

IMF Working Paper

Fiscal Transparency and the Performance of Government Financial Assets

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Statistics Department

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January 2015

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Abstract

Stock-flow adjustments are typically measured as the difference between changes in gross debt and deficits. These are interpreted as a proxy for unexplained fiscal discrepancies, and often associated with a lack of fiscal transparency. However, such measures fail to capture the role of financial assets and valuation changes and therefore do not correctly predict fiscal transparency. The purpose of this paper is to provide a more detailed exposition of stock-flow residuals and the relationship with fiscal transparency, highlighting government acquisition of equities and investment fund shares and their performance in secondary markets. The results suggest that the performance of government equity portfolios correlates with fiscal transparency to the extent that fully transparent governments are expected to generate between 6 and 8 percent higher returns on their equity portfolios than others. These findings suggest that the performance of government assets may be a promising area for future research of fiscal transparency and stock-flow residuals.

JEL Classification Numbers: H60, H62

Keywords: stock-flow adjustments, holding gains on government financial assets, fiscal transparency, government portfolios of equities and investment fund shares, public finance

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¹ The authors would like to thank Claudia Dziobek, Robert Heath, and Syed Alam, Reda Cherif, Joe Crowley, Luiza Antoun de Almeida, Rob Dippelsman, Thomas Elkjaer, Artak Harutyunyan, Fouad Hasanov, Greg Hormann, Tim Irwin, Yevgeniya Korniyenko, Marco Martinez, Johannes Mueller, Huong Nguyen, Roberto Rosales, Phil Stokoe, and Florina Tanase, for helpful comments and review. All remaining errors are our own.

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I. INTRODUCTION

The aftermath of the 2008 financial crisis highlighted the need for significant fiscal adjustments in many advanced economies. Lessons from the crisis have underscored the importance of compiling and disseminating more comprehensive macroeconomic statistics in order to achieve more accurate forecasting and better policy advice, especially for the public and financial sectors (IMF, 2012). While gross debt and surplus/deficits are generic ‘go to’ measures for assessing a government’s fiscal performance, the integrated relationship between these two concepts has become an area of greater scrutiny in recent literature (Von Hagen and Wolf, 2006; Campos, Jaimovich, and Panizza, 2006; Weber, 2012; Alt, Lassen, and Wehner, 2012; Eurostat, 2012; Seiferling, 2013). Emphasis is being placed on changes in net worth and balance sheet analysis building on Blejer and Cheastey (1991), Easterly, de Haan and Gali, (1999), and Milesi-Ferretti and Moriyama (2006). Some find a significant negative correlation between ‘stock-flow’ residuals, and fiscal transparency.

However, recent work from a sample of countries that disseminate fully integrated financial balance sheet data found evidence that this relationship does not exist when complete, rather than partial, stock-flow data are used (Seiferling, 2013). This paper sheds some light on the missing link which reconciles these results by examining stock-flow residuals in greater detail, reevaluating their relationship with fiscal transparency. The authors study the performance of government financial assets, in particular equity portfolios.

In this paper, stock-flow residuals are defined in line with the international methodology of the *Government Finance Statistics Manual 2014 (GFSM 2014)*, as financial transactions and other economic flows. These require further decomposition to determine which of these a government can use “as strategic variables to disguise its deficits” (Buti et al., 2007; and Alt, Lassen, and Wehner, 2014). Realized and unrealized² returns on specified financial instruments, mainly equity and investment fund shares, are interpreted as an effective profitability indicator of government investments.

We use the integrated public finance data of the IMF’s *Government Finance Statistics Yearbook (GFSY)*. The results from an unbalanced panel of 25 countries over the 1995–2012 period suggest that government acquisitions of equities reflect fiscal performance indicators and valuation changes. More specifically, governments tend to increase investment in equities when (i) generating fiscal surplus balances; (ii) increasing gross debt to finance investments; (iii) softening the impact of exogenous shocks to other sectors of the economy; and (iv) in response to their expected realized and unrealized returns on equity portfolios. While government investment in equities can take place for ‘policy lending’ purposes, some of the portfolios appear to generate significant returns which are not associated with specific domestic policies. Governments which generate consistent surpluses, or with large sovereign

² Throughout this paper, unrealized returns are defined as those whose prices are derived from secondary markets and are, either held by government at the end of an accounting period or sold by government during that period at market price.

wealth funds, for example, are able to generate higher returns from a well structured equity portfolio than from debt securities. A better understanding of the relationship between stock-flow residuals and fiscal transparency requires information regarding the returns on government portfolios. The correlations between governments' equity portfolios and fiscal transparency appear to be more complex than past results have suggested.

II. AN OVERVIEW OF THE LITERATURE

Since the mid-1990s, the literature incorporates more comprehensive accounts of fiscal flows and balance sheets into the analysis of fiscal performance. One strand of this literature focused on inconsistencies that emerge in stock-flow residuals within (and between) countries over time. Several papers have explored instances of 'fiscal gimmickry,' or 'nonstructural adjustments,' where government accounts are adjusted to achieve favorable results for highly visible indicators (deficits and gross debt), while hiding liabilities in less scrutinized areas within government balance sheets or removing them from the balance sheet altogether (Easterly, de Haan and Gali, 1999; Milesi-Ferretti and Moriyama, 2006; Koen and van den Noord, 2005; Buti et al., 2007; Alt, Lassen, and Wehner, 2014; Irwin, 2012). While some such practices may not be direct violations of international accounting standards, they tend to obscure true fiscal performance, especially during periods where numerical benchmarks, or fiscal rules, are required to be met by law.

Buti et al (2007) provide some additional insight by exploring the strategic use of stock-flow adjustments, decomposing them into three main components.³ From these components, the authors derive two measures of 'hidden deficits.' The first is seen as a timing tool where cash and accrual accounting can be used strategically to manipulate the timing of accrual deficit increases. The second measure attempts to isolate government subsidies disguised as the acquisition of financial assets by separating 'safe' from potentially 'unsafe' assets.⁴ Their empirical findings for a sample of 25 EU countries over the 1994–2004 period suggest that governments, subject to fiscal rules (Maastricht), are more likely to use the sale of financial assets to finance deficits and/or decrease gross debt than those without fiscal rules.

A general theme in this literature is that governments that reach or exceed the threshold of a fiscal rule will likely take advantage of loopholes and resort to "hidden deficits." To remove these loopholes, fiscal rules should be based on a balance sheet

³ These are (i) the difference between accrual recording of deficits and cash recording of gross debt (i.e., the exclusion of other accounts payable/receivable); (ii) the difference between gross and net recording of debt (exclusion of financial assets from the former); and (iii) valuation effects and statistical adjustments (foreign exchange movements, redemption effects, etc.).

