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THE MACROECONOMIC EFFECTS OF A PRODUCTIVITY SHOCK IN THE NONTRADED GOODS SECTOR

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Abstract

This paper analyses the macroeconomic effects of a productivity shock in the nontraded goods sector using a small open economy model. The paper develops a simple dynamic general equilibrium model offering intuitive explanations of how a productivity shock affects a small open economy. The model gives a surprisingly pessimistic view on the benefits of productivity shocks. For example, a productivity shock has, except for one special case, a negative effect on the output of nontraded goods in the short run. This result differs from the results of RBC models. The paper gives an interesting insight into the possible effects that the introduction of the EU (European Union) services directive or GATS (General Agreement on Trade in Services) agreement may have.

Keywords: *Productivity, nontraded goods, open economy macroeconomics.*

JEL Classification: E20, E30, F41

1. Introduction

Although productivity growth in the nontraded goods sector has historically been lower than that in the traded goods sector, it is also worth studying the macroeconomic effects of productivity[2] growth in the nontraded goods sector. Even though many services are traded goods, a relatively large fraction of services are still nontraded goods. The aim of the GATS (General Agreement on Trade in Services) agreement is to promote economic growth and development through the expansion of international services trade (WTO 2006). However, the GATS agreement, if signed, would most likely lead to actions to increase productivity in the nontraded goods sector. Also, the European Union (EU) has tried to increase competition and to improve productivity in the service sector. The Directive on Services in the Internal Market (henceforth the services

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[2] We use the term productivity to refer to average labour productivity, as, e.g., in Gali (1999).

directive) is an attempt to open up the service sector to competition. As emphasized, e.g., by Copenhagen Economics (2005), in the EU, barriers to the cross-country provision of services are abundant. Reducing barriers to service provision is likely to increase competition, reduce costs and improve productivity, because barriers waste real resources (Copenhagen Economics 2005). In this paper, we assume that the EU services directive or the GATS agreement increases competition improving productivity. It is hard to imagine that the liberalisation of services would not have a positive effect on the productivity of services. For example, Nickell (1996) shows that increasing competition has a favourable effect on productivity.

The paper analyses the macroeconomic effects of a productivity shock (an increase in labour productivity) in the nontraded goods sector using a small open economy model. Since many services are nontraded goods and increasing competition has a positive effect on productivity, the model can be used to analyze the effects of increasing competition in the service sector. The model does not specify what causes a positive productivity shock, however, one can think that it is caused by increased competition. The model can thus be used to analyze the effects of the EU services directive or the GATS agreement on small open economies. Lithuania is a good example of a small open economy. It is integrated into the world economy and a price taker in world markets. One goal of this paper is to provide a discussion of the economic effects of these agreements through their effects on the nontraded goods sector. Thus, the heading of the paper could equally well be, e.g., "the macroeconomic effects of the EU services directive on the Lithuanian economy".

To address the above-mentioned issue, the paper develops a simple dynamic general equilibrium model which offers quite intuitive explanations of how a productivity shock affects a small open economy. In the spirit of the New Open Economy Macroeconomics (NOEM) framework, the model "incorporates the price rigidities essential to explain exchange rate behavior without sacrificing the insights of the intertemporal approach to the current account" (Obstfeld & Rogoff 1995, 624). Thus, we investigate the effect of a productivity shock not only on the output of the nontraded good sector, but also on the exchange rate and the current account.

The model presented in this paper is based on the model of Lane (2001b). He extends the small country model of Obstfeld and Rogoff (1995) by assuming a non-separable utility function in consumption in traded and nontraded goods. This is advantageous. In this setup, economic shocks in the nontraded goods sector have consequences on the traded goods sector. Lane (2001b) and Obstfeld and Rogoff (1996, Section 4) highlight that if the utility function is non-separable in consumption of traded and nontraded goods, the elasticity of substitution between traded and nontraded goods is a key parameter in governing the macroeconomic effects of economic shocks. Thus, we pay special attention to how the effects of a productivity shock depend on this elasticity. The models of Lane (2001b) and Obstfeld and Rogoff (1996, Section 4) are monetary policy models, but as Obstfeld and Rogoff (1996, Section 10) show, NOEM models can be used for an analysis of productivity shocks.

