (indirect) taxation. In particular, almost half of the tax revenue in Bulgaria is from value-added taxation. Also, the consumption tax rate in Bulgaria is higher than the personal income, and the corporate tax rate. Next, we ask the following questions: (i) How would a VAT cut work in a model, focused on the short to medium run, or, more specifically - into the Keynesian Framework? (ii) What is the size of the tax multiplier (*i.e.*, the expression of the partial derivative of output with respect to the consumption tax rate)? There is not much treatment in either the original works of Keynes, or modern textbooks. Hence, the research in this paper is novel and will generate new insights.

After all, being a tax on demand, VAT is not as distortionary as the other taxes, such as the personal income tax (which is a tax on production factors), and is often considered a sure source of revenue. In addition, in the he US, this question is not interesting, due to the absence of a federal consumption tax. Intuitively, a VAT cut is a clear temporary reform measure: several economists have recently suggested a temporary VAT cut (*e.g.*, for two years), or some scheme that has to do with reimbursement based on receipts. The issue is that by law ("de jure") the seller is responsible for sending the money to the tax authority. However, in reality ("de facto") the seller pushes the burden of the tax onto the consumer. From the public finance literature, and the Ramsey rule in particular, we know that the burden of tax is inversely related to elasticity. Thus, the side that is relatively more elastic, is able to pass the bigger part of the tax burden on the other counter-party. Furthermore, it is not clear who should submit the receipts for reimbursement to the tax authority - consumers, or merchants. Yet another question is whether consumers need to have a VAT registration, whether there would be a cap on reimbursement? These questions are difficult to answer. Theoretically, people can claim millions in expenditures, so there is a serious need to cross-check with their incomes and whether they match their spending; furthermore, individuals could claim they borrowed the money - so the VAT reimbursement problem is akin to problems with hiding income. Lastly, checking whether the receipts are genuine also has an administrative cost. Another reason for caution when discussing the effects of a VAT cut, is that it might interfere with fiscal discipline, especially in countries under a currency board arrangement (Bulgaria). (Yet another camp of economists argues that cutting taxes might trigger a cut in expenditure, and actually increase efficiency of spending, and reform implementation.) In this note, we will focus on the short- to medium run and abstract away from deficits and debt considerations. For simplicity, we will also abstract away from excise taxes. Thus, in this paper we aim to fill a clear gap in the literature, and at the same time the work could be a good teaching case for students.

The paper is structured as follows: Next section evaluates the effect of a VAT cut 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.

The Model Setup

In this section, we present a battery of models, starting from the simplest case, and then extending the setup, one element at a time. First, we begin with output determination in the closed-economy case

$$AE = AD = (1+\tau^c)C + I + G, \tag{1}$$

where $(1+\tau^c)C$ is the VAT-inclusive spending on private consumption C, I is investment, G is government purchases, AE is (planned) aggregate expenditure, and AD is aggregate demand. In equilibrium

$$Y = AE = AD \text{ , or} \tag{2}$$

$$Y = (1+\tau^c)C + I + G. \tag{3}$$

Our consumption modelling follows the standard Keynesian consumption function, or

$$C = a + b(Y - T) \tag{4}$$

where a>0 is the autonomous consumption component (linked to permanent/life-cycle income), 0<b<1 is the marginal propensity to consume (MPC), and T denotes taxes. Next, we will consider several sub-cases (note that the absence of an intercept in the consumption function does not change the results):

Case I: Lump-sum (exogenous) taxes: Solve for Y to obtain

$$Y = \frac{(1+\tau^c)(a-bT)+I+G}{1-(1+\tau^c)b} \tag{5}$$

Next, rearrange terms and compute comparative-static effect of VAT on output to obtain:

$$\frac{dY}{d(\tau^c)} = \frac{a-bT}{1-(1+\tau^c)b} = \frac{C}{1-(1+\tau^c)b} < 0 \tag{6}$$

which holds as long as $(1+\tau^c)$b > 1, or when MPC and VAT are sufficiently high. This is satisfied for Bulgaria, where τ^c = 0.2, and b > 0.833, which is in the lower end for b as estimated in Vasilev (2015), who obtains a = 0.12, with st.dev (a)=0.27, so we cannot reject the null hypothesis that the true value is zero. Next, b ∈ [0.77, 0.99], where we have bounded the value from above by unity. If we ignore the economic bound, the statistical procedure yields 1.13 with error 0.15, and 0.89 with error 0.06. In addition, this high degree of hand-to-mouth consumption behaviour is not a bad approximation in the short run, and/or during periods like the SARS-CoV-2 pandemic. Next, we make the analysis more realistic by endogeneizing the taxes, and making them conditional on earning.

