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Abstract

This theoretical paper studies the issue of fiscal transparency, which we define as asymmetry of information between the households' perception of fiscal policy and the actual government balance sheet, in the context of a 24-hour news cycle. We model the economy using the New Keynesian three-equation model to study the effect of fiscal transparency on output, inflation, and especially government debt in order to draw conclusions that are relevant in the realm of policy-making in a sovereign debt crisis scenario. We find that a higher degree of fiscal transparency leads to greater levels of output and inflation as well as higher government debt.

Keywords

fiscal transparency, fiscal policy, output, inflation

The Effect of Fiscal Transparency on Output, Inflation, and Government Debt

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Abstract

This theoretical paper studies the issue of fiscal transparency, which we define as asymmetry of information between the households' perception of fiscal policy and the actual government balance sheet, in the context of a 24-hour news cycle. We model the economy using the New Keynesian three-equation model to study the effect of fiscal transparency on output, inflation, and especially government debt in order to draw conclusions that are relevant in the realm of policy-making in a sovereign debt crisis scenario. We find that a higher degree of fiscal transparency leads to greater levels of output and inflation as well as higher government debt.

1. Introduction

This paper theoretically analyzes how the government's transparency with regards to its fiscal position affects output, inflation, and especially public debt. We choose these three variables because they are mostly representative of the economy and they allow us to capture most of the effects of fiscal transparency on economic outcomes. Moreover, these three economic outcomes are the most present in the existing literature. This has to do with the notion that the effects of fiscal transparency on the real economy are mostly indirect, which means that choosing other outcomes, such as employment or the capital stock, may lead to far-fetched conclusions about their relationships.

Transparency in regard to all government activities is a cornerstone of a democratic society, as the people elected to public office have an obligation to keep their constituents informed to ensure that they are acting in their best interest. It is in fact not a coincidence that authoritarian regimes are known to give a distorted version of the truth, or even to outright lie, to their own citizens to make sure that they do not question the government's behavior. In the last two to three decades households have been able to retrieve important fiscal policy information from the media, thanks to the existence of a 24-hour news cycle, as the activities of governments in developed countries have been under a great degree of scrutiny. In particular, one of the topics which most news outlets spend a lot of time covering is government debt and fiscal policy. However, given the relatively infinite amount of channels through which individuals can obtain this information, they sometimes end up forming fiscal policy opinions that deviate from the government's actual fiscal position (Bernoth and Wolff, 2008). One of the greatest issues that arise with the existence of such a large number of news outlets has to do with how they each interpret an official government announcement, especially when it is not a transparent one. This issue has had the attention of global financial markets especially since the 2016 Presidential Election and the rise of the fake news phenomenon across most developed countries.

The principal issue that we investigate is how fiscal transparency (or lack thereof, referred

to as fiscal opacy) affects market expectations of future fiscal policy. In particular, we assume that both the government itself and media outlets make an announcement on the current status of fiscal policy which allows markets to form beliefs on future fiscal policy outcomes. Intuitively, if the media's announcement is close enough to the government's, then the government is being relatively transparent with regard to its fiscal position, and vice-versa otherwise, and is thus able to conduct expansionary fiscal policy and efficiently allocate money to meaningful projects. We hypothesize that fiscal opacy generates non-trivial uncertainties in the economy that cause households to act sub-optimally and expect a smaller fiscal stimulus than they otherwise would, therefore leading to lower income, inflation, and government revenue.

In this paper we model the economy using the New Keynesian 3-equation model to study the impact of this specific issue on output, inflation, and government debt. The vast majority of the papers that have been written are empirical ones, so this paper's contribution is to study a heavily-researched topic using a new theoretical approach. Our results from comparative statics analysis are consistent with our hypothesis and provide a theoretical backing for the existing quantitative findings. Specifically, they agree with the works of Galois and Wei (2002) and Teig (2006), Sargent and Wallace (1989), and Bastida et al. (2015) in that a lower degree of uncertainty on fiscal policy, generated by a relatively more transparent government, has beneficial effects across the economy: total output and inflation increase, thus suggesting positive economic outcomes, and government debt also increases, caused by the government's higher revenue and a greater degree of freedom to implement the fiscal stimuli that it intends to.