Several interesting insights, including the surprisingly pessimistic view of the benefits of productivity shocks, are highlighted. For example, it emerges that a productivity shock in the nontraded goods sector does not have a positive effect on the output of nontraded goods in the short run, when the demand is demand-determined and prices are fixed. A productivity shock has, except for one special case, a negative effect on the output of nontraded goods. This result

differs from the results of Real Business Cycle (RBC) models. For example, Neaime (2004) shows that a productivity shock in the nontraded goods sector increases the output of nontraded goods by a substantial amount in the short run. In this model, only when the economy reaches the new steady state, the output of nontraded goods increases. A key parameter in explaining the effect of a productivity shock on output is the elasticity of substitution between traded and nontraded goods. If this elasticity is small, an improvement in productivity has a relatively small positive effect on the output of nontraded goods in the long run. The greater the elasticity of substitution between traded and nontraded goods, the higher the increase in the output of nontraded goods. Based on the results of this model, one could argue that the benefits of the EU services directive or the GATS agreement on the Lithuanian economy, through the increased competition in the nontraded goods sector, will be neither instant nor large. It is also shown that the behaviour of the nominal exchange rate greatly depends on the elasticity of substitution between traded and nontraded goods. In addition, the impact on the current account depends on the relative magnitude of the elasticity of substitution between traded and nontraded goods and the intertemporal elasticity of aggregate consumption.

2. The Small Economy

2.1. Market Structure, Preferences and Budget Constraints

The small open economy, which in called home, consists of two sectors: the traded goods sector and the nontraded goods sector. The traded goods sector produces single homogeneous goods. The output of nontraded goods is fixed and their price is determined in the world market. The nontraded goods sector is monopolistically competitive and the prices of these goods are fixed in the short run. The home country is populated by a continuum of consumer-producers: households. The size of the economy is normalized to one and households are indexed by z. Each household produces a differentiated nontraded good.

The utility function of the representative household is

$$(1)\quad U_t = \sum_{s=t}^{\infty} \beta^{s-t}\left[\frac{\sigma}{\sigma-1} C_s^{\frac{\sigma-1}{\sigma}} + \chi \log\frac{M_s}{P_s} - \frac{\kappa}{2}\left(y_{s,s}(z)\right)^2\right],$$

$$(2)\quad C_t = \left[\gamma^{\frac{1}{\theta}} C_{T,t}^{\frac{\theta-1}{\theta}} + (1-\gamma)^{\frac{1}{\theta}} C_{N,t}^{\frac{\theta-1}{\theta}}\right]^{\frac{\theta}{\theta-1}}$$

In equation (1), β $(0 < \beta < 1)$ is the discount factor, C is the aggregate consumption index, σ is the intertemporal elasticity of aggregate consumption, χ is a parameter, M denotes nominal balances and P is the price index (defined below). In addition, κ is a parameter and $y_s(z)$ denotes the output of nontraded good z. As explained in Obstfeld and Rogoff (1995, 1996), a positive productivity shock can be modelled as a fall in κ. "The higher productivity – the lower κ – the less labor is required to produce a given quantity of output" (Obstfeld and Rogoff 1996, 696).

The consumption index (2) aggregates the consumption of traded and nontraded goods. The variable C_T is consumption of the traded good, C_N, is consumption of nontraded goods, γ is the share of traded goods in total consumption and θ denotes the elasticity of substitution between traded and nontraded goods. Two special cases are worth mentioning. When θ is one, the consumption index is Cobb–Douglas (see, e.g., Obstfeld & Rogoff 1996, 222–223). When θ is zero, the consumption index corresponds to the Leontief utility function: $C_t = \min\{C_{T,t}, C_{N,t}\}$. The variable C_N is the nontraded goods consumption index

(3) $$C_T = \left(\int_0^1 c(z)^{\frac{\mu-1}{\mu}} dz \right)^{\frac{\mu}{\mu-1}}$$

where $c(z)$ is the consumption of good z and μ (> 1) is the elasticity of substitution among different varieties of nontraded goods.

The price of the traded good is determined in the world market. Assume that the law of price holds in tradables. If the foreign currency price of the traded good is normalized to one, then $P_T = E$, where P_T is the price of the traded good in domestic currency and E is the nominal exchange rate. Thus, the price of the traded good denotes the nominal exchange rate.

