

## Fiscal Decentralization and Revenue Stability in the Kyrgyz Republic, 1993-2010

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### **Abstract**

*This study examines whether the policies of fiscal decentralization in the Kyrgyz Republic (1993-2010) had any effect on revenue stability at the national level. We find reasonable evidence of revenue volatility at the national level due to instabilities in subnational revenues. In terms of tax buoyancy measures, the revenues at the national level have to grow faster to compensate for the decreasing size of revenues at the subnational level. As to the measures of tax elasticity, we find that the income tax base, and VAT to a lesser extent, grew much less rapidly than the indicator for economic activity. As a result, revenue adequacy has suffered in the Kyrgyz Republic both at national and subnational levels.*

**Keywords:** Fiscal decentralization, devolution, revenue stability, tax buoyancy, tax elasticity, tax volatility

**JEL Code Classifications:** H20, H71, H77

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## 1. Introduction

In this paper, we examine whether the policies of fiscal decentralization in the Kyrgyz Republic had any effect on revenue stability at the national level. We do so by utilizing national and subnational level revenue indicators for a number of tax sources between 1993 and 2010. These data are obtained from the International Monetary Fund Government Statistics information base, the World Bank data base on national accounts, and the national tax yield reports of the State Committee on Taxes and Tax Collection of the Kyrgyz Republic. After a review of the legal background and policies of fiscal decentralization in Kyrgyzstan, we measure how delegation of revenue yielding authority to local levels impacts, if at all, the national revenue stability.

As a test for national revenue stability, we survey tax buoyancy, revenue elasticity, and revenue volatility in the Kyrgyz Republic. First, we estimate three sets of models for revenue buoyancy – national level revenues, for subnational revenues, and for national less subnational revenues. Second, we estimate the measure of revenue elasticity. Due to the lack of data on local incomes as well as lack of information on the size of tax base for business incomes both at national and subnational levels, and due to the lack of data on tax bases for the selective set of excise taxes, we only estimate a model with gross national income (GNI) figures for the national level. In the model for tax elasticity we control for two major statutory changes with regards to revenue decentralization. Third, we estimate the measures of tax stability of the overall national revenue system with and without local taxes. We also survey the impact of subnational income and VAT taxes on similar national revenue sources. It would have also been adequate to study the effects of local property taxes on national revenue system; however, data for this revenue instrument are only available for 2004-2006 and do not allow any statistical analysis. Yet, in this third component, i.e. in our estimated measures of tax stability, we are looking for signs of volatility in national revenue shift rates due to local revenue fluctuations.

Briefly, we do find some evidence of revenue volatility at the national level due to fluctuations in subnational revenues. Thus, an overall stability of national revenue system appears to be affected by greater instability at the subnational level. In terms of tax buoyancy measures, there is also some evidence that suggests that because the measure of local tax buoyancy is small or negative, the taxes at the national level have to grow faster to compensate for the revenue decreases at the local levels. Thus, a less reliable tax collection of subnational revenues seems to be adding to revenue instability at the central level. As to the measure of tax elasticity, we find that the income tax base, and to a lesser extent the VAT base, grew much less rapidly than the indicator for economic activity in the country. We also find that our two binary variables representing statutory changes are not significant in any manner. In light of this evidence, we ought to conclude that these statutory changes had no effect on tax elasticity.

## 2. Literature Review

The phenomenon of fiscal decentralization has firmly arrived as an alternative to failing central government institutions in the ex-Communist bloc and the developing world. The logic behind fiscal decentralization is that the lower levels of government may most efficiently use the resources by tailoring their services to variations in local needs, thus eliminating unnecessary waste and administrative costs of a centralized approach. In similar logic, Bahl and Wallace (2005: 84) cite Oates' decentralization theorem "[...] in the absence of cost savings from a centralized provision of a [local public] good and of interjurisdictional externalities, the level of welfare will always be at least as high (and typically higher) if Pareto-efficient levels of consumption are provided in each jurisdiction than if any single, uniform level of consumption is maintained across all jurisdictions." Therefore, interjurisdictional differences may require varying approaches that are more readily and clearly detected from a local perspective. These authors further argue that more savings may be generated due to two additional reasons: 1) the local populations may choose the set of services that they desire and are actually willing to pay for; 2) local governments may have a comparative advantage in assessing the tax base, ability to pay, and collecting taxes, thus "[...] overall revenue mobilization might be increased by decentralizing certain taxing powers" (Bahl and Wallace, 2005: 84).

Moreover, Meloche et al. (2004: 2) concur by adding that "An efficient allocation of local public services means that subnational governments provide services up to the point at which the value placed at the last unit of services for which citizens are willing to pay is just equal to its benefits. This implies that the subnational governments must be free to levy 'own-source' revenues to match citizens' preferences on expenditures." Consequently, the assertion above also points at possible effects of revenue decentralization on efficiency at the margin. However, Meloche et al. (2004) suggest that there is no conclusive evidence to fully support their assertion. Yet, at least in theoretical terms, Oatesian approach needs to be tested further to make any persuasive conclusions. The problems of inefficiency may arise not because of implausible theorization, but rather because of faulty implementation of the process of fiscal devolution.