⁴ 'Safe' assets include securities and equity investments of social security funds (which are generally assumed to be high quality) and 'unsafe' assets include loans and equity investments (outside of social security subsector).

approach which emphasizes the role of changes in net worth (or net debt) rather than gross debt or deficits (Easterly, de Haan and Gali, 1999; Milesi-Ferretti and Moriyama, 2006; Buti et al., 2007). Fully integrated balance sheet data provide a more complete view of fiscal performance by allowing to decompose the stocks and flows of financial assets and liabilities over time. The absence of reliable and comprehensive fiscal data in many countries, however, prevents an evaluation of such comprehensive benchmarks. Without these data, governments are susceptible to using ‘loopholes’.

Examining the asset side of government balance sheet also raises the question of profitability. While investment decisions of the public and private sectors will likely differ, realized and unrealized returns/losses and net worth will be of significant interest to both. For financial and nonfinancial investments, governments will likely take into account the social and political benefits, but may also consider the expected direct and indirect returns over the lifetime of the asset in question (Brixi and Irwin, 2004). When public investments are likely to generate negative profits over their lifetime these should be recorded as an expense in government financial statements (*GFSM 2014*).

While past literature has examined the role of government net acquisition of financial assets to date, none of these have considered the role of returns on these portfolios and their relationship with fiscal transparency. This paper is the first to take advantage of the information on realized and unrealized returns from government equities portfolios as a profitability indicator rather than assuming these to be outside of government control.

III. DECOMPOSING THE STOCK-FLOW RESIDUAL

“A large stock-flow adjustment (SFA) that depends predominantly on the accumulation of assets quoted in the stock exchange by a government in surplus has a considerably different nature from a large positive because of the increase in the share capital of distressed public enterprises, a depreciation of national currency, because the government had to settle a large stock of spending arrears or simply because cash and accrual statistics do not match. Which of the SFA components can then be used as strategic variables to disguise its deficits?”

-Buti et al., 2007-

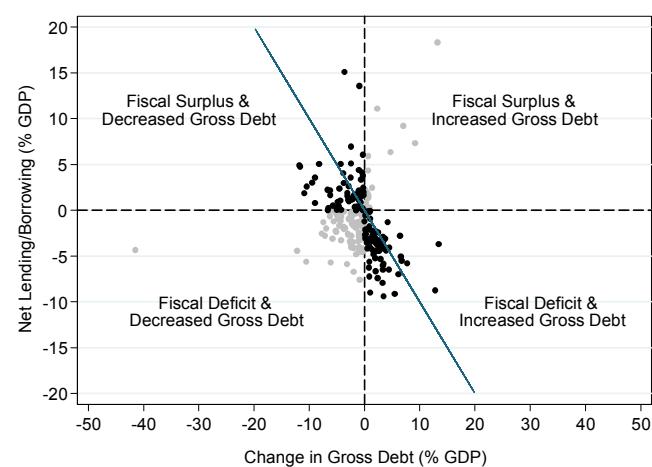
A. Debt and Deficits

Stock-flow residuals are often measured as the difference between changes in gross debt and deficits. This measure is incomplete (although a good second best for large N empirical analysis, given data limitations). Figure 1 shows the relationship between surplus or deficit and changes in gross debt for a sample of 35 countries. The information covers the general government (central, state,⁵ and local) over the 1995–2012 period and the measure is ‘net lending/borrowing’ as defined in *GFSM 2014*. Where observations do not fall on the imposed line, changes in gross debt and deficits differ and stock flow residuals will be non-zero. The

⁵ Where applicable.

observations in Figure 1 suggest that general governments can run surpluses while increasing gross debt and run a deficit while paying off gross debt. The average change in debt for the sample is 4.0 percent GDP ($sd=6.5$) and average deficit is 1.8 percent GDP ($sd=4.8$).

Figure 1. General Government Fiscal Balances and Changes in Gross Debt
(Percent of GDP)



Source: IMF GFSY (1995–14)

The downside to this partial measure is expressed in the prevalence of observations falling off the imposed line across all quadrants in Figure 1. The opening quote of this section—the residual itself has too many meanings to be meaningful. To decompose this residual into more meaningful parts we examine the components of fiscal stocks and flows. As in Seiferling (2013), the complete stock-flow adjustment is an accounting identity which recognizes the roles of financial assets and other economic flows (volume and valuation changes). Consistent with international standards (*GFSM 2014*), the relationship between partial and complete stock-flow residuals can be characterized in four accounting identities:

(i) government change in net *financial* worth.⁶

$$\Delta NFW_t = \sum_{i=1}^8 (\tilde{x}_{it}^{FA} + \Delta val_{x_{it}^{FA}} + \Delta vol_{x_{it}^{FA}}) - \sum_{i=1}^8 (\tilde{x}_{it}^L + \Delta val_{x_{it}^L} + \Delta vol_{x_{it}^L}) \quad (1a)$$

(ii) government change in gross debt:

$$\Delta D_t = \sum_{i=1}^6 (\tilde{x}_{it}^L + \Delta val_{x_{it}^L} + \Delta vol_{x_{it}^L}) \quad (1b)$$

(iii) government surplus/deficit:⁷

$$\delta_t = \sum_{i=1}^8 (\tilde{x}_{it}^L - \tilde{x}_{it}^{FA}) \quad (1c)$$

⁶ This measure does not cover nonfinancial assets. For an in-depth discussion, see Bova et al., 2013.

⁷ This is from a ‘below-the-line’ perspective.

(iv) other economic flows (volume and valuation changes):

$$oef_t = \sum_{i=1}^8 [(\Delta val_{x_{it}^{FA}} + \Delta vol_{x_{it}^{FA}}) - (\Delta val_{x_{it}^L} + \Delta vol_{x_{it}^L})] \quad (1d)$$

Financial assets and liabilities are classified into eight separate instruments (debt securities, loans, other accounts payable, currency and deposits, SDRs, and insurance, pension and standardized guarantee schemes), and:

ΔD_t is the first differenced stock of gross government debt in period t .⁸

δ_t is net lending/borrowing (deficit/surplus) in period t .

\tilde{x}_i^q represents transactions in instrument i during fiscal year t ($q=FA$ for financial assets) or ($q=L$ for liabilities)

$\Delta val_{x_{it}^q}$ represents holding gains and/or losses or re-evaluations of an asset ($q=NFA$, FA) or liability ($q=L$) for instrument i in period t ; and

$\Delta vol_{x_{it}^q}$ represents changes in the volume of an asset ($q=FA$) or liability ($q=L$) for instrument i in period t that do not result from a transaction or from valuation change.

