II. AKTUALNE TEME

REVENUE-EXPENDITURE NEXUS IN A TRANSITION ECONOMY: EVIDENCE FROM CROATIA

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Abstract

This paper examines the temporal relationship between government revenues and expenditures for the transition economy of Croatia. Government expenditures and revenues are found to be trend stationary with a break in the deterministic trend. Given the relatively short-time horizon, tests of Granger-causality in the context of an unrestricted vector autoregressive model (VAR) using de-trended data are used. The Granger-causality results lend support for the tax-spend hypothesis of the revenue-expenditure nexus.

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1
INTRODUCTION

Understanding the behavior of budget deficits for developed, industrialized and less-developed economies has been an ongoing research agenda for economists. Since the onset of the late 1980s and early 1990s the world economy has experienced a large number of communist and socialist countries undertaking a transition to market-oriented economies. In many of these countries, one of the effects of this market transition has been the growth in the respective countries' budget deficits. Given the lack of well established capital markets to aid in the financing of budget deficits, countries relied upon the monetary authorities to finance deficits via monetization. The predictable outcome of inflationary pressures resulted. Although policies of restricting money supply growth may stifle inflation, gaining control of budget deficits is also required. This paper investigates the relationship between government revenue and expenditure behavior in the context of the prevailing macroeconomic and institutional factors for a transition economy. The transition economy in this case is Croatia, which gained independence in July 1991 in the aftermath of the breakup of the former Yugoslavia. Although researchers have investigated the relationship between government revenues and expenditures for numerous countries with varying levels of economic development, there has been no published research in the case of transition economies.

There are essentially four hypotheses concerning the intertemporal relationship between government revenues and expenditures set forth in the literature. First, in the case of the tax-spend hypothesis, Friedman (1978) argues that raising taxes, thereby to reduce budget deficits only results in increased government expenditures. Thus, if taxes have a positive effect on expenditures then reductions in taxes would in turn reduce government expenditures. Buchanan and Wagner (1977, 1978) argue an alternative view in that raising taxes would decrease government expenditures through fiscal illusion. Within the Buchanan-Wagner framework government expenditures financed by means other than direct taxation result in the public's perception that the price of government expenditures is less than what it would be under direct taxation. Contrary to Friedman's view, Buchanan-Wagner propose that higher taxes will reduce government expenditures.

Second, the spend-tax hypothesis suggests that expenditure decisions are determined first with adjustments in tax policy and revenues

made to meet expenditure demands. Based on the Ricardian equivalence proposition that government borrowing today results in an increased future tax liability, which is fully capitalized by the public, Barro (1978) questions the fiscal illusion advanced by Buchanan-Wagner. Along different lines, Peacock and Wiseman (1979) propose that temporary increases in government expenditures due to "crisis" situations translate into higher permanent taxes. Thus, under the spend-tax hypothesis, reductions in government expenditures would lead to reductions in deficits.

Third, the fiscal synchronization hypothesis argues that revenue and expenditure decisions are made jointly. Musgrave (1966) and Meltzer and Richard (1981) propose that voters compare the marginal benefits and marginal costs of government programs when deciding the appropriate level of government revenues and expenditures. Fourth, the institutional separation hypothesis recognizes that decisions on taxation are independent from the allocation of government expenditures (Wildavsky, 1988, and Baghestani and McNown, 1994). The evidence has been mixed across countries of varying levels of economic development due in part to the use of different methodological approaches and variable selection, as well as variations in lag length selection criteria, temporal aggregation, and time periods.[1] To date, there have been no studies related to transition economies. The task of this paper is to fill this void by examining the revenue-expenditure nexus associated with the Croatian economy.

Section 2 briefly discusses the budgetary process and experience in Croatia. Section 3 describes the data, methodology and empirical results, and provides concluding remarks.

2
THE CROATIAN EXPERIENCE

With the declaration of independence in 1991, Croatia faced a number of economic hurdles. In addition to war with Serbia and Montenegro, the transformation from a socialist self-management system to a market-oriented economy, falling output, and accelerating inflation were some of the economic woes facing this newly independent country. In 1992 and 1993 the Croatian economy was in the midst of a hyperinflation, with an average inflation rate of more than 1,000 percent. Combined with the

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[1] *An extensive overview of the literature has been omitted to conserve journal space. Payne (2003) presents an extensive review of the empirical literature on the tax-spend debate.*

escalation of military expenditures and assistance to war refugees, this placed tremendous pressure on the country's resources. In October 1993, a two-phase stabilization program was instituted.[2] The first phase of the stabilization program was the implementation of anti-inflationary policies with a restrictive monetary policy, liberalization of the foreign exchange market, realignment of public utilities prices to eliminate losses, and wage controls in the public sector. Such anti-inflationary measures have resulted in an average inflation rate between 3 and 4 percent since 1993.