In the context of the Kyrgyz Republic fiscal decentralization may in fact be an optimal decision if we want the decentralization efforts in other realms to be successful as well. In an environment that is undergoing a political and economic transition from a fully command-and-control state and market to a more liberal form of societal management, off-loading the public service provision to lower levels without sharing the resources to fund them would be somewhat hypocritical. Mikesell (2007: 42) accurately states that "What is clear is that effective decentralized service provision requires revenue decentralization. Giving decentralized governments a degree of revenue autonomy allows them to be more responsive to their citizens because that lets them adjust the size of their budgets,

not just allocated transferred funds, and established how the costs of service will be distributed.”

However, there are downsides associated with fiscal decentralization that we must keep in mind. Central administration has advantages of economies of scale. For smaller and/or poorer countries decentralization could well turn out to be rather costly. Fiscal decentralization may fail due to inexperience and lack of cadre at the subnational level (Shah, 2004; 2005; Crandall and Bodin, 2005; Kimr, 2008; de Mello, 2001; Gray et al., 2007; Helling et al., 2005; Shoup et al., 1937). In not-so-democratic states, paradoxically labeled ‘illiberal democracies’ or in strictly authoritarian regimes, fiscal decentralization may increase corruption and outright theft at the local levels, thus further spreading the roots of inefficiency to every corner of the society. Bahl and Wallace (2005) caution us that efficiencies from fiscal decentralization may not be realized under inhospitable environments, i.e. when the assumptions for efficiency in service delivery do not hold. These assumptions are that in the absence of competitive elections and transparent decision making mechanisms at national but also at local levels there is hardly any difference in choosing one or the other level of revenue administration. When there are information asymmetries concerning bids for services, decentralization cannot generate savings from individualized tailoring of service provision.

Another limitation that is specified is that effective service delivery is a function of administrative capacity at local levels. The problems of availability of skills and economies of scale that may accompany revenue devolution are obvious; but sheer geographic distances and/or misbalances of distribution of wealth may further hinder administrative abilities. One final caution is that of legal nature, “[...] i.e. the local governments may not have been assigned the ‘right’ expenditure responsibilities or adequate taxing powers” (Bahl and Wallace, 2005: 85). There could also be a discord between the responsibilities assigned to different levels of government, or disagreements as to who should pay for the services and what the size of the government ought to be.

Furthermore, Ebel and Taliercio (2005: 12-13) establish that not all revenue decentralization is justified. Before undertaking any revenue devolution we need to recognize that national and subnational governments may have different fiscal functions. Only after such careful consideration should we spend efforts on estimating efficiencies associated with delegation of tax authority. Three major functions appear to be paramount national responsibilities, all three dealing with macro policy: international trade policy, insurance, and stabilization. The first one deals with managing external trade and foreign cash reserves, as these are central to monetary policy. Thus, taxing trade is a macro/central government responsibility. The second function deals with insuring the state from external and internal disturbances by using the fiscal and monetary policy tools, either to redistribute wealth or assume risks stemming from revenue source volatility. The third and perhaps the most important function of the central government is

stabilization policy. “The central government must have access to debt and revenue instruments that serve as effective tools for fiscal policy. For tax assignment, that argues for central assignment of broad based taxes on consumption (value added tax) and income (personal income taxes, broad-based business receipts, and profits levies)” (Ebel and Taliercio, 2005: 13). Consequently, to continue this line of thought, when the central government shares revenue collection authority from these influential tax tools, there are concerns over stability of the national and subnational revenue systems. Thus, revenue adequacy may be jeopardized, and the costs associated with greater instability in the revenue system (hence, stabilization policy) may far outweigh the benefits obtained from efficiencies achieved by revenue decentralization.

In addition, Webb (2004: 2) argues that by assigning fiscal responsibility to lower levels we run the risk of creating subnational governments that pursue unsustainable fiscal policies. Arguably, since the local governments are not responsible for macro-level policy they may quickly deplete certain tax bases, get into debt, and misappropriate the transferred revenues. Thus, the Latin American experience appears to suggest that the major task in achieving efficient revenue devolution projects is to motivate fiscal sustainability among subnational units of government. Two conditions may indeed generate inefficient outcomes – i) when local governments perceive that they will be bailed out by national government (moral hazard); and ii) subnational governments may choose not to reveal certain characteristics about their revenue bases (adverse selection). To illustrate the point, an example from Brazil is in order: “The non-cooperative outcomes in representation and revenue sharing set the stage for non-cooperation in fiscal prudence to protect macroeconomic stability, especially because mainly the large rich states had access to credit markets and thus the opportunity for serious fiscal imprudence” (Webb, 2004: 6). Consequently, one possible danger is that fiscal imprudence at subnational levels may generate instability at the national level by increasing budget deficits, thus, further increasing debt. Given the size of foreign debt and infrequent defaults on them, Latin American governments may need to keep an eye on such potential dangers.

Then, the major step is to classify the revenues by government function and responsibility. After that, if and when the decision is made to decentralize revenue administration and policy, under normal conditions there does not seem to be any difference as to whom actually gets to collect the taxes as long as the funds find their way back to where they were initially assigned to be. A survey of international practice suggests that “[...] taxes available to a government might not be administered by the government that levies them. When given the option, some subnational governments will administer their own taxes and others will choose administration by others. There is no necessary reason why the government that levies a tax should administer it, but neither is there any necessary reason why it should not” (Mikesell, 2007: 42). As a result, it does not matter who collects the

money, but it is important how, when, on what, and by whom the revenues get to be spent.