From equations (1b) and (1c), the first conventional measure of stock-flow residuals reduces to:

$$\Delta D_t - \delta_t = \sum_{i=1}^6 (\Delta val_{x_{it}^L} + \Delta vol_{x_{it}^L}) - \left(\sum_{i=7}^8 \tilde{x}_{it}^L - \sum_{i=1}^8 \tilde{x}_{it}^{FA} \right) \quad (2a)$$

and the difference between changes in net financial worth and fiscal flows reduces to zero:

$$\begin{aligned} \Delta NFW_t - (\delta_t + oef_t) &= \sum_{i=1}^8 (\tilde{x}_{it}^{FA} + \Delta val_{x_{it}^{FA}} + \Delta vol_{x_{it}^{FA}}) - \sum_{i=1}^8 (\tilde{x}_{it}^L + \Delta val_{x_{it}^L} + \Delta vol_{x_{it}^L}) \\ &\quad - (\sum_{i=1}^8 \tilde{x}_{it}^L - \sum_{i=1}^8 \tilde{x}_{it}^{FA}) + \sum_{i=1}^8 [(\Delta val_{x_{it}^{FA}} + \Delta vol_{x_{it}^{FA}}) - (\Delta val_{x_{it}^L} + \Delta vol_{x_{it}^L})] = 0 \end{aligned} \quad (2b)$$

From equations (2a) and (2b), there are two missing components which should resolve discrepancies between changes in gross debt and fiscal deficits: transactions in financial assets ($\sum_{i=1}^8 \tilde{x}_{it}^{FA}$) and other economic flows ($\sum_{i=1}^6 (\Delta val_{x_{it}^L} + \Delta vol_{x_{it}^L})$).⁹ Figure 2 shows the relationship between fiscal flows ((1c) + (1d)) and changes in government net financial worth (1a) for the same sample of countries/years in Figure 1.

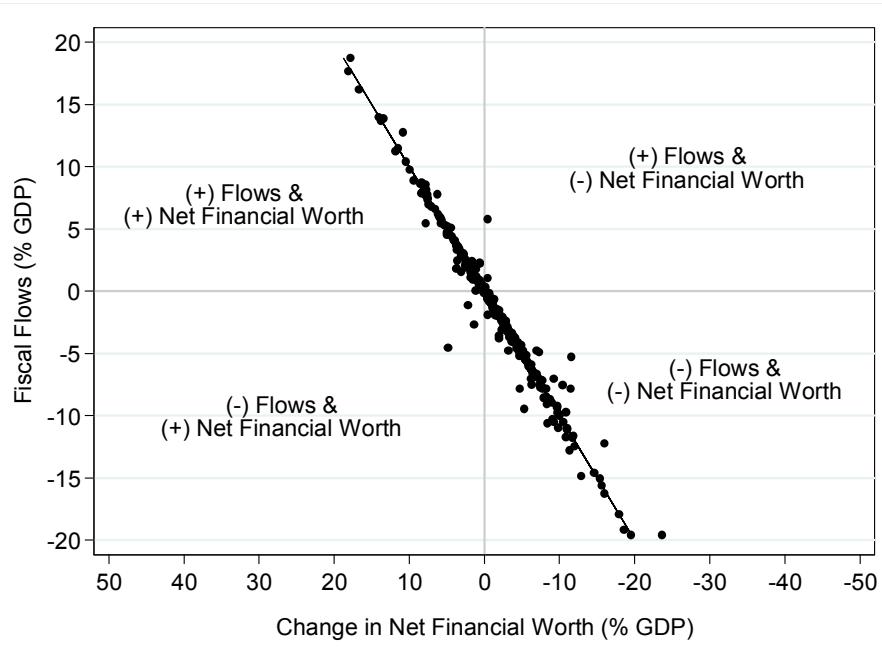
⁸ As defined in *GFSM 2014* and *Public Sector Debt Statistics Guide (PSDSG) 2012*. This definition includes all liabilities excluding equity and derivatives. These concepts are consistent across the spectrum of macroeconomic statistics, notably the *System of National Accounts (SNA)*.

⁹ We assume that liabilities in the form of derivatives are zero for general government and they incur no liabilities in shares and equity $\sum_{i=7}^8 \tilde{x}_{it}^L = 0$.

B. Transactions in Financial Assets

While the liability side of a government's balance sheet receives more attention in analytical or policy work, governments also hold portfolios of financial assets. These can have important implications for debt sustainability (a large stock of highly liquid financial assets can offset unexpected increases in short term gross debt) and governments overall net worth. Incorporating information on government transactions in financial assets and other economic flows dramatically improves our ability to understand fiscal performance and to generate more meaningful analytical results. This can be illustrated by comparing Figure 1 with Figure 2 below. The extent of realignment between observations in the two figures suggests that the magnitude of these two 'missing links' is not trivial. It is encouraging that not all observations fall exactly on the imposed line—there are a variety of reasons for stocks and flows to marginally differ (timing differences, rounding, statistical discrepancies, etc.).

Figure 2. General Government Flows* and Changes in Net Financial Worth**
(Percent of GDP)



Source: IMF GFSY (1995–2014)

Notes: * see equations (1c) and (1d)

** see equation (1a)

Table 1 reports data on the net acquisition of financial assets for three averaged or discrete time periods: pre-2008, 2008 and post-2008. The range of these averages shows large variances across instruments and over time.

Table 1. Pre- and Post-Crisis Net Transactions in Financial Assets by Instrument 1/
(Percent of GDP)

Transaction - Financial Assets	Pre-2008 2/	2008	Post-2008 2/
Net Acquisition of Financial Assets	0.9 (2.3)	4.0 (6.4)	1.6 (3.1)
Currency and Deposits	0.3 (1.5)	1.0 (3.2)	0.1 (2.1)
Debt Securities	0.3 (1.3)	0.4 (0.7)	0.23 (1.5)
Loans	0.02 (0.8)	1.3 (3.5)	0.2 (1.0)
Equity and Investment Fund Shares	-0.01 (1.4)	0.9 (2.0)	0.6 (1.6)
Other Accounts Receivable	0.4 (0.7)	0.4 (0.7)	0.4 (0.8)
Financial Derivatives and Employee Stock Options	-0.02 (0.1)	-0.001 (0.06)	-0.02 (0.1)

