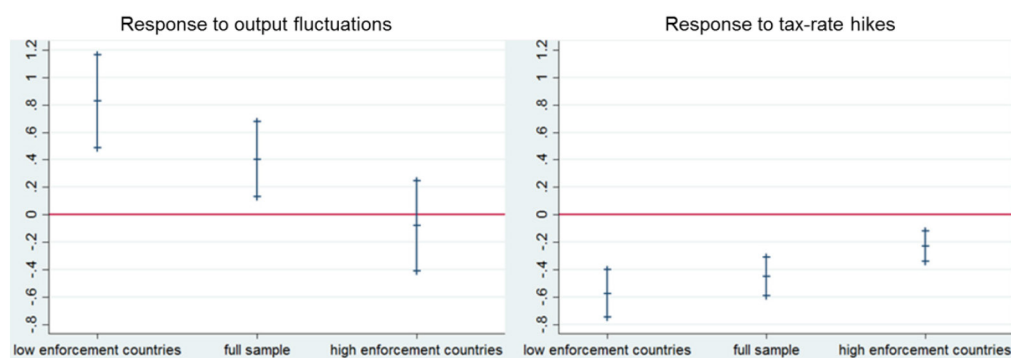


Tax compliance, default risk and GDP linked bonds

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New cross-country evidence shows that VAT compliance is pro-cyclical, and its response to tax-rate hikes is sizeable and negative. Countries with highly sensitive tax compliance have a low ability to reimburse their debt, thus facing higher default risk. Issuing GDP linked bonds may protect such countries from the combined, cyclical risk of growing debt-to-GDP ratios and declining tax revenues.

Chart 1: The response of VAT compliance to output fluctuations and tax-rate hikes



The chart reports the response of VAT compliance to a 1 percent increase in output (left panel) and a 1 percent increase in VAT rates (right panel) with the 95% confidence intervals. Low (high) enforcement countries refer to countries above (below) the median response. [Source: Pappadà and Zylberberg \(2017a\) and \(2017b\).](#)

In a recent study, [Pappadà and Zylberberg \(2017a\)](#) measure the ability of a government to collect tax revenues using the ratio between the VAT revenues collected by the government and the notional VAT revenues computed on observed consumption. With perfect tax enforcement, there would be full tax compliance and this ratio would be exactly equal to 1 over the business cycle and would not respond to tax reforms.

Tax compliance is sensitive to output fluctuations and tax reforms

As shown in chart 1, this study documents two novel stylized facts:

1. VAT compliance increases in expansions and decreases in downturns
2. The response of VAT compliance to tax-rate hikes is sizeable and negative

The sensitivity of tax compliance to economic fluctuations and tax reforms varies across countries. While some countries display stable tax compliance, those with a lower capacity to collect taxes are exposed to large fluctuations in tax revenues. These countries sometimes try to compensate for weak enforcement by raising the average tax rate. But this is no guarantee that tax receipts will increase.

Noticeable examples are the several rounds of austerity plans implemented in Greece over the past few years. [Pappadà and Zylberberg \(2017a\)](#) show that VAT compliance dropped by about 7% in Greece after the 20% increase of VAT rates in 2010. The drop in tax compliance accounted for the gap between the actual VAT revenues and the expected VAT revenues. The fluctuations in tax compliance are not specific to the Greek case. The results on a panel of 35 countries show that a **1 percent increase in VAT rates is associated with a fall in tax compliance up to 0.5 percent** in countries where the response of tax compliance to tax hikes is large.

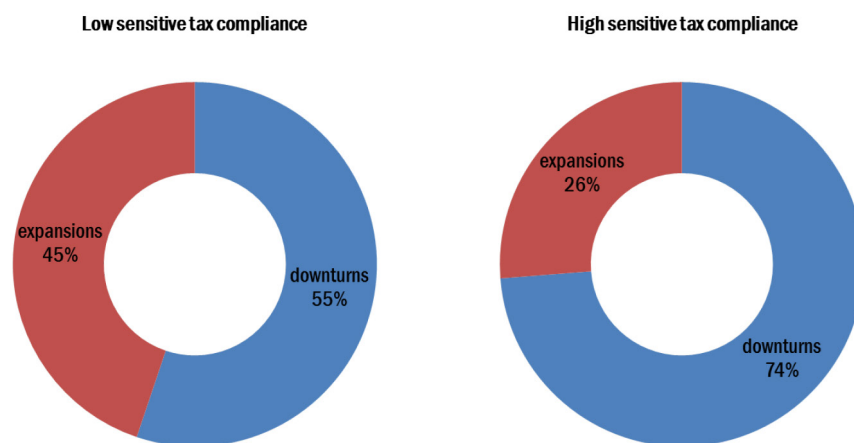
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Highly sensitive tax compliance increases default risk

[Pappadà and Zylberberg \(2017b\)](#) explore the consequences of the fluctuations in tax compliance on the risk of default on sovereign debt. In this paper, fiscal consolidations affect the capacity to levy taxes in the future - through the negative response of tax compliance - thereby increasing the risk of default. When highly indebted, countries with a weak capacity to raise tax revenues are hanging off a cliff: governments are unable to stray from debt ceilings because tax hikes generate long-run distortions on output, thereby increasing the incentive to default and the cost of servicing debt. As a result, periods of high tax rates, low output, low fiscal surplus and high default risk may be long-lasting.