For example, Albania appears to rely on a system of unified tax collection method and also unconditional intergovernmental transfers. Tax collection efforts are centralized for both national and subnational taxes, and the funds collected are then redistributed. First, the locality specific revenues are returned to the region of origin and additional national funds are transferred to lower level governments by a transparent formula. What is important is that the local governments in Albania have revenue-raising powers; they just do not necessarily collect the taxes themselves. Schroeder believes that since these new rules were introduced in 2002, it is still too early to make any grand conclusions about efficiencies involved (Schroeder, 2007: 54). The Peruvian example also seems to have ventured out into the same type of revenue administration system as Albania. However, as Ahmad and Garcia-Escribano (2006: 11) suggest fiscal decentralization in Peru needs more fine-tuning for efficiencies to take place – own-source revenue accountability mechanisms need to be introduced, subnational responsibilities need to be clarified, and the design of intergovernmental transfers should address more forcefully the regional disparities.

We have so far purposefully avoided discussing the revenues obtained from natural resources. Yet, many countries rely on them to balance their expenditure budgets. At the same time, windfall revenues have been found to have a negative relationship with the extent of revenue decentralization in resource rich states. Freinkman and Plekhanov (2005: 18) discover in the case of the Russian Federation that availability of windfall revenues explains centralization of revenue policy but also leads to a more centralized overarching political structure. Windfall revenues can be large in the Kyrgyz Republic. However, compared to its neighbors, with an exception of perhaps Tajikistan, Kyrgyzstan is not well-endowed in 'easily' extractable natural resources, especially gas and oil, which the neighboring autocratic regimes have been blooming on. For the Kyrgyz Republic, a lack of hydrocarbons appears to be both a blessing and a curse (though some argue that having resources is more of a curse than a blessing, save for Norwegians). As a result, Kyrgyzstan is said to have been slightly more liberal than its neighbors and has undertaken on fiscal decentralization schemes as a medication pill 'prescribed' by the World Bank in return for funds. Thus, given the uncertainty of any major-scale sources of windfall revenues, we will limit the discussion of mineral resource revenues to this paragraph only.

### **3. Revenue Policy/Administration and Fiscal Decentralization in the Kyrgyz Republic**

The legal basis for fiscal policy and administration in the Kyrgyz Republic is still in the process of formation. The Bakiev government, that has won the power after large-scale civil disobedience and revolt in 2005, has drafted new laws on

budgetary regulations and revenue policy, which was aided by the Asian Development Bank<sup>1</sup>. It would not be surprising to see the current “new” government in the country to attempt re-writing the laws once again. For Kyrgyzstan, the period of initial independence from the USSR coincided with full economic and fiscal (some might even add physical) collapse of state institutions. The final split of fiscal affairs of the country from the Russian Federation occurred in 1993, with introduction of new monetary policy (new currency and the governing institutions such as a Central Bank) and fiscal policy identifying the legal framework for such independence. For the period we study in this paper (i.e., 1993-2010), the laws that governed fiscal affairs in the Kyrgyz Republic were generally introduced in 1996 and 1998. The latter law refers to the Law on “Basic Principles of Budgetary Administration in the Kyrgyz Republic, 1998”, which generally governed budgetary responsibilities between levels of government and across government institutions at each level. Therefore, this law dealt with the budgetary side of fiscal policy and is of smaller interest for this paper.

Revenue policy and administration were governed by the former law, which is the “Tax Code of the Kyrgyz Republic” adopted in 1996. At the national level this law established broad tax categories; i.e. identified the available range of tax instruments in the tax portfolio – i) individual income taxes, ii) business income taxes, iii) VAT, and iv) various excise taxes. These four categories of taxes were administered by the State Committee on Tax and Tax Collection, a semi-independent agency under the Ministry of Finance. However, due to the evolving nature of revenue administration agencies, but also the overall state institutions in the country at all levels, there have been numerous amendments to the tax code as well as interpretations, instructions, temporary and semi-temporary orders, decrees and normative acts. As of April 2008, for example, the State Committee on Tax and Tax Collection listed fifty-nine such legal documents just for the national level (SCTTC, 2008a). Finally, at the national level the state collects import duties, which are administered by the Customs Service of the Kyrgyz Republic and are governed by a separate law. The most important relation of the Tax Code to the Customs Service, however, is that the products for export are taxed on a zero-rated VAT method, except products and services that are subject to certain excise taxes.

