RINGKASAN HASIL PENELITIAN

CAUSALITY RELATION BETWEEN ENVIRONMENTAL TAX REFORM AND DOUBLE DIVIDEND IN THE CZECH REPUBLIC

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ABSTRAK

Untuk meminimalisasi dampak perubahan iklim serta pola konsumsi dan produksi yang tidak berkelanjutan dapat dicapai dengan cara mengimplementasikan sebuah reformasi pajak lingkungan. Mekanisme reformasi pajak lingkungan dilakukan melalui penurunan tingkat pajak yang tinggi terhadap tenaga kerja dan dunia usaha dengan diimbangi penerapan pajak terhadap tindakan pencemaran lingkungan serta pada kegiatan ekstraksi sumber daya alam yang tidak dapat diperbarui. Tujuan dari studi ini adalah untuk menentukan hubungan kausalitas antara reformasi pajak lingkungan dan indikator ekonomi untuk pembangunan berkelanjutan di negara Republik Ceko. Selanjutnya, studi ini juga menganalisis interaksi antara kebijakan lingkungan dan kebijakan fiskal dalam mempengaruhi prospek terjadinya kejadian keuntungan ganda (double dividend). Keuntungan ganda adalah kondisi dimana penerapan pajak lingkungan dapat menghasilkan dua manfaat utama, yaitu: perbaikan kualitas lingkungan dan penurunan biaya di dalam sistem perpajakan. Hasil dari studi ini menunjukkan bahwa dalam kondisi yang relatif netral dan sederhana, kondisi keuntungan ganda tidak ditemukan pada studi kasus di negara Republik Ceko. Hal ini mengindikasikan bahwa pajak lingkungan yang diterapkan masih lebih rendah dibanding jenis pajak lain yang digantikan.

Kata Kunci: *Pembangunan Berkelanjutan, Reformasi Pajak Lingkungan, Double Dividend, Kausalitas.*

ABSTRACT

Minimizing the impact of climate change and unsustainable practices of consumption-production could be achieved by environmental tax reform. Environmental tax reform applied by reducing the high tax burden on human labor and the business sector and raised taxes on pollution and the exhaustion on non-renewable natural resources. The aim of this study is to determine the direction of causality between environmental tax reform and economic indicator for sustainable development in the Czech Republic. Furthermore, this study attempts to analyze the interaction between environmental and fiscal policies that influence the prospects for a double dividend. Double dividend is condition where the environmental tax can produce two main benefits that are an environmental improvement and a decrease in the costs of the tax system. The result in this study shows that under relatively simple and neutral conditions, the double dividend in the case of Czech Republic does not arise. That condition indicates the environmental tax is narrower than the other tax it replaces.

Keywords*: Sustainable Development, Environmental Tax Reform, Double Dividend, Causality.*

INTRODUCTION

This is the fifth years of the division of Europe P2SDR-LIPI to conduct research in the Czech Republic as part of studies about sustainable development in eastern European countries. The previous research topics such as post-velvet environmental movement, adaptation to climate change, renewable energy use and the management of urban forest will be focused on a large frame that is sustainable development. The history of the environmental movement in the Czech Republic which start from the

action statement awareness of environmental degradation into an interesting discussion in the context of the dynamics of regional integration in the European Union. Concur with the euphoria of democratization which occurred in the beginning of the Soviet collapse, many eastern European countries use the environmental pollution issue as a tool to declare freedom from the influence of the socialist regime. Environmental issues become interesting to be studied in the case of the Czech Republic as the country, which prefer to adopt a green economy in order to catch up developmental advancement with the rest European Union member countries.

The Czech Republic's economy has been performed remarkably for almost a quarter of the century since the Velvet Revolution in 1989, from which the totalitarian government and planned economy were overthrown. There has been period of faster and slower development, complicated by the world economic slowdown (recession) in the recent time, but the overall performance of the socioeconomic system has moved closer to the West European model. Over the years, national policies have recognized that economic growth also had harmful side effects. The fossil fuel-based economy, a driver of growth in the past, may also hold back growth in the future.

The previous econometric model to examine the presence of Granger causality on the relationship between environmental taxes and economic growth is still under researched. One of them is studying by Abdullah and Morley (2014) which uses panel dataset from Organization for Economic Co-operation and Development (OECD) and the EU countries from 1995-2006. Abdullah and Morley (2014, 32) found that there is long-run causal effect of GDP and net adjusted savings to environmental taxes. That study provides robust evidence that an expansion of environmentally friendly tax policies will potential to enhance economic growth. Thus, following Abdullah and Morley (2014) this study seeks to examine the impact of environmental tax on the macroeconomic condition. The objective of this study is to investigate the direction of causality between economic indicator of sustainable development and environmental tax reform in the Czech Republic. This study also attempts to analyze the interaction between environmental and fiscal policies which potentially create double dividend. However the difference with the previous study lies on this study is more focusing on causal relation among environmental taxes and sustainable development indicators in the Czech republic. In this study, we proposes that the causality relationship between environmental tax and sustainable development indicator should be followed by a probability of double dividend.