The remainder of the paper is as follows: in section 2 we place the topic of fiscal transparency in the existing economic literature; in section 3 we set up the theoretical model; in section 4 we solve the model and analyze the results by conducting comparative statistics; section 5 is the conclusion.

2. Literature Review

As we mentioned above, the existing literature abounds of studies on the effect of government transparency on economic outcomes. It is further divided into two separate categories, fiscal transparency and interest rate transparency. This theoretical paper fits inside the first. The literature, most of which is empirical, shows evidence that fiscal transparency is generally associated with a better economic outcomes, good governance, and more democratic (Fukda-Parr et al., 2011; Kopits and Craig, 1998). Furthermore, countries with low levels of fiscal transparency tend to be low-income, authoritarian regimes, and located in parts of the world with ongoing internal and international wars (Guillamon et al., 2011). The asymmetry of information generated by a non-transparent government causes a suboptimal outcomes because of wasteful and inefficient government spending (Persson et al., 1997). Heald (2003) is one of the few papers that claim that fiscal transparency is not always beneficial, arguing that an “overexposure” to government budgetary information may lead to some inefficiencies, political polarization, and high maintenance costs.

Since a lot of papers study the effect of fiscal transparency on output and inflation at the same time, we cover them simultaneously. Wehner and Renzio (2010) and Baldrich (2005) both find non-trivial positive relationships between fiscal transparency and GDP per capita. Similar works study the same relationship through a third outcome. Gelois and Wei (2002) find that lower fiscal opacity increases confidence in international investors, and therefore foreign direct investment, which leads to higher levels of GDP and inflation rates. Sargent and Wallace (1989) claim that fiscal transparency is closely tied to a well-functioning monetary authority. Especially in countries that adopt inflation targeting or that operate under high government debt, fiscal transparency is of fundamental importance: it puts pressure on interest rates and the money supply, and thus inflation levels. Teig (2006) finds a negative relationship between a transparent government and the level of corruption, as his result show statistically significant evidence to correlate corruption and output. Benito and Bastida (2009) study a sample of 41 countries, developed and developing ones, and find

that higher fiscal transparency leads to higher voter turnouts and a decreased budget deficit, which then in turn translates into better economic outcomes, including output per capita. The empirical work of Montez and Lima (2018) shows a negative relationship between fiscal transparency and inflation, which they attribute to lower economic volatilities. They argue that the effect of inflation volatility on inflation expectations is stronger than the positive externalities of a more transparent government, thus resulting in an overall decrease in inflation. They find that this effect is stronger in developing countries and countries whose central bank adopts inflation targeting.

With regard to the effects of fiscal transparency on government debt, Bernoth and Goff (2008) empirically study the effects of creative accounting on interest rate spreads between bond yields in European countries; they find that a higher degree of fiscal transparency reduces risk premia, a result which they attribute to the relatively lower influence that a government announcement has on financial markets' beliefs regarding the current fiscal position. Wang et al. (2012) study the same relationship by mimicking the work of Duffie and Lando (2001), but they edit their asset density function with added positive bias; they find that low fiscal transparency, which they refer to as fiscal opacity, increase credit spreads non-linearly. Alt and Lassen (2006) study a cross-section off 19 countries in 1999 to study the impact of fiscal transparency on the government deficit; they show that fiscal transparency ensures better fiscal outcomes when the size of the debt is small enough, less than 1% of GDP, but they are unable to come to the same conclusion in countries that have large outstanding public debt.

