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Consequences of lower oil prices and stranded assets for Russia's sustainable fiscal stance☆

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ABSTRACT

Despite substantial oil and gas revenue Russia's fiscal stance is unsustainable. Under our benchmark assumptions the permanent-income rule requires a permanent tightening of the fiscal stance by 4.6%-points of GDP. Delaying it by a decade implies that the fiscal stance needs to be tightened by a further 0.9%-point. This benchmark optimal policy ensures that depletion of oil and gas wealth is matched by an equal increase in above-ground financial wealth. Its merits are highlighted by comparing it with the tougher alternative of the bird-in-hand rule and with projecting the current fiscal stance. If oil and gas revenue rises by a half due to higher prices or more discoveries, the fiscal stance needs to be tightened by only 3.2%-points of GDP. However, if a large chunk of oil and gas has to be kept in the soil to meet international agreements to keep global warming below 2 °C, the permanent transfer drops to 2.0% of GDP and the fiscal stance needs to be tightened by 5.5%-points of GDP.

1. Introduction

Oil and gas windfalls have a large impact on the public finances of a country. If the windfall is used to boost public or private spending, future tightening of the fiscal stance is needed to ensure solvability. This volatility is inefficient. The permanent-income prescription (Barro, 1979) avoids this volatility. It requires that countries borrow in advance of the anticipated windfall, pay back and save during the windfall, and live of the interest on accumulated assets after the windfall. If the windfall is unanticipated, such countries should borrow after an oil or gas discoveries and thus increase in wealth. The permanent-income hypothesis also implies that all oil and gas revenue must be invested to transform below-ground oil and gas wealth into above-ground financial assets (Hartwick, 1977).

Our main contribution is to show what the permanent-income rule implies for managing Russian oil and gas revenue. The fiscal stance under this rule, called the sustainable or permanent fiscal stance, should be a fixed proportion of above- and below-ground assets, but this has not been so in Russia. Russia has been depleting its oil and gas wealth without building sufficient financial assets. Russian funds are 11% of GDP in 2015 (Ministry of Finance of the Russian Federation, 2016), which is less than similar funds in other oil- and gas-rich countries. [1] During the last four years Russia has used its oil and gas revenues primarily to finance its budget deficit with almost none of it spent on investments. If this prolongs into the future, Russia risks squandering its oil and gas wealth without using this revenue to diversify and make structural reforms to put the economy on a sustainable growth path. Furthermore, substantial tightening of the fiscal stance is required to put the government finances on a sustainable path.

We therefore calculate the required tightening of the fiscal stance that is needed to avoid volatile shares of tax revenues in national income. We compare this permanent-income outcome for the fiscal stance and its implications for debt and asset management with when the future fiscal stance is projected from historical policies[2] and with the bird-in-hand rule which states that windfalls are saved entirely and

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[1] In 2015 the Norwegian SWF was 226% of its GDP, Kuwait's fund was 519% of its GDP, and the UAE fund was 208% of its GDP (IFSWF, 2015)

[2] Ossowski et al. (2008) and Bornhorst et al. (2009) offer estimates of fiscal rules and discuss the sustainability of fiscal stances for oil-rich countries, Mendoza and Ostry (2008) do the same for emerging and industrial economies, and Ghosh et al. (2011) for advanced economies (e.g., Ghosh et al., 2011). These studies offer cross-country estimates, which makes them less appropriate for discussing intertemporal issues of managing oil windfalls. Harding and van der Ploeg (2013) therefore offer time-series estimates of forward-looking fiscal rules for Norway.

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only part of accumulated financial wealth is spent (e.g., Davis et al., 2002; Barnett and Ossowski, 2003; Medas and Zakharova, 2009; Harding and van der Ploeg, 2013).[3]

Given the current low oil and gas prices, the required tightening of the fiscal stance is 4.6%-points of GDP. If future oil and gas prices or reserves turn out to be 50% higher, the required tightening is only 3.2%-points of GDP. We also calculate by how much the required fiscal stance in Russia has to be further tightened if the international agreements made at the 2015 United Nations Climate Change Conference in Paris to limit peak global warming to 2 °C are kept. This requires that 19% of Russia's oil reserves and 59% of its gas reserves must be left in the ground (McGlade and Ekins, 2015). [4] The required tightening of the fiscal stance must then be much higher: 5.5%-points of GDP.

Section 2 sets out the permanent-income rule and Hartwick rules and compares these with the bird-in-hand rule. Section 3 discusses historical developments of Russian oil and gas revenues and fiscal policy. Section 4 shows by how much Russia's fiscal stance has to be tightened under the permanent-income rule for our benchmark scenario where the world oil price stays low, and also by how much more if the adjustment is delayed. The outcomes are compared with a projected historical fiscal rule and the bird-in-hand rule. Section 5 shows by how much the sustainable fiscal stance is cut if the world oil price bounces back by 50% and by how much it is increased if global warming has to be limited to 2 °C. Section 5 also discusses the sensitivity with respect to the return on assets. Section 6 discusses how our rule must be adjusted for capital scarcity, difficulties in international borrowing and absorption constraints, and comments on issues related to exchange rate and monetary policy. Section 7 concludes.

2. Theory of managing oil and gas wealth and the fiscal stance[5]

Here we derive the permanent-income rule and contrast it with the bird-in-hand rule, discuss what these rules imply for managing a fund, and demonstrate that the bird-in-hand rule is not in line with the Hartwick rule.