The consumption index implies (2) that the optimal allocation of consumption between traded and nontraded goods is governed by the following equations:

(4) $$C_T = \gamma \left(\frac{P_T}{P} \right)^{-\theta} C,$$

(5) $$C_N = (1-\gamma) \left(\frac{P_N}{P} \right)^{-\theta} C$$

In these equations, P denotes the consumer price index and P_N is the nontraded goods price index (defined below). The consumer price is

(6) $$P = \left[\gamma P_T^{\theta} + (1-\gamma) P_N^{1-\theta} \right]^{\frac{1}{1-\theta}}$$

Here, the nontraded good price index is

$$P_N = \left(\int_0^1 p_N(z)^{1-\mu} dz \right)^{\frac{1}{1-\mu}}$$

where $p_N(z)$ is the price of nontraded good z.

The aggregate demand for the representative nontraded good is given by

(7) $$y_N(z) = \left(\frac{p_N(z)}{P_N} \right)^{-\mu} C_N^A.$$

This equation states that the demand for good z depends on its relative price, the price elasticity of demand and aggregate demand.

The budget constraint of the representative household is

(8) $$P_{T,t} B_t + M_t = P_{T,t}(1+r) B_{t-1} + M_{t-1} + p_{N,t}(z) y_{N,t}(z) + P_{T,t} \bar{y}_{T,t} - P_t C_t$$

where B_t denotes bond holding of the household entering period $t + 1$. These bonds are denominated in tradables. In addition, r denotes the world interest rate and $\bar{y}_{T,t}$ is the output of the traded good.

2.2. Optimality Conditions

The representative household maximizes the utility function (1) subject to the budget constraint (8) taking into account the demand curve (7). The optimality conditions are given by

(9) $$\frac{C_{T,t+1}}{C_{T,t}} = \left(\frac{P_t / P_{T,t}}{P_{t+1} / P_{T,t+1}} \right)^{\sigma-\theta}$$

(10) $$\frac{C_{N,t}}{C_{T,t}} = \left(\frac{1-\gamma}{\gamma} \right) \left(\frac{P_{N,t}}{P_{T,t}} \right)^{-\theta}$$

(11) $$\kappa y_N^{\mu+1/\mu} = C_t^{-1/\sigma} \left(\frac{P_{N,t}}{P_t} \right) \left(\frac{\mu-1}{\mu} \right) \left(C_{N,t}^A \right)^{\frac{1}{\mu}}$$

(12) $$\frac{M_t}{P_t} = \left[\chi C_t^{1/\sigma} \left(\frac{1+i_t}{i_t} \right) \right]$$

where i denotes the domestic nominal interest rate defined by the Fisher identity

$$1+i_t=(1+r)\frac{P_{T,t+1}}{P_{T,t}}$$

Because the price of the traded good also denotes the nominal exchange rate, the Fisher identity implies the uncovered interest rate parity. Equation (9) is the Euler equation that describes the optimal intertemporal consumption of the traded good. As shown in Dornbusch (1983), the relevant interest rate for a small open economy with two sectors is not the world interest rate but the interest rate measured in terms of the domestic consumption basket. For example, if the price index, relative to the price of the traded good, is temporarily low to its future ratio, the consumption-based real interest rate is temporarily low. This favours short-run consumption and consumption raises with elasticity σ. On the other hand, when the relative price of the traded good becomes higher, the consumption of the traded good falls as a fraction of aggregate consumption with elasticity θ.

Thus, the relative magnitude of σ and θ determines the sign of the traded good consumption change. Equation (10) governs the optimal allocation between traded and nontraded goods. This allocation depends on the openness of the economy, relative prices and the elasticity of substitution between traded and nontraded goods. Equation (11) is the supply curve, the supply of nontraded good z is an increasing function of aggregate demand and its relative price and a decreasing function of consumption of household z. Equation (12) shows the demand for money, it depends on the interest rate and aggregate consumption.

2.3. *The Current Account*

The current account is here the sum of the trade balance and net factor income from abroad. Assume an initial equilibrium where the economy has no net foreign assets/debt. The change in the current account in the first period is given by

$$\Delta B_t=\bar{y}_{N,t}-C_{N,t}. \tag{13}$$

Assume that the prices of nontraded goods are fixed for one period but fully flexible after the period. Then the economy reaches a new steady state after one period. The steady state current account can thus be written as

$$rB_t=C_{N,t-1}-C_{N,0} \tag{14}$$

The short-run current account imbalances determine net foreign assets/debt in the steady state. If a productivity shock generates a current account surplus in a short run, domestic household can increase consumption of the traded goods in a long run, due to interest earnings on the economy's net foreign assets. If the economy runs a current account deficit in a short run, it has to service the debt by decreasing the consumption of the traded good.