In the existing economic literature numerous fiscal transparency papers study it quantitatively by exploiting the notion of creative accounting. Creative accounting is a government practice strategically implemented to lead individuals to form beliefs on fiscal policy that differ from its actual fiscal position. Von Hagen and Wolff (2006) show some European countries in the midst of a sovereign default crisis tend to utilize stock-flow adjustments, a form of creative accounting, to hide budget deficits. This phenomenon is particularly prevalent to

circumvent the EU regulation named Stability and Growth Pact, whose very primary goal is to constrain government behavior. Milesi-Ferretti (2000) theoretically studies what types of environments lead governments to engage in creative accounting practices. She finds that when the publicly-available budget is not transparent to begin with governments are more likely to trade off a, costly, fiscal adjustment in favor of creative accounting. Unsurprisingly, Koen and van den Noord (2004) show that the more binding fiscal rules are the more likely a government is to adopt fiscal gimmicks.

Every paper mentioned above is an empirical one, whereas this paper takes a theoretical approach to study the effect of fiscal transparency on output, inflation, and government debt. To the author's best knowledge, there does not exist a study that analyzes these relationships using the New Keynesian 3-equation model. Hence, our most significant contribution is that we theoretically model fiscal transparency using the notion of creative accounting.

3. Model

We adopt the framework of the New Keynesian 3-equation model and analyze fiscal transparency in a similar fashion to how the existing literature models central bank transparency (Blinder, Ehrmann, Fratzscher, De Haan, Jansen, 2008; Poutineau, Sobczak, Vermandel, 2015). The model consists of three equations, each specifying the three variables of interest: output, inflation, and government debt.

We start off by introducing the notion of fiscal transparency. The works of Koen and van der Noord (2005), von Hagen and Wolff (2006), and Milesi-Ferretti (2000) show evidence to argue that governments regularly engage in creative accounting practices to booster their fiscal position and mislead financial markets. Once the government makes an official announcement regarding its fiscal position, we can write

$$F_t - F_t^{\text{official}} = CA_t \tag{1}$$

where $CA = c + \epsilon_c$. We assume that investors know c , the average usage of creative account-

ing, and that they *do not* know the true fiscal position of the government. F_t is the actual fiscal position and F_t^{official} is what the government says it is. Combining the two, we have

$$F_t - F_t^{\text{official}} = c + \epsilon_c \Rightarrow F_t^{\text{official}} + c = F_t - \epsilon \quad (2)$$

where ϵ is normally distributed with mean 0 and standard deviation ρ . Let $\tilde{F}_t^{\text{official}} = F_t^{\text{official}} + c$. After the government makes an official announcement regarding its fiscal position, there is a second announcement, done by news outlets and other agencies that closely follow government activities. This is another estimate of F_t , which we denote by

$$F_t^{\text{other}} = F_t - \eta \quad (3)$$

where η is also normally distributed with mean equal to zero. Hence, households' true expectation of the government's fiscal position is given by

$$F_t^e = \frac{\rho \tilde{F}_t^{\text{official}} + \omega F_t^{\text{other}}}{\rho + \omega} =$$

$$\frac{\rho \tilde{F}_t^{\text{official}} + \omega \tilde{F}_t^{\text{official}} + \omega F_t^{\text{other}} - \omega \tilde{F}_t^{\text{official}}}{\rho + \omega} = \tilde{F}_t^{\text{official}} + \frac{\omega}{\rho + \omega} (F_t^{\text{other}} - \tilde{F}_t^{\text{official}}). \quad (4)$$

Let $\gamma = \frac{\omega}{\rho + \omega}$ and $m_t = F_t^{\text{other}} - \tilde{F}_t^{\text{official}}$, so we have

$$F_t^e(m_t) = \tilde{F}_t^{\text{official}} + \gamma m_t. \quad (5)$$

The parameter γ captures the level of precision of the news agencies' announcement with respect to government's announcement. Thus, $\gamma = 0$ means that news agencies do not lead financial markets to believe that the government's creative accounting practices are greater than it says they are; vice-versa, $\gamma = 1$ means that news outlet completely disregard the government's announcement and are able to completely sway the opinion of investors about

creative accounting.