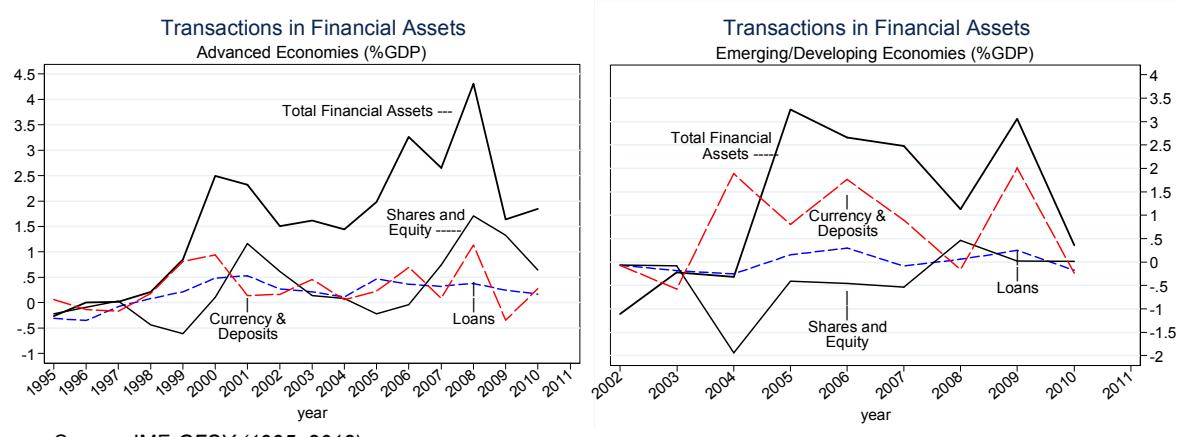
Source: IMF GFSY (1995–2014)

1/ Excludes Monetary gold and SDRs and 'Insurance, Pension and Standardized Guarantee Schemes (GFSM 2014).

2/ Average

Decomposing government acquisition of financial assets adds several new dimensions of information.¹⁰ A closer look at the dynamics of the three highlighted categories shown in Figure 3 below suggests that investment in shares and equities tend to be most variable in terms of magnitude for both advanced and emerging countries.

Figure 3. Average Transactions in Selected Financial Assets (Advanced and Emerging Economies)



Source: IMF GFSY (1995–2012)

¹⁰ See Appendix B for summary statistics.

A notable difference between the two groups of countries shown in Figure 3 is the high degree of reliance in developing and emerging economies on currency and deposits, with more dispersed portfolios in advanced economies where shares and equities feature more prominently (especially during bailouts in 2008). Governments in advanced economies tend to place greater emphasis on extending loans and purchasing equity in temporarily insolvent firms during financial crisis than emerging market governments.

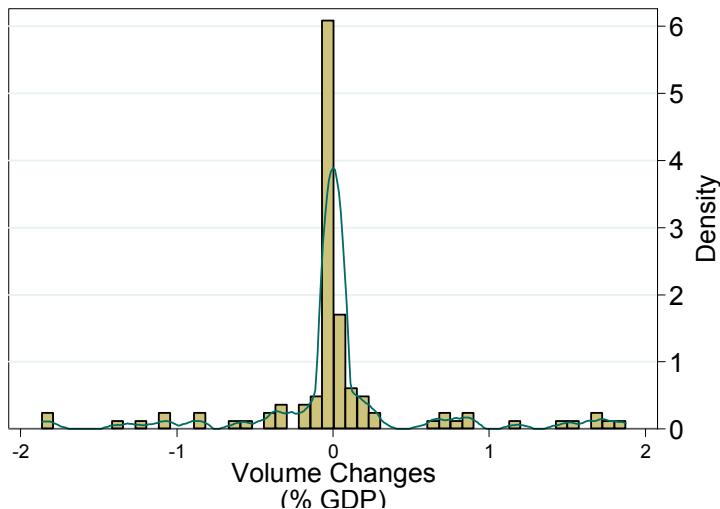
C. Other Economic Flows (Volume and Valuation Changes)

Other economic flows are broadly characterized as changes in the value of an asset or liability which are not the outcome of transactions. This broad categorization can be decomposed into two categories: holding gains/losses (Δval_{xit}^L —valuation changes) and volume changes (Δvol_{xit}^L) (see equation (1d)). Holding gains/losses represent changes in the monetary value of an asset or liability resulting from changes in market prices including those resulting from changes in exchange rates (*GFSM 2014*). This is a reflection of the current market value of the asset or liability relative to its previous market value, or on the asset side, the unrealized profits/losses or changes in exchange rates on the current stock and portfolio of financial investments. Along with interest and dividend revenue (realized returns on financial investments), holding gains provides very useful information on the performance of a government’s current stock of financial investments.

Volume changes represent a range of events which are neither transactions nor holding gains. Some examples of volume changes would be a decrease in net worth due to natural disasters, the reclassification of government units of the general government, unilateral debt write-offs, or the discovery of government assets/liabilities for which there is no past information (see *GFSM 2014*). These are relatively rare events but have the potential to significantly impact a government’s balance sheet. Figure 4 shows density plots for volume changes where the expected value is centered around zero with very skinny tails ranging from -2 to 2 percent of GDP.

Because other economic flows are not transaction based, many analytical approaches assume them to be outside of the realm of government performance as they are not within the direct control of policymakers. In some cases (volume changes due to natural disaster) this is certainly true, but in the case of holding gains or losses (valuation changes), these could, in normal economic times, be considered second order determinants of government performance as the investments themselves are determined, or at least controlled, by government.¹¹ Other economic flows for equity investments tend to be most variable in terms of magnitude for both advanced and emerging countries (Table 2). They are examined more closely in Section IV.

¹¹ For foreign investments, valuation changes would also include changes in exchange rates.

Figure 4. General Government Financial Asset Volume Change Densities

Source: IMF GFSY (1995–2012)

Table 2. Pre- and Post-Crisis Other Economic Flows in Financial Assets by Instrument
(Percent of GDP) 1/

Other Economic Flows	Pre-2008 2/	2008	Post-2008 2/
Net Acquisition of Financial Assets	1.26 (3.75)	-1.94 (5.61)	1.16 (2.81)
Currency and Deposits	0.04 (0.40)	0.09 (0.36)	-0.004 (0.20)
Debt Securities	-0.03 (0.42)	0.49 (2.59)	-0.24 (1.19)
Loans	-0.03 (0.40)	0.60 (1.94)	-0.03 (0.28)
Equity and Investment Fund Shares	1.30 (3.57)	-2.86 (6.96)	1.30 (2.44)
Other Accounts Receivable	-0.06 (0.38)	-0.26 (0.70)	0.07 (0.33)
Financial Derivatives and Employee Stock Options	0.05 (0.29)	-0.04 (0.26)	0.06 (0.27)

Source: IMF GFSY (1995–2014)

1/ Excludes Monetary gold, SDRs, and “Insurance, Pension and Standardized Guarantee Schemes” (GFSM 2014).