Individual income taxes are administered on a taxpayer-passive approach. All of the entities that have employees for hire are required to collect these taxes and pass on to revenue collection authorities. This necessitates and assumes that all of the employers are legally registered entities in the country. The tax has a variable rate and is set up to be progressive, with the highest marginal rate of 32%. As of 2006, before the turbulent years of Bakiev rule, this tax instrument produced about 7.3% of all national revenues. Throughout 1993-2006, the years generally referred to as ‘fiscally stable years’, revenues generated by individual income taxes did not

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<sup>1</sup> For example, in May 2007 ADB has proposed to fund a grant for reforms and modernization in tax administration. A new Tax Code was adopted in 2008.

exceed 2% of GDP and generally were closer to 1%. Again, in 2006, this source has withdrawn 1.1% from national GDP. Business income taxes are collected on a flat 10% rate basis from all businesses with “economic activities” in the Kyrgyz Republic. The tax applies on profits, i.e. earnings less costs identified in the tax code. One interesting fact is that business income tax also applies on individual incomes earned at a “non-major employment positions”, i.e. individuals get to choose their ‘first-employer’ and pay individual income taxes according to relevant marginal rates, and choose a ‘second-employer’ and pay a 10% tax on these earnings as business income. Business income taxes constituted 6% of total national revenues in 2006. In early 90s this tax instrument has been withdrawing up to 4% of GDP from the economy but fell to below a percent in 2006. The trends beyond 2006, especially during the years of economic turmoil, 2007-2010, were generally unchanged, according to our revenue collection data.

The most productive tax in the Kyrgyz Republic is the value added tax (VAT). A 20% VAT applies to purchase of products and services, and all entities engages in “economic activities” passing a threshold of 2,500 soms (70 USD; as of January 1, 2006 exchange rates) should register as tax collectors. By 2010, the VAT produced 59% of total tax revenues and it put an 8.5% burden on GDP during the same year. However, the VAT to GDP ratio tends to fluctuate, and on average from 1993 to 2010 the rate was about 6.0%. Excise taxes are collected on a variety of products identified in the Tax Code. The rates for each excise are set annually by the parliament. This tax instrument yielded about 6.4% of total revenues by 2010; however, on average it fluctuates at about 1.6% of current GDP. Excises are collected on domestic consumption and are not waved for exports either<sup>2</sup>. Finally, there is a catch-all tax category labeled Other Taxes, which is a combination of taxes on road usage, taxes for emergency relief, and many others. When combined, however, these taxes traditionally added up to a sizable share of the total budget – about 7% of total tax revenues throughout 1993-2005, but fell to below 1% in later years. On average, these tax sources extracted about 2.2% of GDP from the economy, which is double the size of the burden generated by individual income or business taxes.

To summarize, the Kyrgyz Republic makes use of all the potential tax instruments generally considered conventional at a national level. Nevertheless, while the tax portfolio may be diverse, it appears to underutilize the individual income tax to a great extent. On the other hand, the state overburdens the VAT instrument. A better balance between these two instruments is needed to introduce more stability but also predictability into the tax system. In terms of per capita tax burden, on average from 1993 to 2010 the state collected 2,613 soms (about 73 USD), while the mean GDP per capita during the same period was 18,770 soms

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<sup>2</sup> Kyrgyz Republic is a large participant in Central Asia in producing and exporting tobacco and alcohol products.



(about 521 USD). Thus, the average ratio of the burden is estimated to be 0.14 or 14%.

Decentralization in the Kyrgyz Republic started in 1991 with devolution of self-governing functions onto the regional levels. In terms of fiscal decentralization, the various localities introduced their own taxes and fees and were responsible for their budgets without direct accountability to the national government. However, this de-facto feudalization of the state brought to a comical situation when all transports passing via a locality had to pay some sort of a 'passage fee' or products transited through a locality would have to pay a local tax for the right to be transported through and leave the territory. Therefore, in order to clean up the chaos, the parliament introduced the Law on "Local Taxes and Fees" in 1994. This law has later been reorganized to become section VIII of the Tax Code of 1996, hereinafter Section VIII. Thus, the Tax Code of 1996 has put order but also limits on what was devolved to local governments.

Section VIII, identifies the range of possible "[...] local taxes, caps for tax rates, exemptions on taxes for certain segments of the populations, full prohibition of any additional exemptions, tax bases of local taxes, tax payment schedules, auditing and accounting standards, and liabilities for tax evasion" (Tyulendieva, 2005). However, this newly reorganized law improved neither the national revenue yield nor the local capacity for self-government. There were no municipal level tax administration agencies in place and the old institutional arrangements were not dismantled either. The national tax inspectorate was still collecting the taxes at national, oblast' (province) and rayon (district) levels. The responsibility to provide services and initiate local taxes was given to sub-district levels. Thus, without a clear mechanism of actually being able to distinguish where and why the money was coming from, the district and tax authorities kept most of the money to themselves at their respective levels ('fly-paper' effect). Consequently, with no easy way of getting their money back, the municipal governments were not really very keen on enforcing local tax compliance and the yields kept decreasing during the period under survey.

Moreover, the tax collection complication stems from the fact that the liability of government service provision fell not on the municipal self-governing bodies but on district and provincial governments, which explains the easy approach on the part of municipal governments. In fact, if funds were short at the municipal level, the expenses would be covered from the district budgets. This discrepancy between the rights and responsibilities certainly caused many failures in the local fiscal administration efforts. This shortfall has arguably been corrected in 2000 by an Executive Government Order on "Restructuring the Local Self-governing institutions", whereby 40% of civil servants in the tax inspectorates have been re-assigned to work for the lower level governments (Tyulendieva, 2005). However, the results of such a reform have yet to be analyzed; and due to unavailability of local data it is not possible within the framework of this paper either.