A more transparent government means that the value of m decreases, since the difference between the two fiscal policy announcement get small. Furthermore, we assume that the government intends to enact fiscal policy; this means that a higher level of fiscal transparency decreases the asymmetry of information and households behave optimally, thus gives the government more freedom and flexibility to allocate money optimally. Therefore, $F_t^e(m_t) < 0$. Below is a summary of the relationship between m and F_t^e :

- $m_t = 0 \Rightarrow F_t^e(m_t) = \tilde{F}^{\text{official}}$
- $m_t \uparrow \Rightarrow F_t^e(m_t) \geq \tilde{F}^{\text{official}}$
- $m_t \downarrow \Rightarrow F_t^e(m_t) \leq \tilde{F}^{\text{official}}$.

As m_t decreases, the difference between F_t^{other} and $\tilde{F}^{\text{official}}$ decreases, therefore the government becomes more transparent with regards to fiscal policy. Intuitively, if the government's announcement is clear and concise, i.e. the government is transparent, the news media's announcement will closely resemble the one of the government and household will form belief on fiscal policy that are close enough to the government's true fiscal position. On the other hand, if the government is vague and not transparent, then news outlets will all have different interpretations in the second announcement and the public will form a wide range of opinions on fiscal policy.

The output equation is derived from the standard dynamic IS curve equation:

$$y_t = y_{t+1}^e - \frac{1}{\sigma}(r_t - \pi_{t+1}^e) - \alpha D_t. \quad (6)$$

This relationship arises from the intertemporal equilibrium condition of a representative household given its budget constraint (Poutineau et al., 2015). Specifically, the output gap in period t is a function of the expected output gap in period $t + 1$ and the real interest rate ($r_t - \pi_{t+1}^e$); σ is the risk-aversion parameter. Lastly, d_t is government debt in period t , so

$D_t = G_t - T_t$ (Mathieu and Sterdyniak, 2013). The coefficient α is negative because when D_t increases the government has to issue bonds to borrow money to repay its debt obligations. This corresponds to a leftward shift in the supply curve in the loanable funds model, which causes an increase in interest rates and a decrease in the price of the outstanding bonds. Therefore, the households that already owned government bonds will get a lower return than they otherwise would have, thereby decreasing public savings. Recalling the identity "total savings = total investment", we have an overall decrease in output.

We model inflation using a standard Phillips Curve equation:

$$\pi_t = \beta\pi_{t+1}^e + \kappa y_t. \quad (7)$$

This relationship arises from the aggregation of supply decisions by firms that operate under nominal price stickiness (Poutineau et al., 2015). Specifically, inflation in period t is a function of expected inflation in period $t + 1$ and the output gap in period t ; β is the discount factor and κ represents the increase in inflation from a one-unit increase in the output gap.

We model government debt using the following equation:

$$D_t = D_{t-1}(1 + r_t - \pi_t) + \theta F_t^e(m_t). \quad (8)$$

Government debt in period t depends on government debt in period $t - 1$, accounting for the real interest rate $(1 + r_t - \pi_t)$, and the expected fiscal policy as a function of fiscal transparency. Recall that the quantity m_t is the difference between the government's announcement and the media's announcement.