Case II: Proportional taxes: $T = tY, 0 < t < 1$. Solve for Y to obtain

$$Y = \frac{(1+\tau^c)(a-bT)+I+G}{1-(1+\tau^c)(1-t)b}. \tag{7}$$

Next, rearrange terms and compute comparative-static effect of VAT on output to obtain:

$$\frac{dY}{d(\tau^c)} = \frac{a-bT}{1-(1+\tau^c)(1-t)b} = \frac{C}{1-(1+\tau^c)(1-t)b} < 0, \tag{8}$$

which holds as long as $(1+\tau^c)(1-t)b > 1$. Relative to the earlier case, now the requirement is stronger: it requires not only MPC and VAT to be sufficiently high, but also distortionary income tax rate to be relatively low (10 percent in Bulgaria, or t=0.1.). In other case, the public finance model is organized around low income taxes, and high indirect taxes - a model that fits the fiscal situation in many Eastern European countries.

However, if we add the employee contributions as adding to the burden on labour – another 14 percent - then the result is preserved as long as MPC > 0.926, which is still plausible for Bulgaria. Lastly, the MPC requirement is even higher depending on the size of a VAT cut considered: If we cut VAT by 1 percentage point, MPC > 0.934, while if we cut VAT by 2 percentage points, then MPC > 0.942, and we are not only approaching the upper end of the estimate for MPC (one st. dev. from the mean), but also the loss of consumption revenue might put a strain also on the budget balance (note that the tax cut may increase consumption, so consumption tax revenue might actually increase). Luckily, the debt-to-GDP ratio in Bulgaria is around 40 percent, which is quite low. Finally, yet another way to preserve our original result is to argue that the average consumer in the model is a person over the life-cycle, hence most of those contributions correspond to an income redistribution over time (a "deferred income"), and are not a tax on labour in the legal sense.

The next extension to the model setup is to open the economy and consider the effect of net exports – when taxes are lump-sum first and then consider distortionary taxes. Solve for Y to obtain

$$Y = AE = AD = (1+\tau^c)C + I + G + NX \tag{9}$$

$$Y = (1+\tau^c)C + I + G + X - (1+\tau^c)m(Y-T) \tag{10}$$

$$Y = (1+\tau^c)a + I + G + X - (1+\tau^c)(m-b)(Y-T), \tag{11}$$

where 0 < m < 1 is the MPI (marginal propensity to import. For short we denote IGX = I + G + X. Notice also that exports are free of VAT, while the imports are levied with VAT. Notice that levying VAT on G does not affect the results in any major way, so we will not present it here. Next, rearrange terms and compute comparative-static effect of VAT on output to obtain:

$$\frac{dY}{d(\tau^c)} = \frac{a+(b-m)T}{1-(1+\tau^c)(b-m)} < 0, \tag{12}$$

which holds as long as $(1+\tau^c)(b-m) > 1$. This, however, is possible only under extreme home bias, *e.g.* MPC > 0.9 and MPI < 0.1. For example, in the case of Bulgaria that is not plausible even when we stretch the value of the MPC, as the lower bound of the MPI over the period 1999-2023 is 0.4. However, the result is still salvageable, if we assume that the majority of the imports are investment goods (and thus freed from VAT), and not consumption goods (which are the ones levied with VAT). In general, the more open the economy is, the lower the effectiveness of this tax cut on the economy. In more complicated models, the effect would also depend on the VAT pass-through in prices, degree of competition in the product market, etc.

The implausibility scenario is reinforced once we account for proportional taxes: in that case, the comparative-static is of the right sign, *i.e.*,

$$\frac{dY}{d(\tau^c)} = \frac{a+(b-m)(1-t)Y}{1-(1+\tau^c)(b-m)(1-t)} < 0, \tag{13}$$

only when $(1+\tau^c)(b-m)(1-t) > 1$, which now requires the (MPC −MPI) term to be even larger than before. Such a case is not observed in any open economy.

Conclusions and Further Research

The standard textbook treatment of expansionary fiscal policy at intermediate macroeconomics level (and implemented via a tax rate reduction in particular), *e.g.*, Blanchard (2021), Burda and Wyplosz (2023), or even at an advanced level, *e.g.*, Romer (2018)- only considers tax cuts affecting the economy through the consumption function, by increasing the level of disposable income. In this paper we introduce VAT in the Keynesian cross framework and study the effects of a cut in the VAT rate. Under certain conditions, such as a relatively high pre-existing level of the VAT rate, a relatively low (proportional) income tax rate, and a sufficiently high MPC, a cut in the VAT rate has a positive effect on output and thus can be potentially used as a short-term anti-crisis measure. Interestingly, we find that the stimulus effect dissipates once we allow for an open economy, as people spend a substantial part of their income on imported products, *i.e,* when the MPI is high.