Subnational individual income taxes are also administered on a taxpayer-passive approach. This tax is collected by central tax authorities and ideally is remitted back to localities where the tax was collected. As of 2010, this tax instrument produced about 23% of total local revenues. Throughout 1995-2001, revenues generated by local individual income taxes did not exceed 1% of GDP and on average were closer to 0.6%. In later years, this source has withdrawn about 1.1% from national GDP. Subnational VAT is also collected by central tax authorities and then is remitted back to localities where the tax collecting businesses are located. By 2010, this tax instrument generated slightly less than 36% of total local revenues. In terms of burden on the economy, on average, local VAT revenues withdrew 2.2%.

Finally, one very important tax instrument for local governments is the property tax. The property taxes were introduced in the tax code of 1996 as an instrument reserved for local governments. However, since there was no national property tax to piggy-back the local tax on, each locality had to collect its own revenues. This perhaps is a confirmation that "When the central government receives no revenue from administration of a tax, that tax is likely to receive less attention than is given to taxes yielding revenue for the central government" (Mikesell, 2007: 68). Given a full discretion over property taxes and perhaps lack of interest on the national level to collect the property taxes for the local governments, there appears to be no reliable aggregate figures for property taxes for most of the fiscal years<sup>3</sup>. As a result, property tax revenue data are only available for three years: 2004, 2005, and 2006. This limited data suggests that property taxes accounted for 15% of total revenues at the local level in 2006, which is about one half percent of GDP.

## 4. Methodology

### 4.1. Data

In order to conduct our analysis, we will use three sources of data: i) The major data set to be used is the International Monetary Fund (IMF) government statistics information base (IMF, 1999, ..., 2010). This is the most comprehensive source, which identifies both local and national distribution of tax revenues. However, there is no possibility to delineate the local tax sources by region. ii) The second source is the World Bank (WB) on-line database on national accounts (WB, 2011). Here we obtained aggregate numbers for state revenues and expenditures, as well as macro-indicators such as GDP, population size, and exchange rates. iii) The third source is the data from the State Committee on Taxes and Tax Collection of the Kyrgyz Republic (SCTTC, 2008b). This source was used to clarify some of the ambiguities that arose from comparison of IMF and WB data, but also to fill in the holes for observations of several revenue sources in 2002 and 2003. All current

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<sup>3</sup> Another plausible explanation for the lack of data on property taxes is that perhaps these revenues were not collected at all due to the lack of core functions of tax administration at the local levels. Incompetence may also have been the case.

monetary measures from these three sources have been converted to constant figures (2010 = 100). None of the data sources given above appear to possess any meaningful breakdown of relevant subnational revenue indicators. With this limitation in mind, we proceed with estimating the models.

#### 4.2. Methods

Three sets of models for revenue buoyancy are estimated: for national level revenues, for subnational revenues, and for national less subnational revenues. The log-log model equation is:

$$\log(\text{revenue}_i) = \beta_0 + \beta_1 \log(\text{GDP}) + \varepsilon_i \quad (1)$$

The above equation is estimated using the deflated GDP figures. To test whether the findings hold we re-estimated buoyancy models by adjusting for population size, i.e. using GDP per capita.

Next we estimated the measures of revenue elasticity. We estimated a model with gross national income (GNI) figures for the national level. We control for an introduction of the 1996 tax code with subnational provisions in Section VIII, as well as reorganization of tax collection workforce in 2000. The effects of these statutory changes are assumed to occur the following fiscal year. Accordingly, the log-log model is:

$$\log(\text{GNI}_i) = \beta_0 + \beta_1 \log(\text{GDP}) + \beta_2 \text{TxCd}_{96} + \beta_3 \text{TxInsp}_{00} + \varepsilon_i \quad (2)$$

The same model has been re-estimated by substituting GDP by GDP per capita to account for changes in the population size.

Finally, we estimated the measures of tax stability of the overall national revenue system with and without local taxes. We have also surveyed the impact of subnational income and VAT taxes on national revenue stability. It would also be adequate to study the effects of local property taxes on national revenue system; however, data for this indicator are only available for 2004-2006 and are not enough to perform any meaningful analysis. The equation for the relevant test statistic is:

$$SD_R = \sqrt{\sum_{t=1}^T (R_t - \bar{R})^2 / (T - 1)} \quad (3)$$

Therefore, according to the equation provided above, the tax stability measure employed here is the standard deviation of year-to-year percentage change in national total tax revenues, income tax revenues, and VAT revenues, with and without controls of similar subnational tax categories. Consequently, we are looking for signs of volatility in revenue changes due to local revenue changes.

#### 5. Findings & Results

In this section we proceed with measuring revenue adequacy and stability in the Kyrgyz Republic, both at national and local levels. We will also estimate how a

delegation of revenue authority to local levels affects revenue stability at the national level. Both levels of government worry about revenue stability and adequacy, thus devolution of revenue authority ought to be a concern at the national and local levels alike. Aside from devolution measures, economic indicators such as the GDP – aggregate and/or per capita, tax revenue shares of the GDP, and tax revenue per capita affect revenue stability. Consequently, we will survey tax buoyancy, revenue elasticity, and revenue stability in the Kyrgyz Republic.