4. Results and Analysis

From equations (6) – (8), we total-differentiate each to get:

$$dy = dy - \frac{1}{\sigma}dr + \frac{1}{\sigma}d\pi - \alpha dD \quad (9)$$

$$d\pi = \beta d\pi + \kappa dy \quad (10)$$

$$dD = dD(1 + r - \pi) + D(dr - d\pi) + \theta F_m dm. \quad (11)$$

In this paper we are interested in the effect of fiscal transparency on output, inflation, and government debt: $\frac{dy}{dm}$, $\frac{d\pi}{dm}$, and $\frac{dD}{dF}$ respectively, in order to conduct comparative statics analysis. Furthermore, since we are interested in the independent effect of fiscal transparency, we set the change in interest rate equal to 0, that is $dr = 0$. By re-writing the system of equations above in matrix form we have

$$\begin{bmatrix} 0 & -\frac{1}{\sigma} & \alpha \\ -\kappa & 1 - \beta & 0 \\ 0 & 0 & r - \pi \end{bmatrix} \begin{bmatrix} dy \\ d\pi \\ dD \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ \theta F_m dm \end{bmatrix},$$

where the determinant is

$$\begin{vmatrix} 0 & -\frac{1}{\sigma} & \alpha \\ -\kappa & 1 - \beta & 0 \\ 0 & 0 & r - \pi \end{vmatrix} = -\kappa d\alpha - \frac{1}{\sigma} \kappa (r - \pi) < 0,$$

provided that $r > \pi$. Note that this is a reasonable assumption, given current levels of inflation and interest rates.

Using Cramer's Rule, we have

$$\frac{dy}{dm} = \frac{\begin{vmatrix} 0 & -\frac{1}{\sigma} & \alpha \\ 0 & 1 - \beta & 0 \\ \theta F_m & 0 & r - \pi \end{vmatrix}}{-\kappa d\alpha - \frac{1}{\sigma} \kappa (r - \pi)} = \frac{-\alpha(1 - \beta)\theta F_m}{-\kappa d\alpha - \frac{1}{\sigma} \kappa (r - \pi)} \quad (12)$$

$$\frac{d\pi}{dm} = \frac{\begin{vmatrix} 0 & 0 & \alpha \\ -\kappa & 0 & 0 \\ 0 & \theta F_m & r - \pi \end{vmatrix}}{-\kappa d\alpha - \frac{1}{\sigma}\kappa(r - \pi)} = \frac{-\alpha F_m}{-d\alpha - \frac{1}{\sigma}(r - \pi)} \quad (13)$$

$$\frac{dD}{dm} = \frac{\begin{vmatrix} 0 & -\frac{1}{\sigma} & 0 \\ -\kappa & 1 - \beta & 0 \\ 0 & d & \theta F_m \end{vmatrix}}{-\kappa d\alpha - \frac{1}{\sigma}\kappa(r - \pi)} = \frac{-\frac{1}{\sigma}F_m}{-d\alpha - \frac{1}{\sigma}(r - \pi)}. \quad (14)$$

From equation (12), recall that we assumed $F_t^e(m_t) < 0$. This implies that as fiscal transparency increases households are able to form accurate beliefs on the government fiscal position, which allows it to pass the expansionary policy measures that it desires, which corresponds to a larger fiscal stimulus, that is $F_m < 0$. Therefore, $\frac{dy}{dm} < 0$. This means that a decrease in m , which is an increase in fiscal transparency, leads to an increase in total output. While a direct relationship between the two variables is not immediately obvious, the source of this result is probably correlated to the positive externalities brought about by a more transparent government. This is in fact consistent with the findings of Galois and Wei (2002) and Teig (2006): a decrease in fiscal opacity most likely decreases the risk premium associated with financing projects, increases consumer confidence and political stability. Hameed (2006) also finds that fiscal transparency is positively correlated with fiscal discipline, which means that the government is able to efficiently allocate money to meaningful projects, thus stimulating economic activity. The aggregate effect is an increase in total output.