2.4. *Log-Linearizing the Model*

The model is log-linearized around a symmetric steady state where all households consume and produce an equal quantity of nontraded goods and set the same price. In this symmetric equilibrium, the demand for each nontraded good is given by

$$y_N=C_N+G_N. \tag{15}$$

The equations that describe the equilibrium of the model are (3), (6) and (9)–(15). As mentioned, the model is log-linearized around the initial steady state, expressing the model in percentage deviations around it. Because the economy has

no foreign assets/debt, bond holdings are normalized by initial consumption of the traded good. As mentioned, the prices of nontraded goods are fixed for one period and the economy reached a new steady state after one period. In addition, the labour-leisure trade-off condition (11) is not binding in a short run.

3. The Choice of the Parameters

To solve the model numerically, values for five parameters are needed. As mentioned, we focus attention on how the effects of a productivity shock depend on the elasticity of substitution between traded and nontraded goods. The empirical estimates of this elasticity are very low. Mendoza (1991) finds an elasticity of 0.74, Ostry and Reinhart (1992) find an elasticity of 0.66–1.3, and Stockman and Tesar (1995) find an elasticity of 0.44. We let this elasticity to be between zero and three. The intertemporal elasticity of aggregate consumption is set to one. This is a standard assumption and corresponds the logarithmic utility function. Stockman and Tesar have (1995) estimated that nontraded goods make up half of output and thus $\gamma = 0.5$. Rotenberg and Woodford (1992) have estimated that the elasticity of substitution between differentiated goods is 6 and thus μ is set to 6. The world interest rate is set to 4 percent.

4. The Effects of a Productivity Shock in the Nontraded Goods Sector

Figure shows the effects of a one percent increase in productivity on the key variables. As mentioned in Section 2.1, the productivity shock is modelled as a fall in κ. This implies that less labour is required to produce a given quantity of nontraded goods. In Figure, the horizontal lines show the elasticity of substitution between traded and nontraded goods and the vertical lines show the percentage deviations from the initial steady state. Because the current account is normalized by initial consumption of the traded good, the current account shows a deviation as a percentage of the initial consumption of the traded good. The real exchange rate measures the internal terms of trade. It is the relative price of traded goods in terms of nontraded goods.

4.1. Output, the current account, the nominal exchange rate in a short run

As one can see in Figure, in the case when $\theta = \sigma > 1$, a productivity shock decreases the output of nontraded goods but increases the consumption of the traded goods and aggregate consumption. The Figure also shows that a productivity shock appreciates the nominal exchange rate and generates a current account surplus in a short run. Equation (12) implies that, in the case of a logarithmic utility function over aggregate consumption and real balances, the demand for money is proportional to aggregate consumption. Hence, an increase in aggregate consumption raises the demand for the money requiring an appreciation of the nominal exchange rate to restore the money market equilibrium.

The appreciation of the nominal exchange rate and the fact that the prices of nontraded goods are fixed imply that the relative price of nontraded goods in terms of the traded goods rises. This causes a shift in the consumption basket. Households increase the consumption of the traded goods and consume less nontraded goods. The strength of this change depends on the elasticity of substitution between traded and nontraded goods (θ). On the other hand, the domestic interest rate is higher than the world interest rate. As mentioned earlier, Dornbusch (1983) shows that the relevant interest rate for a small two-sector economy is the interest rate stated in terms of the

domestic consumption basket. Because a rise in productivity in the nontraded goods sector allows households to sell nontraded goods at lower prices, the relative price of the traded goods rises in a long run. Thus, one unit of traded goods today has a little purchasing power relative to its purchasing power in the long run. The rising relative price of the traded goods means that the real interest rate in terms of the consumption basket is temporarily high. The high real interest rate causes an intertemporal switch in aggregate consumption whose magnitude depends on the intertemporal elasticity of aggregate consumption (σ). Because $\theta > \sigma$, the consumption of nontraded goods falls and the consumption of traded goods rises. The higher the elasticity of substitution between traded and nontraded goods, the stronger the shift in consumption.

A rise in the consumption of traded goods implies a permanent reduction in net foreign assets. To service the debt, households have to decrease consumption of traded goods in the long run. However, Figure demonstrates that this effect is very weak.