2/ Average

The size and variability of these two missing links in the stock-flow residual suggests that they can play an important role in the determination of a country’s overall fiscal health and transparency. The acquisition of financial assets (i) is important for liquidity purposes to offset liabilities with short term maturities, especially in the case of emerging/developing economies; (ii) can provide a source of significant profits for surplus generating governments; and (iii) serve as an important mechanism by which governments can minimize/absorb some of the damage from exogenous shocks to other sectors of the

economy. Other economic flows provides additional data on the valuation changes of these investments from secondary markets and changes in foreign exchange rates. Together, these components complete the stock-flow identity and allow for a more comprehensive analysis of the relationship between stock-flow residuals and fiscal transparency.

IV. REVISITING STOCK-FLOW RESIDUALS AND FISCAL TRANSPARENCY

Unlike actors in the private sector, policymakers are likely to base financial decisions, not only (or, not at all), on profit maximization. The financial portfolio of a government will likely take into account social welfare, economic stability, and political considerations that come with investments in state-owned enterprises, even if these carry greater risk and/or lower expected returns than those of a benchmark market index such as the S&P 500.

There are also different motivations for holding specific financial instruments within a government's portfolio.¹² Among them, we consider only two (loans, shares and equity) as potential candidates for policy lending or financial mismanagement. Both financial instruments can be used to prop up state-owned enterprises or fulfill unprofitable promises of ‘investor/lender of last resort.’ Given the relative magnitude of transactions in equities (Figure 3) and the fact that holding gains on loans will generally be zero, we focus our attention on equities.

In cases where these investments produce positive average returns over time, they do not impose a direct cost on government (measured as a decrease in net worth). In cases where financial investments produce consistently negative returns, such transactions should realistically be recorded as a government expense (policy lending) which will have an impact on fiscal balances. It is, however, difficult to determine whether capital injections contain implicit subsidies for specific financial investments (see Brixi and Irwin 2004),¹³ especially when only limited low frequency (annual) macro data are available. As noted in Buti et al. (2007), “ultimately, one would have to distinguish loans granted by government according to beneficiaries’ rating, and the specific conditions of each loan”. The same would hold true in the case of equities where “the purchase of blue-chip shares by social security investing its surpluses is not of the same nature of an injection in the share capital of a loss-making public enterprise by central government.”¹⁴ Unfortunately, the public availability of high frequency micro level data on government financial assets is extremely scarce. It is, however, possible to explore the variance in financial portfolios (by instrument) across countries and over time using the *GFSY* database. This takes the analysis a step further from past approaches

¹² Government portfolios of financial assets includes currency and deposits, debt securities, loans, shares and equity, and, other accounts receivable.

¹³ One step to improve transparency mentioned in Brixi and Irwin (2004) would be the publication of individual contracts which could include any equity acquisitions.

¹⁴ In relation to shares, the distinction between good and bad assets could be attempted by separating the shares which are quoted in the stock exchange and the non-quoted shares, in particular in enterprises which are controlled by government.

(Buti et al., 2007 and Alt et al., 2014) by incorporating information on the performance of financial assets, examining their ‘aggregate’ profitability.

Characterizing the returns of financial asset q as:

$$\tau_q = \tau_q^R + \tau_q^U$$

where τ_q^R and τ_q^U are measured as interest/dividend revenue (realized returns), and holding gains (unrealized returns) as a percentage of the stock of q . Measuring the effective realized and unrealized returns for government’s portfolio of shares and equity is a relatively straightforward exercise as both are directly reported in the *GFSY*:

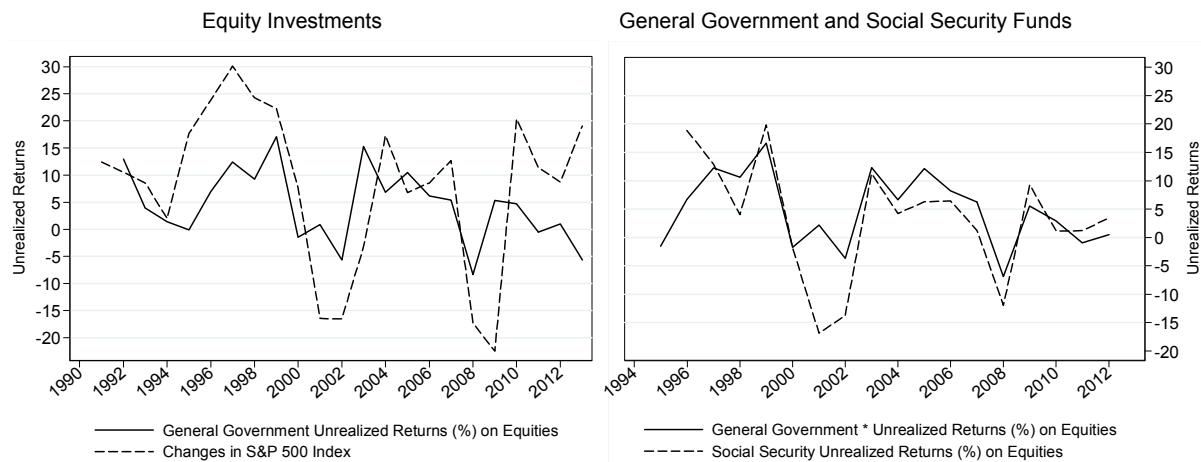
$$\tau_{SE}^R = \frac{DR}{\bar{x}_{SE}}$$

and

$$\tau_{SE}^U = \Delta val_{SE} / \bar{x}_{SE}$$

where DR is total dividend revenue over period t and \bar{x}_{SE} is the stock of government equities at the end of period t . Figure 5 shows average unrealized returns (which include movements in foreign exchange rates where applicable) for general governments net of social security subsectors relative to (a) average private returns on equity (S&P500), and (b) average unrealized returns for the social security subsector.

Figure 5. Average Returns on Equity Investments, General Government, and Social Security



Source: IMF *GFSY* (1995–2014) and S&P 500

Trends in these averages suggest that governments are relatively conservative in their choice of equity portfolio compared with those of the private sector (lower volatility in unrealized returns) and, the social security subsector performs, on average, quite poorly compared with secondary market movements in the equity portfolio of the remainder of the general government. Combining these results with those in Figure 3 suggests that governments tend to favor the acquisition of equities during market downturns. This preliminary finding supports the idea that governments are willing to act countercyclically to temporarily ensure solvency of institutional units in other sectors.