### 5.1. Tax Buoyancy

First, we test for revenue buoyancy of total revenues at national and subnational levels, and for the scenario of total national revenues less subnational revenues. The buoyancy parameter for total national revenues is estimated to be 1.12, which is indicative of the fact that total revenue collections at this level increase more rapidly than the increase in economic activity, i.e. taxes grow faster than the GDP. This evidence is rather significant ( $t_{totrev} = 6.75, p < 0.001$ ). In addition, the magnitude of the relationship between total tax revenues and GDP is very strong with adjusted R-squared of 0.77. When we adjust the indicator of economic activity to per capita, the coefficient for buoyancy now equal to 1.47 becomes even more significant. The adjusted R-squared also increases to 0.79.

**Table 1: Tax Buoyancy Parameters (estimated with GDP), 1993-2010**

Tax Instrument	Coefficient of Buoyancy	Std. Error	$P \geq  t $	Adjusted R-squared	Time (years)
<b>NATIONAL</b>					
Total Tax Revenue	1.12	0.17	0.001	0.77	17
Income Tax Revenue	0.70	0.35	0.070	0.18	17
Business Tax Revenue	-0.87	0.78	0.284	0.02	17
VAT	1.66	0.32	0.001	0.67	17
Excise Tax Revenue	0.37	0.49	0.465	0.03	17
<b>SUBNATIONAL</b>					
Total Tax Revenue	-1.45	0.82	0.128	0.23	17
Income Tax Revenue	-0.32	0.81	0.707	0.14	17
VAT	-2.57	0.58	0.004	0.73	17
<b>NATIONAL less LOCAL</b>					
Total Tax Revenue	1.88	0.23	0.001	0.90	17
Income Tax Revenue	0.95	0.50	0.104	0.28	17
VAT	4.41	0.69	0.001	0.85	17

Source: IMF. 1999-2010. *Government Finance Factbook*, Washington, D.C.: IMF Publications.

In contrast to national figures, the buoyancy parameter of total subnational revenues is actually negative and equal to  $-1.45$ . However, the confidence interval for this parameter includes zero, thus the result is not statistically significant ( $t_{jertotrev} = -1.76, p = 0.128$ ). We may infer from this result that subnational revenues were increasing slower compared to growth in economic activity. The adjusted R-squared is relatively low ( $R_{adj}^2 = 0.23$ ), thus there is no evidence to suggest that the total local tax revenues have any consequential relationship with

economic activity in the country. Re-estimation of the model with per capita indicators does not change the magnitude of the effect, but the buoyancy coefficient becomes higher ( $\beta_{buoyancy} = -2.00$ ).

What is the tax buoyancy measure for total national revenues when we adjust for total local revenues? In this case, the coefficient for buoyancy significantly increases and becomes 1.88, i.e. the national revenues less the size of local revenues actually grow faster than the GDP. This result is highly significant ( $t_{totlessjer} = 8.02, p < 0.001$ ), with a very strong adjusted R-squared ( $R_{adj}^2 = 0.90$ ). An adjustment of GDP to per capita figures makes the coefficient of tax buoyancy even more significant, producing an R-squared of 0.92. Consequently, there is some evidence that suggests that because local tax buoyancy was small, the taxes at the national level had to grow faster to compensate for the revenue decreases at the local levels. Thus, a less reliable tax collection of subnational revenues could have added to revenue instability at the central level.

## 5.2. Tax Buoyancy of National Tax Instruments by Source

Our results suggest that the national income tax revenues are not buoyant ( $\beta_{buoyancy} = 0.70$ ). The result is marginally significant ( $t_{inctax} = 1.99, p = 0.070$ ), with a small R-squared ( $R_{adj}^2 = 0.18$ ). A model with GDP per capita increases the national income tax buoyancy to 0.97, but overall does not change the significance or magnitude of the effect. Compared to individual income taxes, the national business tax appears to have been decreasing with respect to economic activity, in terms of both GDP and GDP per capita. Statistically, the results are not significant at all, and there seems to be no relationship between national business tax revenues and growth in the economy. A model with GDP as an indicator of economic activity yields a buoyancy measure of -0.87 ( $t_{bustax} = -1.12, p = 0.284$ ), whereas the relevant adjusted R-squared is equal to 0.02.

How about tax buoyancy of the national value added tax? VAT appears to be very buoyant compared to economic activity ( $\beta_{buoyancy} = 1.66$ ). This coefficient is also highly significant ( $t_{VAT} = 5.24, p < 0.001$ ), with a moderately significant adjusted R-squared ( $R_{adj}^2 = 0.67$ ). When we account for population size, VAT becomes even more buoyant ( $\beta_{buoyancy} = 1.99$ ). This coefficient remains highly significant ( $t_{VAT} = 4.05, p = 0.002$ ), with a slightly less significant adjusted R-squared ( $R_{adj}^2 = 0.54$ ). Next, according to our estimates national excise taxes are not buoyant at all ( $\beta_{buoyancy} = 0.37$ ). However, this conclusion is highly unreliable given the wide confidence interval that contains zero. Therefore, this result is statistically insignificant ( $t_{excisetax} = 0.75, p = 0.465$ ). An adjustment to population size does not add any value to our analysis of national excise taxes.