The interaction of the imperfect capacity to collect tax revenues and limited commitment to repay sovereign debt may explain the adoption of pro-cyclical fiscal consolidations, typically based on expenditure cuts in downturns as shown in [Ferrara et al. \(2017\)](#). When looking at fiscal consolidation episodes in OECD countries, we indeed observe that **countries with more sensitive tax compliance are also those implementing fiscal consolidation measures more often in downturns than in expansions**, as shown in chart 2. Despite the large distortionary effects of raising taxes in economic downturns stemming from imperfect tax compliance, these countries have no other means than adopting austerity measures in downturns in order to raise revenues and avoid the default.

Chart 2: Timing of fiscal consolidations in countries with different responses of tax compliance



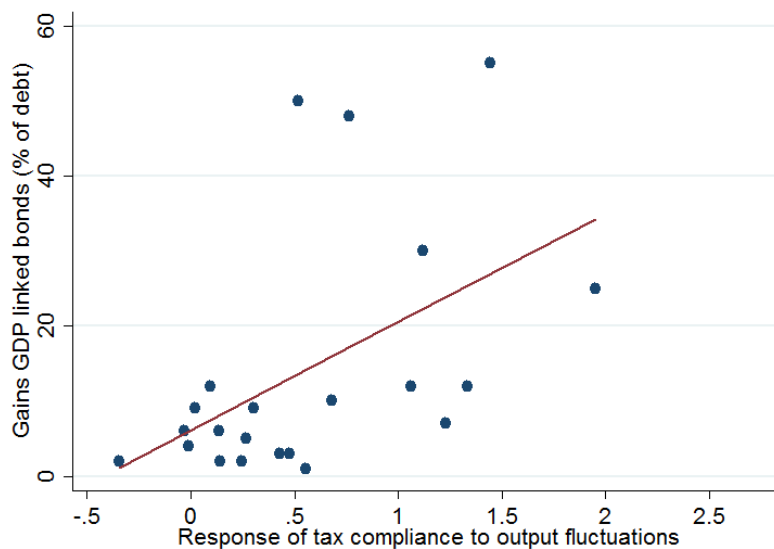
Low (high) sensitive tax compliance refers to countries below (above) the median response of tax compliance to output fluctuations. Expansions (downturns) refer to the top (bottom) 2 quartiles of the countries' business cycle. [Source](#): Authors' calculations based on [Pappadà and Zylberberg \(2017b\)](#) and [Ferrara et al. \(2017\)](#).

GDP-linked sovereign debt contracts may help countries with highly sensitive tax compliance

One possible solution for countries hanging off this cliff would be to introduce GDP-linked sovereign debt contracts, and more precisely bonds whose principal is indexed on nominal GDP in local currency. When sovereign debt is entirely issued in GDP-indexed bonds (GIBs), the public debt-to-GDP ratio is mechanically stabilised over the cycle. Hence issuing countries are able to recover a large amount of countercyclical fiscal space.

The introduction of GIBs has several effects on risk premia. An indexation premium covers the risk of greater volatility in the total return, the novelty premium compensates investors for the risk related to difficulties in pricing a new instrument, and the introduction of a new category of sovereign debt increases the liquidity risk on the overall market. Finally, the introduction of GIBs reduces the default risk on the overall debt. For highly-indebted countries with highly sensitive tax compliance, this reduction would be very significant. The interaction between these two characteristics increases indeed the probability of default during downturns and, at the same time, exacerbates and lengthens these downturns.

Chart 3: The response of tax compliance to output fluctuations and the gains of GDP linked bonds



Source: Authors' calculations based on [Pappadà and Zyberberg \(2017b\)](#) and [Cabrillac et al. \(2016\)](#).

As shown in chart 3, a larger response of tax compliance to output fluctuations is indeed associated with larger gains of GDP linked bonds, measured in terms of the decrease in debt-to-GDP ratios as in [Cabrillac et al. \(2016\)](#). Countries with highly sensitive tax compliance face a higher default risk because the pro-cyclical fluctuations in tax compliance reduce their commitment to repay the debt during economic downturns. GDP linked bonds would relax this constraint and allow them to earn additional credibility on their commitment to repay their sovereign debt, thus reducing the default risk premium.

Of course, this solution is not the silver bullet and one drawback could be the moral hazard associated with GIBs. Indeed, governments are not only recovering countercyclical fiscal space, but also additional debt capacity during downturns. If they use it to push up the debt-to-GDP ratio, the cure is worse than the disease.