V. ESTIMATION AND RESULTS

A. Model Specification

Our focus is on the value of general government transactions in, and returns on, equities. We specify the following two equations:

$$\kappa_{jt} = \lambda \kappa_{jt-1} + \alpha^U_E \tau_{jt}^U + \alpha^R_E \tau_{jt}^R + \delta nlb_{jt} + \eta chdebt_{jt} + \rho crisis_{jt} + \mathbf{X}_{jt}\boldsymbol{\beta} + \varepsilon_{jt} \quad (3a)$$

and

$$\tau_{jt} = \theta \tau_{jt-1} + \alpha_M \tau_{jt}^M + \gamma trnsp_j + \pi \Delta fx_{jt} + \nu_{jt} \quad (3b)$$

where:

κ_{jt} is general government j's transactions in financial asset q over time period t and t+1

τ_{qjt}^p is the marginal realized ($p = R$) and unrealized ($p = U$) returns on the stock of equities at time t in country j

τ_{jt}^M captures volatility and magnitude of private market returns (year on year changes in the S&P 500 index)

nlb_{jt} is general government j's net lending borrowing (surplus/deficit) in year t as a percent of GDP

$chdebt_{jt}$ is general government j's change in gross debt between year t and year t-1 as a percent of GDP

$crisis_{jt}$ measures the binary existence of a banking crisis in country j at time t

Δfx_{jt} measure changes in exchange rates (relative to the US dollar in country j over time t

$trnsp_j$ measures fiscal transparency in country j using IMF ROSC database (see Weber 2012)

\mathbf{X}_{jt} is a matrix containing information on exogenous macroeconomic conditions in country j at time t (GDP, growth, banking crisis, exchange rates)

$(\lambda^U, \alpha^U, \alpha^R, \delta^U, \eta^U, \theta^U, \rho, \alpha_M, \pi, \beta)$ are unknown parameter to be estimated.

The logic of this specification is relatively straightforward: (i) acquisition/sale of equities can be a good investment for surplus generating countries ($\delta^U > 0$), (ii) debt is an alternative option for deficit generating countries for financing acquisition of equities ($\eta^U > 0$) which, (iii) can be used to soften the impact of exogenous shocks on other sectors in the case of a banking crisis ($\rho > 0$) or act as a countercyclical reaction to general downturn in private markets ($\alpha^U < 0$).

With respect to unrealized returns on government equity portfolios, we choose a relatively parsimonious specification (given data constraints) which models government equity returns as a function of changes in private market equity returns, fiscal transparency, and movements in foreign exchange rates (for foreign held assets).

We estimate (3a) and (3b) using a random intercept model where $\varepsilon_{Ejt} = \zeta_j + \epsilon_{jt}$ and $v_{Ejt} = \vartheta_j + \omega_{jt}$ where $[\zeta_j, \vartheta_j]$ are time constant (permanent) error terms which vary across countries and $[\epsilon_{jt}, \omega_{jt}]$ are transitory across time and countries. The consistency of parameter estimates from this GLS estimated specification, relative to a fixed effects approach, is validated using a Hausman-test.¹⁵

B. Results

Results for (3b) and for an unbalanced panel of 19 countries, respectively, are shown below with bootstrapped standard errors in parenthesis. As expected, unrealized returns on government equities are significantly correlated with private market returns on equities. From the sample of 19 countries in column 1 of Table 3, government equity portfolios should expect 0.2 percent higher returns given a 1 percent increase in the S&P 500 index. From this, general governments appear to be potentially more risk averse than private markets with their equity portfolios. There also appears to be a somewhat robust relationship between fiscal transparency and unrealized returns on government equity portfolios (see Figure 6).

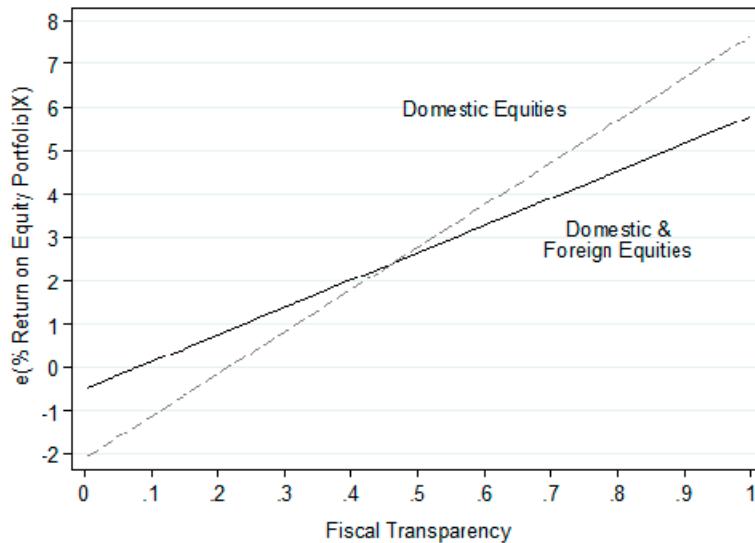
¹⁵ See Rabe-Hesketh and Skrondal (2005)

Table 3. General Government: Unrealized Returns on Shares and Equity

	Domestic and Foreign		Domestic	
Dependant variable:	General	General	General	General
α^U	Government	Government net of Social Security	Government	Government net of Social Security
(unrealized returns)	0.20*** (0.07)	0.16** (0.64)	0.12*** (0.03)	0.12*** (0.03)
τ^M				
(market returns)				
γ	6.63* (3.63)	9.73* (5.85)	9.76 (6.73)	6.72 (10.42)
Π	0.008 (0.13)	0.007 (0.07)		
(annual changes in FX %)				
λ	-0.002 (0.10)	-0.01 (0.06)	-0.001 (0.16)	0.09 (0.19)
(lagged unrealized returns)				
Constant	-1.87 (2.86)	-3.41 (4.17)	-2.79 (4.79)	-1.30 (7.26)
Countries	19	14	10	9
Observations	240	160	94	84
Rsq (within)	0.09	0.06	0.04	0.04
Rsq (between)	0.57	0.39	0.42	0.42
Rsq (overall)	0.10	0.09	0.08	0.07

Source: Authors' calculations

Note: *** - significant at p<0.01; ** - significant at p<0.05; * - significant at p<0.1

Figure 6. Predicted Unrealized Returns on Government Equity Portfolios and Fiscal Transparency

Source: Authors' calculations

These results suggest that relatively transparent governments tend to hold significantly more profitable equity portfolios by a magnitude of between 6 to 8 percent relative to less transparent governments. This relationship is especially pronounced in the case of government returns on domestic equities (dashed line). With respect to transactions in equities, results for (3a) and for an unbalanced panel of 25 countries are shown respectively

below with bootstrapped standard errors in parenthesis (Table 4). As expected, the key drivers of government net acquisitions of equities are fiscal balances (surplus generating countries are more likely to acquire equities), changes in gross debt, and exogenous shocks to other sectors (banking crisis). Realized returns (dividend receipts) appear to play a minimal role in governments' acquisition of equities with the consistently negative coefficient on unrealized returns potentially signifying a government's willingness to invest in equities during market downturns.