For the effect of fiscal transparency on inflation we have

$$\frac{d\pi}{dm} = \frac{-\alpha F_m}{-D\alpha - \frac{1}{\sigma}(r - \pi)}.$$

Similar to above, $F_m < 0$ implies that $\frac{d\pi}{dm}$ is also negative. Therefore, an increase in fiscal transparency leads to an increase in inflation as well. This relationship is perhaps even more indirect than the one with GDP, since it is so heavily influenced by expectations. When fiscal transparency increases, households expect that expansionary fiscal policy will stimulate economic activity which will likely help the economy grow, causing inflation to rise. On the one hand, this result partially agrees with Sargent and Wallace (1989), who argue that a higher degree of fiscal transparency increases the government trustworthiness and their ability to effectively stimulate economic activity which leads to an increase in inflation. For reference, they also find that fiscal transparency eases the pressure on the central bank, especially when it operates under an inflation mandate, which means that it has an even broader impact on those countries. On the other hand, this result goes against the findings of Montez and Lima (2018) whose work shows that a higher degree of fiscal transparency lowers inflation rates and inflation volatility as well as that this effect is stronger in developing countries.

Finally, for the effect of fiscal transparency on government debt we have

$$\frac{dD}{dm} = \frac{-\frac{1}{\sigma}F_m}{-D\alpha - \frac{1}{\sigma}(r - \pi)}.$$

Similar to above, $F_m < 0$ implies that $\frac{dD}{dm}$ is also negative. An increase in fiscal transparency increases the credit ratings and the share of debt owned by foreign creditors, thus allowing the government to borrow more from the households than it otherwise would; this enhances the already-present fiscal policy regime, leading to greater government spending and higher levels of debt (Bastida et al., 2015; Kemoe and Zhan, 2018). This result goes against the findings of Alt and Lassen (2006) that show that the positive effect of fiscal transparency on output and revenue is greater than the fiscal burden caused by higher levels of spending; the net result is therefore a lower government debt.

As per Trinh (2017), “the job of monetary policy is one of managing expectations”. One

could thus draw a parallel between fiscal transparency and monetary policy transparency, especially in an economy in which households are able to obtain crucial macroeconomic information almost instantaneously, thanks to the 24-news cycle. Therefore, in terms of policy implication under a sovereign default crisis, our model shows that a higher degree of fiscal transparency increases output and therefore public revenue. Clear signs of fiscal transparency for the government are the equivalent of forward guidance behavior for the Federal Reserve. If the government is attempting to reassure and instill confidence in financial markets, implementing changes to the way in which it goes about relaying information about its finances can generate tangible benefits. For instance, publishing its fiscal position more frequently, including more detailed descriptions of its spending, or decreasing (if not completely eradicating) creative accounting practices are all possible routes to steer the economy in the right direction. Even though our model shows an increase in the government budget deficit, this is likely to only be temporary, as the economic growth and the positive externalities of a transparency are able to restore faith in creditors and households and steer the government onto the path of debt consolidation in the near future.

5. Conclusion

This paper investigates how fiscal transparency affects output, inflation, and government debt, with some emphasis on sovereign default scenarios. We find that less fiscal opacity creates a more favorable environment for the government to conduct expansionary fiscal policy, which leads to higher GDP, higher inflation, and higher government debt. All three effects are linked to the government's increased ability to borrow money in order to stimulate economic activity.

Significant limitations of these results lie in the numerous assumptions we imposed on a lot of our variables as well as in the fact that we modeled the economy with only three equations. We used the notion of creative accounting as a proxy for fiscal transparency, but there are several other ways to specify the same indicator. Furthermore, a lot of the rationalizations in our conclusions rely on the results already present in the existing literature, whose theoretical

(and sometimes empirical) approach is entirely different; that is, we assumed that certain sectors of the economy, such as financial markets or households, behave the same way they do in prior research without actually modeling or specifying their incentive structure.

The topic of fiscal transparency is undoubtedly at the forefront of the economic literature, especially in an environment where the news cycle keeps us updated on current events every minute of every day. Future theoretical papers studying this issue should consider an environment which includes more agents with rigorous incentive structures and constraints, in order to cement the conclusions on solid ground. Moreover, since there does not exist a rigorous definition of fiscal transparency, further studies should consider modeling it using more than one indicator and minimize its inherent specification bias.

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