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. For example, under monopolistic competition, firms exhibit market power, and might increase prices when taxes are cut, thus decreasing consumption and aggregate demand. Finally, in the presence of tax fraud, any positive effect of a tax cut would be undermined further.

Credit Authorship Contribution Statement

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

Declaration of Competing Interest

The author is a member of the Editorial Advisory Board but was not involved in the editorial review or the decision to publish this article.

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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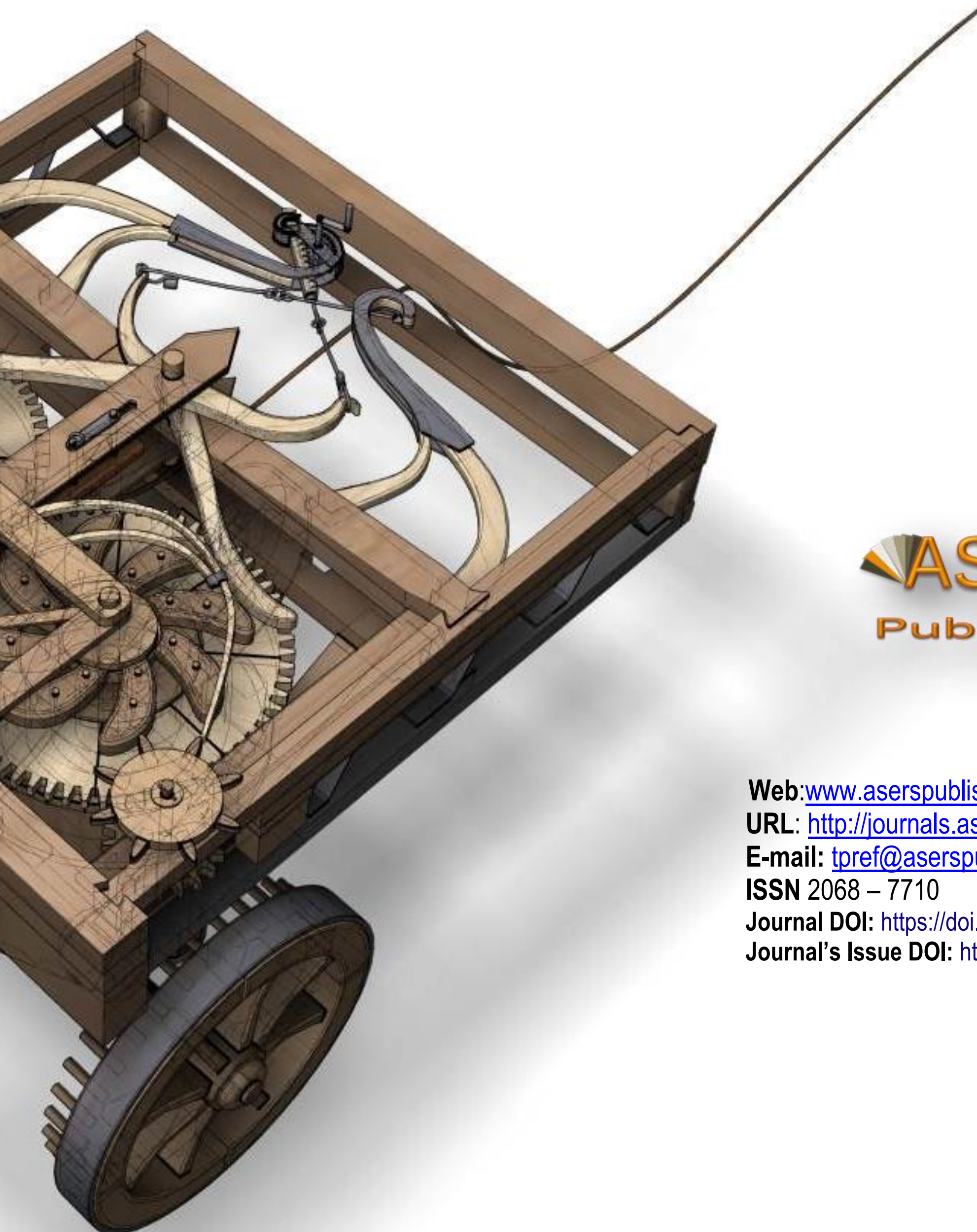

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