Table 4. Government Net Acquisition of Shares and Equity

	Domestic and Foreign		Domestic	
	General Government	General Government net of Social Security	General Government	General Government net of Social Security
κ_{Ejt} (net acquisition of equities)	General Government	General Government net of Social Security	General Government	General Government net of Social Security
δ_{SE} (net lending/borrowing)	0.27*** (0.08)	0.14*** (0.05)	0.12* (0.07)	0.14** (0.07)
η_E (changes in gross debt)	0.13*** (0.03)	0.13*** (0.04)	0.08** (0.04)	0.10*** (0.03)
ρ_{SE} (banking crisis)	0.57* (.32)	0.52** (0.26)	0.90* (0.53)	0.56* (0.32)
α^R_{SE} (realized returns)	-0.07 (0.05)	-0.06 (0.04)	-0.05 (0.07)	-0.01 (0.05)
α^U_{SE} (unrealized returns)	-0.04* (0.03)	-0.3** (0.13)	-0.03* (0.02)	-0.02 (0.02)
Constant	1.92 (1.86)	0.09 (1.99)	-0.73 (2.42)	-1.36 (2.06)
Countries	25	18	18	15
Observations	274	200	180	148
Rsq (within)	0.21	0.37	0.21	0.20
Rsq (between)	0.70	0.30	0.19	0.44
Rsq (overall)	0.41	0.36	0.21	0.23

Source: Authors' calculations

Note: *** - significant at p<0.01; ** - significant at p<0.05; * - significant at p<0.1

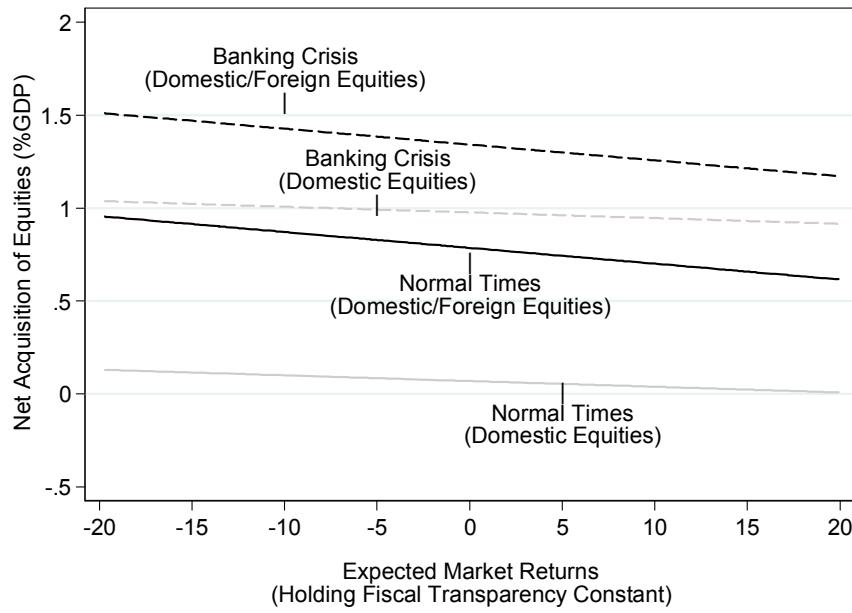
Because $\kappa = f_\kappa(\tau)$ and $\tau = f_\tau(\tau^M, \text{trnsp})$, we assume that the effects of fiscal transparency and market volatility on government net acquisitions of equities can be isolated by imputing predictions from (3b) into (3a) holding these constant one at a time.¹⁶ We use estimates of what market returns would look like if (i) holding fiscal transparency constant and varying market returns $f_\tau(\tau_{jt}^M, \overline{\text{trnsp}})$ and (ii) holding market

¹⁶ This is imperfect for several reasons including the assumption that: $v_{Ejt} = 0 \rightarrow$ ((3b) is perfectly specified (which is not the case) and, that the parameter estimates in (3b) are known, or, estimated without error ($\text{var}(\alpha_M) = \text{var}(\gamma) = 0$). Where 3b is not perfectly specified, this approach assumes that the residuals from equation (3a) and (3b) are uncorrelated ($\text{corr}(\varepsilon_{Ejt}, v_{Ejt}) = 0$) and the parameter estimates in Table 3 and Table 4 are consistent.

volatility constant while varying fiscal transparency $f_\tau(\overline{\tau}_{jt}^M, \text{trnsp})$. Plugging these estimates for f_τ into f_κ via τ_{SE} captures the second order effect of fiscal transparency on government acquisition of equities in the first case (trnsp), and captures the second order effects of private market volatility in the second case ($\overline{\tau}_{jt}^M$).

The predicted first order effects of a banking crisis and second order effects of private market fluctuations in equity prices on net acquisitions of general government equities from equation (3b) are shown in Figure 7. The dashed and solid lines show the predicted net acquisition of government equities during banking crisis and in normal times, respectively. Moving along the x-axis, we can see that governments tend to partially favor equities during market downturns, which could work as a countercyclical mechanism to restore short-term confidence in the market. Moving along the y-axis, it appears that governments tend to be highly active in providing equity injections during domestic banking crisis. This effect is especially pronounced for investments in domestic equities where governments appear to be more sensitive to banking crisis, providing a ‘cushion’ during periods of exogenous shocks to other sectors of the economy.