In the case of $\theta < \sigma = 1$, contrary to the previous case, a productivity shock depreciates the nominal exchange rate, generates a current account surplus and decreases both aggregate and nontraded goods consumption in a short run. As in the previous case, a productivity shock in the nontraded goods sector lowers the output of nontraded goods in a short run. Because the demand for money is proportional to aggregate consumption, a fall in aggregate consumption induces an exchange rate depreciation.

Because of the exchange rate depreciation, the relative price of traded goods in terms of nontraded goods rises. This change encourages households to shift consumption away from nontraded to trade goods. On the other hand, the prices of nontraded goods in terms of the consumer-price index are temporarily high. Consequently, the interest rate in terms of the domestic consumption basket is temporality high and households postpone aggregate consumption. Because the intertemporal elasticity of aggregate consumption is greater than the elasticity of substitution between traded and nontraded goods, the consumption of both traded and nontraded goods decreases. In the case of the Leontief utility function ($\theta = 0$), the consumption of traded and nontraded goods decreases by equal quantity. A decrease in consumption of traded goods causes a current account surplus in the short run and households accumulate net foreign assets. The interest income is used to purchase traded goods, so domestic households can increase consumption of traded goods in the new steady state.

In the case when $\theta = \sigma = 1$, the utility function corresponds to the Cobb–Douglas case. Figure illustrates that a productivity shock has no effect at all on the economy in the short run! The intra- and intertemporal effects cancel each other out and consumption does not change. This in turn implies that the demand for money does not change and consequently the nominal exchange rate remains unaffected.

The sign of the current account change depends on the relative magnitude of the intertemporal elasticity of aggregate consumption and the elasticity of substitution between traded and nontraded goods. This result is hardly a surprise. Also Lane (2001b) and Obstfeld and Rogoff (1996, 232–235) have found the same result.

4.2. The Output of Nontraded Goods in the Steady State

As one can see in Figure, a productivity shock has a positive effect on the output of nontraded goods in the steady state. Even though, a productivity shock has a relatively weak effect on output if the elasticity of substitution between traded and

nontraded goods is low. As mentioned by Lane (2001b), net foreign assets have an effect on the consumption level of desired nontraded goods and the optimal labour supply. Since the utility function is non-separable in the consumption of traded and nontraded goods, the consumption level of traded goods has an impact on the desired level of nontraded goods consumption. For example, in the case of the Leontief utility function, the level of desired nontraded goods the consumption is equal to the consumption of traded goods. In this special case, the rise in the consumption of traded good is equal to the rise in the consumption of nontraded goods. If a productivity shock causes a current account deficit, households – due to the negative wealth effect – are willing to supply more labour than in the case where the current account remains in equilibrium. Similarly, if households accumulate net foreign assets, the wealth effect lowers the labour supply when compared with the case of $\theta = \sigma = 1$.

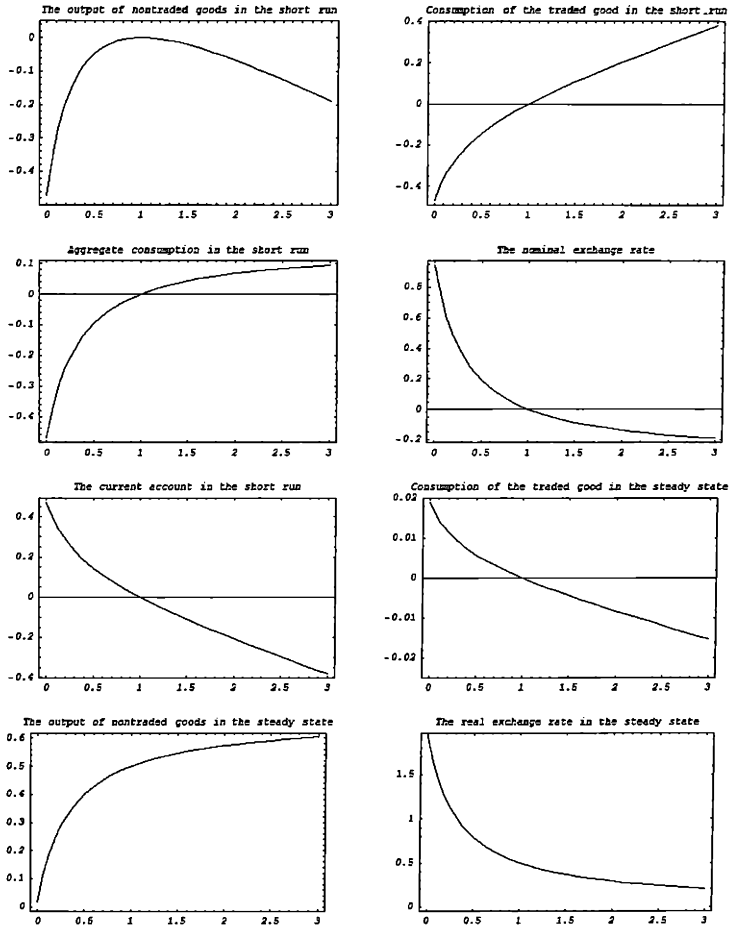
Figure shows that a productivity shock depreciates the real exchange rate. As mentioned earlier, the real exchange rate is the relative price of traded goods in terms of nontraded goods. Because of higher productivity, nontraded goods are sold at lower prices in the new steady state. Thus, the real exchange rate depreciates regardless of whether the nominal exchange rate appreciates or depreciates. This is consistent with the Balassa–Samuelson hypothesis. Hence, households have to produce more nontraded goods in exchange for one unit of traded goods.