Along with the restrictive monetary policy actions, fiscal policy was tightened by increasing tax revenues and limiting government expenditures in order to decrease the size of the budget deficit. The government broadened the tax base as well as introduced more uniform tax rates on income and corporate profits. The government also introduced excise taxes in order to increase revenues. The sales tax was replaced by a value-added tax (VAT) in 1998 in an attempt to capture previously unrecorded transactions. This first phase of the stabilization program provided a stable macroeconomic foundation for the second and ongoing phase of the stabilization program, which focuses on the acceleration of privatization by restructuring loss-generating public sector enterprises and the banking system, as well as reforming the pension and health care system, and further developing the financial system (Škreb, 1998).

The national budget results from a culmination of the various government ministers submitting an agenda of planned expenditures while the minister of finance submits an agenda on overall planned revenues. The respective planned expenditures and revenues are discussed in parliament to establish the budget for the upcoming fiscal year (coincides with the calendar year). Thus, planned expenditures and revenues are established separately in advance. Moreover, there is some sentiment that the replacement of the sales tax with a value-added tax (VAT) in 1998 has changed the behavior of fiscal authorities.[3] For example, the VAT revenues in 1998 were much higher than earlier expected, and thus the budget for 1998 was revised upwards with respect to revenues and expenditures. Likewise, in 1999, VAT revenues were lower than expected due in part to a recession. Thus, the budget for 1999 was revised downwards.

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[2] *For an excellent detailed description of the stabilization program see Anušić, Rohatinski, and Šonje (1995).*

[3] *These assertions have not been empirically investigated, but are based on informal discussions with economists at research institutes and various government agencies in Croatia.*

3
DATA, METHODOLOGY, AND RESULTS

3.1 Data

The data on government expenditures and revenues were obtained from the Ministry of Finance of the Republic of Croatia and compiled from the database of the Ekonomski institut, Zagreb. The seasonally adjusted data is reported on a monthly basis covering the period January 1994 to December 1999.[4] The temporal relationship between revenues (T_t) and expenditures (G_t) was assessed using both nominal and real magnitudes of the variables and controlling for the possibility of omitted variables by including industrial production (I_t) as well as a dummy variable for the adoption of the VAT. Figure 1 displays the time series plots of revenues, T_t, and expenditures, G_t, in nominal terms.

Figure 1

NOMINAL
GOVERNMENT
REVENUE AND
EXPENDITURES
(Thousands
of Kuna)

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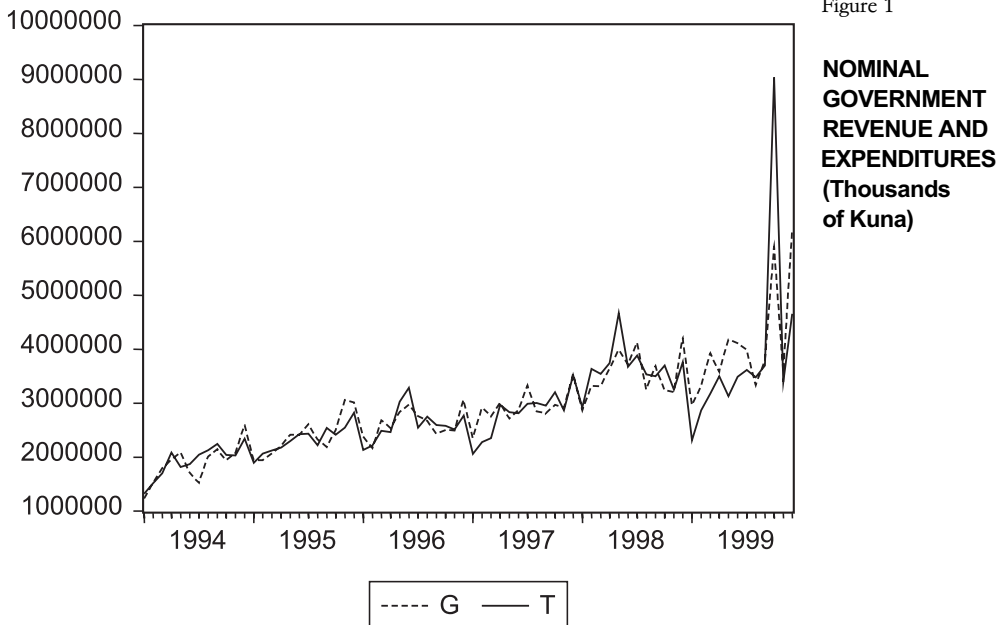
[4] *Given the implementation of the stabilization program, reliable data begins with January 1994.*