**Table 2: Tax Buoyancy Parameters (estimated with GDP per capita), 1993-2010**

<i>Tax Instrument</i>	<i>Coefficient of Buoyancy</i>	<i>Std. Error</i>	<i>P&gt; t </i>	<i>Adjusted R-squared</i>	<i>Time (years)</i>
NATIONAL					
Total Tax Revenue	1.47	0.21	0.001	0.77	17
Income Tax Revenue	0.97	0.46	0.054	0.22	17
Business Tax Revenue	-0.52	1.06	0.635	0.06	17
VAT	1.99	0.49	0.002	0.54	17
Excise Tax Revenue	0.41	0.64	0.531	0.05	17
SUBNATIONAL					
Total Tax Revenue	-2.00	1.07	0.111	0.26	17
Income Tax Revenue	-0.49	1.07	0.667	0.13	17
VAT	-3.48	0.73	0.003	0.76	17
NATIONAL less LOCAL					
Total Tax Revenue	2.53	0.29	0.001	0.92	17
Income Tax Revenue	1.31	0.65	0.089	0.31	17
VAT	5.91	0.88	0.001	0.86	17

Source: IMF. 1999-2010. *Government Finance Factbook*, Washington, D.C.: IMF Publications.

### 5.3. Tax Buoyancy of Subnational Tax Instruments by Source

Given the lack of data on property taxes, here we only estimate tax buoyancy of local revenues obtained from individual income taxes and VAT, for which we have data. Our analyses suggest that the subnational income tax revenues are not buoyant and have a negative growth compared to economic activity ( $\beta_{buoyancy} = -0.32$ ). Yet, this estimate is not statistically significant at all ( $t_{jerinctax} = -0.39$ ,  $p = 0.707$ ). A model with GDP per capita further decreases the coefficient of local income tax buoyancy to  $-0.49$ , but overall does not change the significance or magnitude of the effect. We may assume that though the local income taxes have been decreasing at a slower rate than the increase in the economic activity, the result is inconclusive at best.

The VAT buoyancy coefficient is estimated to be negative 2.57. Consequently, local VAT collections appear to be falling behind compared to the increase in economic activity in the country. This outcome is also statistically very significant ( $t_{jerVAT} = -4.45$ ,  $p = 0.004$ ), with a somewhat significant adjusted R-squared ( $R_{adj}^2 = 0.73$ ). When we re-estimate the model with GDP per capita, the measure of tax buoyancy ( $\beta_{buoyancy} = -3.48$ ) becomes even more significant ( $t_{jerVAT} = -4.79$ ,  $p = 0.003$ ), with a slightly more significant adjusted R-squared ( $R_{adj}^2 = 0.76$ ). Therefore, to conclude on local tax buoyancy measures, we may suggest that tax collections at the local level were decreasing with respect to economic activity, with VAT decreasing even more significantly.

#### 5.4. Tax Buoyancy of National Tax Instruments by Source with Subnational Impacts

As it has been already pointed out, data on local level taxes are rather limited. Given this limitation, we are only able to isolate the effects of subnational individual income and VAT revenues on similar tax instruments at the national level. When we subtract local income tax revenues from national income tax revenues, and estimate the tax buoyancy model, the national tax buoyancy increases to 0.95. While this coefficient remains insignificant ( $t_{totinclessjer} = 1.92$ ,  $p = 0.104$ ), the parameter for buoyancy represents a 36% increase and the model improves by 56% compared to the scenario when local taxes are not subtracted. The model further improves when we take into account per capita GDP. This time around, the national income tax becomes very buoyant ( $\beta_{buoyancy} = 1.31$ ), with this coefficient turning marginally significant at narrower confidence intervals ( $t_{totinclessjer} = 2.03$ ,  $p = 0.089$ ). The adjusted R-squared increases to 0.31 from the initial 0.18, but is still somewhat low.

Similarly, VAT buoyancy increases significantly and now equals to 4.41. This result is statistically highly significant ( $t_{totVATlessjer} = 6.37$ ,  $p = 0.001$ ). The adjusted R-squared for this model is 0.85. A re-estimation of the model by adjusting the economy activity to population size further increases the VAT buoyancy parameter ( $\beta_{buoyancy} = 5.91$ ). The level of significance and magnitude of the effect remains stable, however. But these new buoyancy coefficients are more than double the buoyancy parameters when we do not subtract the effect of local taxes. Therefore, we may convincingly conclude that the decreasing levels of tax collection of local income and VAT revenues appear to be putting an extra pressure on national revenues. This may be a sign of instability of national tax revenues that is generated due to revenue devolution.

#### 5.5. Tax Elasticity

Tax elasticity is the percentage change in the tax base for a percent change in economic activity controlling for other factors, particularly the statutory changes. We use the measure of gross national income as an indicator of economic activity. This measure will serve as a proxy for income tax base, and also for VAT, a consumption based tax. At the national level, there is no data on tax bases for business income taxes, selective excise taxes. We estimate the log-log results of GNI regression on GDP and two dichotomous variables for statutory change providing for local revenue options in 1996 and tax authority reorganization to help local revenue levy in 2000. The tax elasticity coefficient in the model is 0.76. Therefore, a one percent increase in GDP is associated with a 0.76 percent increase in tax base. Income tax base has been growing much slower than the GDP, all else equal. This result is statistically significant ( $t_{logGDP} = 3.88$ ,  $p = 0.003$ ). The two binary variables representing statutory changes are not significant in any manner. We may conclude that these statutory changes had no effect on tax elasticity.