2.1. The permanent-income rule

Let a_t denote net government assets (gross assets minus liabilities) as fraction of national income at the end of period t, g_t primary government spending (excluding net interest payments) as fraction of national income, τ_t the non-oil/gas tax rate, and n_t oil revenue accruing to the government as fraction of national income in period t. The government budget constraint is

$$a_{t+1} = (1+r)a_t + \tau_t + n_t - g_t = (1+r)a_t + n_t - p_t, \tag{1}$$

where a_0 is given and $p_t \equiv g_t - \tau_t$ denotes the primary non-oil deficit. Since variables are expressed as fractions of national income, we use the growth-corrected real rate of interest, denoted by r, in (1). For simplicity, we take r to be constant. If we assume solvency of the public sector, the no-Ponzi games condition holds ($\lim_{s\to\infty} a_{t+s}(1+r)^{-s} = 0$) and the present value of future oil revenues plus government assets must be sufficient to cover the present value of future non-oil primary deficits, p_t:

$$\sum_{s=0}^{\infty}(1+r)^{-s}n_{t+s} + (1+r)a_t \geq \sum_{s=0}^{\infty}(1+r)^{-s}p_{t+s}. \tag{2}$$

The government minimizes expected present discounted intertemporal tax distortions,

$$E\left[\sum_{s=0}^{\infty}\beta^{-s}{\tau_{t+s}}^2|I_t\right], \tag{3}$$

subject to (1) and (2), where I_t is all information available at time t which can be used to forecast future tax shares. The rate of time preference is set to the growth-corrected real interest rate so $0<\beta=1/(1+r)<1$ and government spending and oil revenue as fraction of national income are taken to be exogenous. Intertemporal minimization implies that the marginal cost of fund is the same for all future time periods, and thus all expected future tax rates must equal the current tax rate:

$$E[\tau_{t+s}|I_t] = \tau_t \text{ for all } s>0. \tag{4}$$

This is intertemporal tax smoothing. Tax rates only change in the future upon news of unexpected changes in government budgets (e.g., unexpected budgetary headwind due to an unexpected recession or unexpected oil and gas discoveries). Substituting the efficiency condition (4) into the intertemporal government budget constraint (2), we obtain the optimal tax rate, the optimal non-oil primary deficit, and the change in net government assets:

$$\tau_t = g_t^P - n_t^P - ra_t, \tag{5}$$

$$p_t = g_t - g_t^P + ra_t + n_t^P, \tag{6}$$

$$a_{t+1} - a_t = (n_t - n_t^P) - (g_t - g_t^P), \tag{7}$$

where permanent oil revenue (annuity value of current and future oil revenue) and the permanent government spending share are

$$n_t^P \equiv \frac{r}{1+r}\left(n_t + \sum_{s=1}^{\infty}(1+r)^{-s}E[n_{t+s}|I_t]\right) \text{and } g_t^P \equiv \frac{r}{1+r}\left(g_t + \sum_{s=1}^{\infty}(1+r)^{-s}E[g_{t+s}|I_t]\right). \tag{8}$$

Permanent oil revenue thus corresponds to the return on oil wealth in the ground: $n_t^P = rv_t$ with oil wealth defined by $v_t \equiv \frac{1}{1+r}(n_t + \sum_{s=1}^{\infty}(1+r)^{-s}E[n_{t+s}|I_t])$. Oil wealth is thus the present discounted value of future oil revenue. The permanent government spending share is the one that gives the same present discounted value as the projected government spending share. The interpretation of the rules (5)–(7) is as follows.

First, (5) shows that the non-oil tax rate is lowered in response to permanent increase in oil revenues but must be increased in response to permanent increases in the share of government spending. The tax rate also has to be higher if the inherited stock of net government assets is low (or government debt is high).

Second, (6) indicates that the non-oil primary government deficit must be loosened if government spending is temporarily high (e.g., during a crisis or war). The optimal response is then to borrow, not to

[3] Norway uses such a pragmatic rule. It puts its oil and gas revenue in its fund and draws roughly 4% per annum from it to finance public spending or tax cuts. This 4-percent rule allows Norway to spread oil and gas revenues to future generations. The fund also allows Norway to stabilize the economy across the business cycle, since the 4% has to hold as an average over the business cycle.

[4] Carbon Tracker and Grantham Institute (2013) discuss the issue of unburnable carbon and stranded assets in much more detail. Helm (2016) and van der Ploeg (2016) discuss various other reasons to do with technological developments why the fossil fuel era may come to an end and why oil and gas rich countries face the risk of stranded oil and gas assets.

[5] A more general framework would make public spending endogenous and analyse the trade-off between using windfalls to boost public spending or cut tax rates and allow for a non-oil/gas tax base that depends on the business cycle by including the effects of an output gap in the government budget constraint (Harding and van der Ploeg, 2013). Allowing for habit persistence implies that society gets hooked on high public and private consumption during a windfall, but finds it tough to cut consumption after the windfall has ceased (Leigh and Olters, 2006; Olters, 2007). If habits last forever, the non-oil/gas primary deficit follows a random walk if public spending does not change. One can also allow for stochastic volatility of the oil price (van den Bremer and van der Ploeg, 2013, 2016). The prudence motive then requires building a stabilization fund to accumulate precautionary saving buffers needed to cope with the volatile oil price and other uncertainties to do with oil and gas discoveries and the macro-economy.