3.2   Unit Root Tests

Casual inspection of Figure 1 reveals that both revenues and expenditures increased dramatically in October 1999 when the government initiated a partial privatization of Croatian Telecom with the sale of 35 percent of the company to Deutsche Telecom. The substantial boost to revenues was used to repay outstanding loans and to settle arrears accumulated in the first part of the year, which explains the corresponding jump in expenditures. In light of this jump in both revenues and expenditures, we examine the presence of unit roots with a one-time pulse using Perron's structural change specification as follows:

(1) $$y_t = \alpha_0 + \alpha_1 t + \alpha_2 D9910 + \alpha_3 y_{t-1} + \sum_{i=1}^{n} \beta_i \Delta y_{t-i} + \varepsilon_t$$

where y_t is the respective time series; t is a linear time trend; $D9910$ is a dummy variable equal to 1.0 for 1999:10 and 0.0 otherwise; Δ is the first-difference operator; and ε_t denotes the error process with zero mean and constant variance. Equation (1) allows for a one-time change in the intercept of the trend function. The null hypothesis is that the time series is nonstationary, $\alpha_3 = 1$, against the alternative hypothesis that the time series is stationary, $\alpha_3 < 1$. Table 1 displays the results of the Perron test.[5] The critical values are based on $\lambda = .9$ from Table IV.B of Perron (1989, p. 1376). The revenue and expenditure data, recognizing the one-time jump due to the privatization of the telecommunications firm, are trend stationary in levels. With respect to industrial production, augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests with a time trend reveal it to be trend stationary. Specifically, in the case of industrial production, the ADF test statistic was -3.8665 and the PP test statistic was -5.5753 implying significance at the 5 and 1 percent levels, respectively.

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[5] *Perron unit root tests of the variables in real terms yielded the same conclusions. Results are available upon request.*

Table 1

PERRON UNIT ROOT TESTS AND VAR MODEL (NOMINAL VALUES)

Variable	α_0	α_1	α_2	α_3	λ	k
T_t	9.075 $(3.95)^a$	.0061 $(3.36)^a$	.8912 $(10.20)^a$	.3720 $(-3.93)^b$	.97	7
G_t	10.501 $(5.14)^a$	.0080 $(4.45)^a$	.4650 $(5.02)^a$	.2731 $(-5.12)^a$	.97	1

Notes: λ is the proportion of observations occurring before the structural change. k denotes the lag length of the augmented terms in the Perron unit root test. The appropriate t-statistics are in parentheses. For α_0, α_1, and α_2 the null hypothesis is that the coefficient is equal to zero. For α_3, the null hypothesis is $\alpha_3 = 1$. The above unit root tests were free of serial correlation based on the Lagrange multiplier test, χ^2_{12}. Critical values for $\alpha_3 = 1$ is based on $\lambda = .9$ (Table IV.B, Perron, 1989, p. 1376,): a (1%) -4.27, b (5%) -3.69, and c (10%) -3.38.

3.3 Unrestricted VAR and Granger-Causality

Given that the various time series are integrated of order zero, specifically trend stationary, an unrestricted vector autoregressive (VAR) model using de-trended data is employed to examine the temporal relationship between revenues and expenditures via Granger-causality tests. The government expenditure and revenue series were de-trended incorporating the October 1999 dummy variable for the privatization of Croatian Telecom. The four hypotheses tested are as follows: (1) tax-spend hypothesis (unidirectional Granger-causality from T_t to G_t); (2) spend-tax hypothesis (unidirectional Granger-causality from G_t to T_t); (3) fiscal synchronization hypothesis (bidirectional Granger-causality between T_t and G_t); and (4) institutional separation hypothesis (absence of Granger-causality between T_t and G_t). We begin with the following VAR model:

$$T_t = \alpha_0 + \alpha_1 D98 + \sum_{i=1}^{n} \alpha_{2i} T_{t-i} + \sum_{i=1}^{n} \alpha_{3i} G_{t-i} + \sum_{i=1}^{n} \alpha_{4i} I_{t-i} + \varepsilon_{1t} \qquad (2a)$$

$$G_t = \beta_0 + \beta_1 D98 + \sum_{i=1}^{n} \beta_{2i} T_{t-i} + \sum_{i=1}^{n} \beta_{3i} G_{t-i} + \sum_{i=1}^{n} \beta_{4i} I_{t-i} + \varepsilon_{2t} \qquad (2b)$$

$$I_t = \gamma_0 + \gamma_1 D98 + \sum_{i=1}^{n} \gamma_{2i} T_{t-i} + \sum_{i=1}^{n} \gamma_{3i} G_{t-i} + \sum_{i=1}^{n} \gamma_{4i} I_{t-i} + \varepsilon_{3t} \qquad (2c)$$