Furthermore, a productivity shock in the nontraded goods sector has a positive effect on aggregate consumption in a long run (not shown). Because the impact of a productivity shock on the consumption of traded goods is weak, aggregate consumption follows predominantly the change in nontraded goods consumption. If the elasticity of substitution between traded and nontraded goods is low, aggregate consumption increases only a little. The higher the elasticity of substitution between traded and nontraded goods, the more aggregate consumption increases. For example, if this elasticity is 3, aggregate consumption increases by some 0.3 percent.

5. Conclusions

The paper analyzes the macroeconomic effects of a productivity shock in the nontraded goods sector and gives an interesting insight into the possible effects that the introduction of the services directive or GATS agreement may have on the Lithuanian economy. Based on the results of this model, one could argue that the benefits of the EU services directive or the GATS agreement on the Lithuanian economy, through the increased competition in the nontraded goods sector, will be neither instant nor large. For example, a productivity shock can decrease aggregate consumption in a short run. In addition, it does not have a positive effect on the consumption of nontraded goods in a short run. This result differs from the result of Neaime (2004). In his RBC model, a productivity shock has an instant and strong effect on the output of nontraded goods. In this model, the benefits of a productivity shock come in a long run: a productivity shock increases the consumption of both aggregate and nontraded goods, albeit these effects are small if the elasticity of substitution between traded and nontraded goods is low. In any case, the favourable effects of a productivity shock can be seen as an increase in aggregate consumption. Thus, the services directive and/or the GATS agreement will increase consumption in Lithuania. In addition, many benefits of the services directive and/or the GATS agreement will be a result of increased trade in services. This paper focuses only on the effects of a productivity shock in the nontraded goods sector.

Figure. **The effects of a productivity shock in the nontraded goods sector**



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Summary

This paper analyzes the macroeconomic effects of a productivity shock in the nontraded goods sector using a small open economy model. Since many services are nontraded goods and increasing competition has a positive effect on productivity, the model can be used to analyze the effects of increasing competition in the service sector. The European Union and the World Trade Organization have tried to increase competition and to improve productivity in the service sector. It is hard to imagine that the liberalisation of services would not have a positive effect on the productivity of services. The model may thus be used to analyze the effects of the EU services directive or the GATS agreement on small open economies. Lithuania is a good example of a small open economy. It is integrated into the world economy and a price taker in world markets. Thus, the heading of the paper could equally well be, e.g., "the macroeconomic effects of the EU services directive on the Lithuanian economy". To address the above-mentioned issue, the paper develops a simple dynamic general equilibrium model offering intuitive explanations of how a productivity shock affects a small open economy. The assumption of a non-separable utility function in consumption in traded and nontraded goods is advantageous. In this setup, economic shocks in the nontraded goods sector have consequences on the traded goods sector. Several interesting insights, including the surprisingly pessimistic view of the benefits of productivity shocks, are highlighted. For example, it emerges that a productivity shock in the nontraded goods sector does not have a positive effect on the output of nontraded goods in a short run when the demand is demand-determined and prices are fixed. A productivity shock has, except for one special case, a negative effect on the output of nontraded goods. This result differs from the results of Real Business Cycle models. For example, Neaime (2004) finds that a productivity shock has an instant and strong effect on the output of nontraded goods. In this model, only when the economy reaches a new steady state, the output of nontraded goods increases. A key parameter in explaining the effect of a productivity shock on output is the elasticity of substitution between traded and nontraded goods. If this elasticity is small, an improvement in productivity has a relatively small positive effect on the output of nontraded goods in a long run. The greater the elasticity of substitution between traded and nontraded goods, the higher the increase in the output of nontraded goods. Based on the results of this model, one could argue that the benefits of the EU services directive or the GATS agreement on the Lithuanian economy, through the increased competition in the nontraded goods sector, will be neither instant nor large.