Overall, the model appears to be quite significant, with an adjusted R-squared equal to 0.84.

Next, we re-estimated the tax elasticity model with GDP per capita as an indicator for economic activity. An adjustment to population size appears to have slightly improved the model, which increased the adjusted R-squared to 0.87. The effect of the variable indicating per capita economic activity is also highly significant. Yet, the two statutory change dummy variables remain indistinguishable from zero. Furthermore, a related but separate concept, we have estimated a linear multiple regression model for the effect of the size of total subnational tax revenues and the two statutory changes on budget deficit at the national level. We have found that the size of local revenues has a negative effect on budget deficit; i.e. deficit increases with increases in local tax revenues. However, the result is not significant to offer any meaningful claims.

### 5.6. Tax Stability

In this section, we study distributions of year-to-year percentage changes in revenues. First, the revision is focused on national tax sources and how they impact the stability of total national tax revenues. Second, we address revenue stability of subnational taxes and their effect on stability of total subnational revenues. Third, we test how total subnational tax revenues impact the stability of total national tax revenues. In Figures 1 and 2 below are the illustrations of national and subnational percentage change range distributions.



Source: IMF. 1999-2010. Government Finance Factbook, Washington, D.C.: IMF Publications.

**Figures 1 & 2 (left to right): Annual Percentage Change Range Distributions (Minimum, Mean, and Maximum), National (left) and Subnational (right) Sources**



In contrast to national total tax revenue change range distributions, subnational total taxes have a year-to-year change rate of  $-22\%$  to  $+8\%$ , as shown in Figure 2 above. This range is almost certainly affected by change rate distributions of two subnational taxes – the local revenues from VAT and individual income. Local VAT collection annual change rates are in the range of  $-27\%$  to  $0\%$ . Thus, subnational VAT collections have generally been decreasing or stayed unchanged at best. As to the local individual income tax revenues, the range of annual change rate fluctuations is in between  $-32\%$  to  $+7\%$ . In our next step, we focus on tax revenue stabilities at the national level when the impact of subnational taxes is taken into consideration. Thus, when local taxes are subtracted from national figures we have the annual change rate distributions that are given in Figure 3 below. In Figure 4, we contrast stabilities of national, subnational, and national less subnational totals.



Source: IMF. 1999-2010. *Government Finance Factbook*, Washington, D.C.: IMF Publications.

**Figures 3 & 4 (left to right): Annual Percentage Change Range Distributions (Minimum, Mean, and Maximum), National LESS Subnational Sources (left), and Comparison of TOTALS (right)**

According to Figure 3, when we account for subnational revenues, the year-to-year rate changes cluster above zero, i.e. changes are positive. Consequently, it appears that the local revenues, or better said their low yields, add to greater revenue rate change fluctuations on the national level. National individual income taxes appear to have grown from zero up to 22% annually, whereas VAT year-to-year change rates are between zero and slightly more than 100%. The total national tax revenues less total subnational tax revenues have a range between zero and 12%. In Figure 4, we witness that the annual change rate range for subnational total tax revenues is the widest. When we subtract these subnational taxes from national

tax revenues, the change range for national tax revenues becomes somewhat narrower and mainly positive.

Finally, we have run correlation tests for national, subnational, and national less subnational total annual change rates. The correlation coefficient between the national and subnational total tax revenue annual change rates is equal to 0.41. While this coefficient may not be strongly significant at conventional levels it indicates of a moderate relationship between the two totals. On the other hand, the correlation coefficient between the national total tax revenue annual change rates and the national less subnational total tax revenue annual change rates is 0.60.

## **Conclusion**

In our analysis of national and subnational revenues in the Kyrgyz Republic, we find moderate evidence of revenue volatility at the national level due to fluctuations in subnational revenues. Overall, stability of the national revenue system appears to be affected by greater instability at the local revenue system. In terms of tax buoyancy measures, there is reasonable evidence that suggests that the revenues at the national level have to grow faster to compensate for the decreasing size of revenues at the subnational level. Thus, fewer taxes collected by the subnational governments are adding to revenue instability at the central level. As to the measure of tax elasticity, we find that the income tax base (and the VAT base to a lesser extent) grew much less rapidly than the indicator for economic activity in the country. Moreover, we find that the two binary variables representing statutory changes (for revenue decentralization) are not significant statistically. Given the lack of evidence to the contrary, we conclude that these statutory changes had no effect on tax elasticity.

This analysis has been restricted by data scarcity. In order to make more accurate conclusions additional data are needed. This is particularly true for the subnational level analyses. We could not separate out subnational measures my region (oblast). We also were not able to find region specific economic indicators for the Kyrgyz Republic. Nor were we able to obtain data on tax bases of local taxes. Where appropriate, we managed to supplement IMF information from other sources as well. Consequently, more research needs to be performed to test further the findings of this paper. Nevertheless, despite these limitations, we have learned a lot about the revenue system and administration in the Kyrgyz Republic. We have detected a relationship between revenue decentralization and revenue stability. Hence, given these results it would be appropriate to recommend that the subnational tax efforts ought to be adjusted to increase stability of the national tax system, at the least.

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