where $D98$ is a dummy variable for the value-added tax equal to 0.0 for the period 1994:01 to 1997:12 and 1.0 for the period 1998:01 to 1999:12; and ε_{1t}, ε_{2t}, and ε_{3t} are the respective error terms with zero mean and constant variance. Based on Akaike's information criterion one lag yielded error terms free of serial correlation and heteroscedasticity.[6] From equation (2a) the null hypothesis that G_t does not Granger cause T_t is rejected if the coefficients α_{3i} are jointly significant. Likewise from equation (2b) the null hypothesis that T_t does not Granger cause G_t is rejected if the coefficients β_{2i} are jointly significant. Table 2 displays the results from the VAR model.

Table 2

VAR MODEL

Dependent Variable	Independent Variable				
T_t	C	D98	T_{t-1}	G_{t-1}	I_{t-1}
	.0014 (.906)	.0040 (.849)	.5115 (.000)[a]	-.0009 (.995)	.2151 (.463)
	R^2= .305	F = 7.23 (.000) [a]	Q(12) = 14.83 (.251)	HET = 10.57 (.158)	ARCH(1) = .004 (.945)
G_t	.0055 (.662)	-.0042 (.849)	.2610 (.050)[b]	.1259 (.367)	-.4583 (.138)
	R^2= .127	F = 2.41 (.057) [c]	Q(12) = 1.70 (.999)	HET = 4.33 (.741)	ARCH(1) = 1.91 (.167)
I_t	.0004 (.939)	-.0011 (.897)	.0685 (.205)	-.0648 (.245)	.3168 (.011)[b]
	R^2= .145	F = 2.81 (.032) [b]	Q(12) = 11.88 (.455)	HET = 4.66 (.701)	ARCH(1) = .411 (.522)

Notes: R^2 is the coefficient of determination. F denotes the overall F-statistic. Q(12) is the Ljung-Box Q test for serial correlation distributed as χ^2_{12}. HET is White's test for heteroscedasticity distributed as χ^2_4. ARCH(1) is a test of autoregressive conditional heteroscedasticity in the residuals at one lag distributed as χ^2_1. Significance levels: a (1%), b (5%), and c (10%).

Tax revenues appear to be autoregressive, with government expenditures and industrial production having no statistically significant impact on revenues. Government expenditures appear to be positively influenced by revenues at the 5 percent significance level, while neither past

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[6] Schwarz as well as Hannan-Quinn information criterions also selected a lag length of one. Granger-causality results in real terms yielded the same conclusions. Results are available upon request.

government expenditures nor industrial production have any significant influence on current government expenditures. It appears that the tax-spend hypothesis advanced by Friedman (1978) is supported in this case. Friedman argues that raising tax revenues to reduce budget deficits is futile since additional revenues result in higher government expenditures. Finally, industrial production appears to be autoregressive, with revenues and expenditures having no significant impact on industrial production. The assertion that the introduction of the value-added tax in January 1998 altered the behavior of fiscal authorities is not borne out. The dummy variable, D98, was statistically insignificant across all three equations.

These results seem to support the tax-spend hypothesis advanced by Friedman (1978) in that increases in tax revenues do not lead to deficit reduction, but higher government expenditures. Moreover, the results indirectly demonstrate why transition economies have poor access to capital markets. Indeed, investors perhaps realize that any additional revenues will more than likely be allocated to current public spending needs rather than to debt reduction. Thus, assuming tax bases exist or can be developed, a priority for the governments of transition countries should be on tax reform to effectively raise revenues.

However, as more data become available, particularly reliable GDP data and more time with the VAT as a major source of revenue, a reexamination of the revenue-expenditure nexus may yield different results. An avenue for further research is an examination of the revenue-expenditure nexus for all transition economies, highlighting the differences in tax structure across these countries and the institutional frameworks of their budgeting processes.

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Veza između proračunskih prihoda i rashoda u tranzicijskom gospodarstvu: slučaj Hrvatske

Sažetak

U ovom se radu analizira veza između prihoda i rashoda središnje države u slučaju tranzicijskog gospodarstva Hrvatske. Utvrđuje se da je trend prihoda i rashoda stacionaran s lomom u determinističkom trendu. Zbog relativno kratkih vremenskih nizova, na detrendiranim su podacima primijenjeni testovi Grangerove uzročnosti u okviru modela vektorske autoregresije (VAR) bez ograničenja. Rezultati Grangerovih testova potvrđuju hipotezu da je povećanje prihoda uzrokovalo povećanje rashoda.