NEPREKINIŲ GĖRYBIŲ SEKTORIAUS PRODUKTYVUMO ŠOKO MAKROEKONOMINIS EFEKTAS

Juha Tervala

Santrauka

Straipsnyje naudojant mažos atviros ekonomikos modelį analizuojamas produktyvumo šoko, kylančio neprekinių gėrybių sektoriuje, makroekonominis poveikis. Toks modelis gali būti naudojamas tiriant didėjančios konkurencijos padarinius paslaugų sektoriuje, nes daug paslaugų yra neprekinės gėrybės, o didėjanti konkurencija pozityviai veikia produktyvumą. Europos Sąjunga ir Pasaulio prekybos organizacija (PPO) bandė padidinti konkurenciją ir pagerinti produktyvumą paslaugų sektoriuje. Sunku įsivaizduoti, kad paslaugų liberalizavimas neturėtų teigiamos įtakos paslaugų produktyvumui. Todėl šis modelis gali būti naudojamas analizuojant ES paslaugų direktyvos arba PPO paslaugų sutarties įtaką mažoms atviroms ekonomikoms. Lietuva yra geras mažos atviros ekonomikos pavyzdys. Lietuva yra integruota į pasaulio ekonomiką ir negali daryti įtakos kainoms pasaulinėje rinkoje. Taigi straipsnio pavadinimas galėtų būti: „ES paslaugų direktyvos makroekonominė įtaka Lietuvos ekonomikai“ Sprendžiant šią problemą, straipsnyje yra formuojamas paprastas dinaminis bendrosios pusiausvyros modelis, leidžiantis intuityviai paaiškinti, kokios įtakos produktyvumo šokas turi mažai atvirai ekonomikai. Prielaida dėl prekinių ar neprekinių gėrybių vartojimo nedalijamos naudingumo funkcijos yra naudinga šiam tyrimui. Tokiu atveju ekonominis šokas, patiriamas neprekinių gėrybių sektoriuje, turi padarinių ir prekinių gėrybių sektoriui. Straipsnyje pateikiamos kelios įdomesnės išvados, tarp kurių yra ir netikėtinai pesimistinis požiūris į produktyvumo šoko naudą. Pavyzdžiui, teigiama, kad produktyvumo šokas neprekinių gėrybių sektoriuje neturi teigiamos įtakos šių prekių kiekiui trumpu laikotapiu, kai paklausa yra determinuota ir kainos nesikeičia. Produktyvumo šokas turi neigiamą poveikį neprekinių gėrybių kiekiui, išskyrus vieną ypatingą atvejį. Ši išvada skiriasi nuo tikrų verslo ciklų modelių teiginių. Pavyzdžiui, Neaime (2004) teigia, kad produktyvumo šokas turi staigų ir stiprų poveikį neprekinių gėrybių kiekiui. Šiame modelyje prekių kiekis padidėja tik tada, kai ekonomika pasiekia naują pastovią būseną. Aiškinant produktyvumo šoko įtaką prekių kiekiui, svarbus prekinių ir neprekinių gėrybių substitucijos elastingumas. Jeigu šis elastingumas yra mažas, tai ilguoju laikotarpiu padidėjęs produktyvumas turi palyginti mažą teigiamą įtaką neprekinių gėrybių kiekiui. Kuo didesnis substitucijos elastingumas, tuo didesnis minėtų gėrybių kiekis. Pagal šio modelio išvadas galima teigti, kad didėjant konkurencijai neprekinių gėrybių sektoriuje, ES paslaugų direktyvos arba PPO paslaugų sutarties nauda Lietuvos ekonomikai bus matoma ne iš karto ir nebus labai didelė.

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