This study uses standard Granger causality tests to examine the presence of causal relation between environmental tax and economic indicator of sustainable development. Variables used in this study are the share of environmental tax to total taxes, share of environmental tax to GDP and adjusted net saving. Adjusted net savings are used as proxy of economic growth. We include variable adjusted net savings (ANS) to indicate genuine saving which measure the economic growth in a sustainable manner. Abdullah and Morley (2014, 29) argued the difference between GDP and ANS is that the former measure the physical capital whereas the latter incorporates the monetary values of physical, human, natural and social capital as well as the stock of knowledge.

Granger causality test model which use in this study are:

$$ANS_t = \alpha + \sum_{j=1}^{k} \beta_j \, Tax_{t-j} + \sum_{j=1}^{k} \gamma_j \, ANS_{t-j} + \mu_{1t} \dots\dots\dots.(1),$$
$$Tax_t = \alpha + \sum_{j=1}^{k} \beta_j \, ANS_{t-j} + \sum_{j=1}^{k} \gamma_j \, Tax_{t-j} + \mu_{1t} \dots\dots\dots(2).$$

The Granger causality occurs if variable *Tax* statistically Granger causes variable *ANS*, then past values of *Tax* contain information that can be helpful in predicting *ANS* above the information contained in past values of *ANS* alone. Here *ANS* is defined as a variable of economic indicator for sustainable development. In this study, we use the Czech Republic adjusted net saving(ANS). The environmental taxes (*Tax*) consist of two variables: the share of environmental tax to total

taxes (*TaxT*) and the share of environmental tax to GDP (*TaxY*). Each of these environmental taxes variables (*TaxT* and *TaxY*) will be tested its causality with ANS separately. Meanwhile, μ_1 μ_1, $\mu_2\mu_2$ are *stochastic error terms*.

The time series data examined in this study are annual, with 12 years and runs from 2001 to 2012. The dataset for environmental tax revenue as a share of the Czech Republic total taxes were taken from Statistical Office of the European Union (Eurostat). Meanwhile, the dataset for adjusted net savings (ANS) is found from the World Bank in the World Development Indicators (WDI). As the ANS dataset is current US Dollar we deflate the data by the Czech Republic annual Consumer Price Index (CPI) using 2005 as a base year. We use computer program Eviews 7.1 to estimate the econometric model of the study.

FINDINGS AND DISCUSSION

Granger Causality Test

The results for the stationary test are presented in Table 1. It shows that all variables contain a unit root or not stationary in level. This condition, suggesting the need to differentiate these variables before testing for Granger causality.

Table 1. Augmented Dickey-Fuller Unit Root Test

Variable	Test for Unit Root in	
	Level	1st Difference
ANS	-0.461713	-3.050881**
TaxY	-0.417099	-5.929141***
TaxT	-0.691155	-4.948928***

Notes: Lag length is determined by the Schwarz Information Criteria. Value in parentheses is the Augmented Dickey-Fuller test statistic.
*** Indicates significance at the 1 % level (one tailed test)
** Indicates significance at the 5 % level (one tailed test)
* *Indicates significance at the 10 % level (one tailed test)*

Table 2 presents the results of Granger causality tests. It shows a unidirectional causality from adjusted net savings (ANS) to the share of environmental tax to total taxes (*TaxT*), with 10 % level of significance. Meanwhile, when both

environmental taxes (share of environmental tax to total taxes (*TaxT*) and share of environmental tax to GDP (*TaxY*)) acting as dependent variable show no evidende of significant causality.

Table 2. Granger Causality Tests

Causality Direction		F-Statistic	Prob.
TaxY	ANS	0.64398	0.5722
TaxT →	ANS	1.09463	0.4177
ANS →	TaxY	4.04167	0.1096
ANS →	TaxT	6.26288*	0.0586

Notes: →
*** Indicates significance at the 1 % level (one tailed test)
** Indicates significance at the 5 % level (one tailed test)
* Indicates significance at the 10 % level (one tailed test)

The results show that Granger causality null hypothesis (H_0) of no Granger cause which lie between the variables is not rejected. There is no causal relation between variables observed except in case when ANS acts as dependent variable and *TaxT* became the independent variable. Thus, it can indicate if there is no evidence of double dividend condition (where the implementation of environmental tax can produce two main benefits that is an environmental improvement and a reduction in the costs of the tax system) in the Czech Republic. Which is shown by there is no bilateral or feedback causality between ANS and environmental tax. But, there is one exception evidence of indirectional causality or one way relation running from ANS to share of environmental tax to total taxes (*TaxT*).