Figure 7. Government Acquisitions of Equities—Market Downturns and Bank Crises

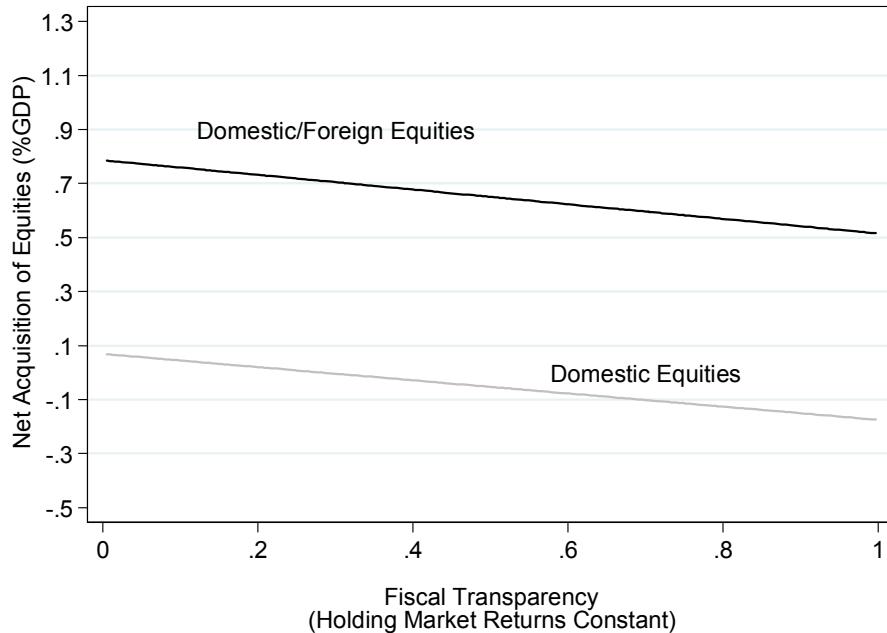


Source: Authors' calculations

The predicted second order effect of fiscal transparency on governments’ net acquisitions of equities is shown in Figure 8. While an interesting avenue for future research would be the second order multiplicative effects of fiscal transparency and market returns on net acquisition of equities (are less transparent governments more likely to sell off

financial assets during crisis), equation (3b) characterizes these as being additive and thus independent.¹⁷

Figure 8. Government Acquisitions of Equities and Fiscal Transparency



Source: Authors' calculations

This independence allows for a separation of the effects of market volatility and fiscal transparency. The second order relationship in Figure 8 is independent of changes in the equities market. During normal times, we would, therefore, expect less transparent governments to acquire relatively larger equity portfolios than more transparent ones (moving along the x-axis), which is generally consistent with past findings (Buti et al., 2007; Alt et al., 2014).¹⁸ Combining this with the findings from Figure 6, less transparent countries should be expected to generate significantly lower average returns on larger portfolios suggesting the potential that these portfolios contain some degree of ‘policy lending’ or ‘unsafe assets.’

VI. DISCUSSION AND CONCLUSION

The results in this paper are encouraging for clarifying the relationship between stock-flow residuals and fiscal transparency. Government acquisition of shares and equities are used as a tool to generate material returns for surplus generating governments, or to ‘cushion’

¹⁷ We run an alternative specification for unrealized returns including a multiplicative term with promising results, suggesting transparent governments are more reliable during downward macroeconomic periods. These results would require a larger sample size to validate.

¹⁸ These authors considered fiscal transparency as a first order determinant of net acquisition of government equities.

the impact of exogenous shocks to other sectors of the domestic economy, or to hide expected losses from policy lending. Unlike past contributions, this paper finds that government acquisition of equities on their own, are not indicative of fiscal gimmickry, as average returns over time for transparent governments tend to be relatively profitable. A more promising indicator of fiscal transparency appears to be the size of unrealized returns on government equity portfolios.

Comprehensive fiscal surveillance based on more complete financial statistics, such as those based on equation (2b), may help reduce the incentives for data fiscal gimmickry. Unfortunately, however, the majority of countries continue to report budget statements on a cash basis or do not report sufficient data to compute equation 2a, especially for the general government sector. Of the 140 countries who reported government finance statistics in the *GFSY 2014*, only about 18 percent reported sufficient data to compute equation 2b. In this respect, the results in this paper, which are based on a truncated sample of relatively transparent countries, are very preliminary and require much larger sample sizes to validate.

Appendix I. Country-Year Coverage¹⁹

Country	Years
Australia	2004–2012
Austria	1997–2012
Hong Kong	2006–2012
Colombia	2009–2012
Cyprus	2001–2012
Denmark	1996–2012
Estonia	1996–2012
Finland	1996–2012
France	1996–2012
Greece	1996–2012
Hungary	1996–2012
Iceland	2002–2008
Italy	1996–2012
Japan	2001–2012
Lithuania	2008–2012
Luxembourg	2002–2012
Malta	2004–2012
Netherlands	1996–2012
Norway	2000–2012
Portugal	1998–2012
Russian Federation	2005–2012
Slovak Republic	2003–2012
Spain	1996–2012
Sweden	1996–2012
Turkey	2008–2012
United Kingdom	1996–2012

Source: IMF *GFSY* (various years)

¹⁹ Country coverage is based on the reporting of transactions and other economic flows in financial assets.

Appendix II. Summary Statistics

Variable	Mean (s.d.)	Min.	Max.	Source
General Government change in Gross Debt	5.35 (15.75)	-22.46	30.09	
General Government Net lending/borrowing	-1.71 (5.08)	-15.63	18.79	
General Government realized returns on equities other than shares (% Stocks)	3.65 (2.89)	0.02	16.53	
General Government unrealized returns on equities other than shares (% Stocks)	4.18 (12.09)	-50.34	50.53	
General Government Transactions in Financial Assets (% GDP)	1.73 (3.77)	-5.35	34.47	
- <i>Currency and Deposits</i>	0.51 (2.03)	-10.88	14.65	
- <i>Loans</i>	0.22 (1.66)	-20.09	14.38	
- <i>Debt Securities</i>	0.36 (1.86)	-14.00	24.45	
- <i>Equity and Investment Fund Shares</i>	0.37 (2.16)	-6.48	21.83	
- <i>Derivatives and Employee Stock Options</i>	-0.04 (0.24)	-2.64	0.26	
- <i>Other Accounts Receivable</i>	0.37 (0.89)	-4.66	6.44	
General Government Other Economic Flows in Financial Assets	1.00 (3.67)	-22.25	32.29	
- <i>Currency and Deposits</i>	0.04 (0.33)	-0.63	4.93	
- <i>Loans</i>	-0.01 (0.85)	-8.38	6.91	
- <i>Debt Securities</i>	0.02 (0.85)	-7.00	11.65	
- <i>Equity and Investment Stock Options</i>	0.90 (3.80)	-25.27	31.12	
- <i>Derivatives and Employee Stock Options</i>	0.09 (0.41)	-0.79	3.02	
- <i>Other Accounts Receivable</i>	-0.002 (0.71)	-5.79	7.16	
Gross Domestic Product (ln)	27.38 (2.26)	22.23	34.13	IMF International Financial Statistics Yearbook
Changes in Foreign Exchange Rates (annual %)	0.19 (9.35)	-16.95	40.58	
Banking Crisis	0.22	0	1	Weber (2012)
Fiscal Transparency	0.71 (0.13)	0.38	0.90	IMF Fiscal Transparency Report on Observance of Standards and Codes

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