Double Dividend Hyphotesis in The Czech Republic

The essence of the environmental tax approach is to provide incentive or permit for polluters to innovate and invent in the most efficient method which can reduce residual discharge. Through the implementation of environmental tax actually give freedom to the polluters for polluting environment, but of course

accompanied by a fee or charge that must be paid for every unit of residual emitted. Field and Olewiler (2002, 226) argue that the tax approach is making the polluters to find the best way to reduce emissions, rather than having a central authority to determine how it should be done. Moreover, by leaving polluters free to decide how best to reduce emissions, they can use their own energy and creativity, and their desire to minimize cost or to find the least-cost way of reducing emissions (Field and Olewiler 2002, 206). The introduction of environmental tax was required to achieve certain results not only in terms of revenue to the state budget, but also a positive environmental impact, which should be the primary essence of the inclusion of these taxes to the legal order of the Czech Republic (Sobotovicova 2011, 167). The introduction of environmental taxes also increases the yield of value added tax, as the value of these taxes enters into the taxation base.

The question arises, is the extent to which the double dividend is attainable. There is still under debate about the economic outcomes of environmental tax reform. The hypothesis of the double dividend which argue that the cuts in direct income taxation overweigh the burdens of the increase in indirect taxation. So that the implementation of environmental tax reform will not merely improve the environment condition, but also increase employment and economic growth. Bruha and Scasny (2005, 3) argues positive environmental effects are expected to come from changes in relative prices of goods and services, which would force economic agents to switch to more environmentally friendly consumption and production patterns.

On the other side Vojacek and Klusak (2007, 68) argues, if the cut in the direct taxes is not effective enough, the environmental tax reform may have very contrary effects on the economy, including negative impacts on the industrial competitiveness and welfare. Furthermore, if the tax base of the environmental taxation is going to erode, the implementation of environmental tax reform can cause problems of unstable public finance. But, this view is not true, since whenever the price elasticity of a good is between 0 (perfectly inelastic) and -1 (inelastic). The increase of an ad valorem tax rate in case of that would not cause a tax base erode high enough to decrease tax revenues. Bruha and Scasny (2005, 3) states that in the extreme case of price elasticity equal to –1, the two effects (increase of the tax rate and the tax base erosion) exactly cancel out. Moreover, an increase of a tax rate would not diminish revenues even if the price elasticity was -1 because the demand has to be much more elastic to outweigh decrease revenues after an increase of a unit tax rate.

Meanwhile, relates to informal labor markets, because of this sector faces no labor tax, so there is a pre-existing distortion in the economy (labor in the informal sector is under-taxed relative to labor in the formal sector) (Goulder 2013, 55). Thus, the environmental tax can reduce this inefficiency by effectively raising the tax on informal labor and thereby reducing the disparity in taxation between formal and informal labor.

Environmental taxes in the Czech Republic that contain of energy tax, transport tax, and pollution/resource tax are taxes on both forms of labor because it raises the prices of goods purchased. It thereby lowers the real wage to all types of labor which consist of formal and informal labor. By environmental tax reform the revenues from the environmental tax are recycled through cuts in the tax on formal labor, this will be produce the net effect. That is the reduce wedge between relative taxation of formal and informal labor, and then efficiency will improve. Furthermore, if the associated efficiency gain is large enough, the costs of the tax system can be reduced. Moreover, overall employment will be increase.

CONCLUSION

The results from Granger causality tests in this study provide some evidence of an indirectional causality effect from adjusted net savings (ANS) to environmental taxes

(share of environmental tax to total taxes). This result indicates that the implementation of green economic in Czech Republic affecting the proportion of environmental taxes revenue which can be gained by goverment. Hence, the link between sustainable development and environmental taxes policy is important.

This study also show that under relatively simple and neutral conditions, the double dividend in case of Czech Republic does not arise. That condition indicates the revenue-recycling benefit is not enough to offset both the primary cost and the tax interaction effect. It's mean that the environmental tax is narrower than the direct tax and social insurance contribution replaces. Meanwhile, the implementation of environmental tax can reduce inefficiency in the labor market by effectively raising the tax on informal labor and thereby reducing the disparity in taxation between formal and informal labor.

The policy implication of this study suggests that environmental tax and the increase on share of energy from renewable source will probably need to continue in linkage with green economic and sustainable development targets. The evidence in this study suggest that increasing environmental taxes does not appear to have any substantial harmful impact on the economy. Futhermore, adjusted net savings (ANS) is better than GDP per capita to use as an indicator for sustainable development.

In addition, the future research will need to concentrate on measuring the impact from environmental taxes to economic and social society. That can be done by ordinary least square regression. However, it would be interesting to use alternative quantitative methods, such as Computable General Equilibrium (CGE) to make simulation model for analyze the impact of environmental taxes on economic as a whole.

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