Inflation targeting and public expenditure in developing countries

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Abstract

This paper assesses the effect of inflation targeting (IT) on public expenditure in 37 developing countries over the period 1990-2016. Using the PSM, we show that IT reduces public expenditure in inflation-targeting countries. A more disaggregated analysis shows however that this effect is more heavily supported by current expenditure. The results highlighted in this paper are robust to an alternative definition of the treatment variable, the addition of different control variables, the use of an alternative method and to unobservable characteristics. Finally, some sensitivity analyses conducted in this paper show that the results are sensitive not only to the type of inflation targeting but also to some structural characteristics of the target countries.

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1 Introduction

How does the discipline effect of inflation targeting (IT) work on fiscal policy? This question is, and will be, the focus of this paper. Since the first episodes of the adoption of inflation targeting by developed countries, but particularly since the adoption of this "new" monetary policy framework by developing countries, which is also taking the form of an institutional arrangement replacing other monetary policies such as exchange rate targeting, much work has been done on the effect of this policy on various types of economic performance. The adoption of this policy framework implies a number of changes. It separates, for example, the Central Bank from the political power. Indeed, the decisions of the Central Bank or simply monetary policy are no longer the responsibility of the Finance Minister or the government. The monetary policy is now delegated [1] to an institution (the Central Bank) whose objectives may conflict with those of the government. However, this delegation or independence of the Central Bank does not mean that it is safe from the excesses of an erratic or unsound fiscal policy. Indeed, according to the very famous Chicken-game theory, the Central Bank is the party that deviates in a game in which its opponent is the government. This deviation allows the Central Bank to save the economy before the drift (which

1. The delegation helps to limit the discretionary aspect of the monetary policy.

can be more expensive). This argument is also consistent with the very famous unpleasant monetarist arithmetic of Sargent *et al.* (1981) and Sargent et Wallace (1984). There are other theories that show the effect of lack of fiscal discipline on inflation targeting. These include the famous fiscal price theory (Leeper, 1991;Leeper, 2016 and Woodford, 1995 for instance) or Leeper (1991), Woodford (1995),Bergin (1998) ,Mishkin (2001),Sims (2004) or to some extent Metin (1998),Sargent (1999), Blanchard (2004) and Ersel et Özatay (2008). One of the arguments behind this fiscal price theory is the respect of the transversality constraint of the government despite the fact that it is non-Ricardian. To do this, the government, through its actions, generates inflation and erodes the real value of the debt. These various interactions and (negative) externalities of fiscal policy on the independence of the Central Bank are therefore subject to fiscal dominance thus leading to a time inconsistency situation. Fiscal price theory, even if it is corroborated by some empirical studies, is still more or less criticised in the literature.

The literature on the nexus between monetary policy (IT) and fiscal policy is still very rich. By weaning the government, the Central Bank forces it to control its fiscal behaviour. Indeed, inflation targeting is associated with the loss of seigniorage revenues. These revenues are a means of financing public expenditure and/or public debt (Barro et Gordon, 1983, Alesina et Tabellini, 1987) and their lose may force the government to be more disciplined in its budgeting (Masciandaro et Tabellini, 1988 ; Castellani et Debrun, 2001;Montiel, 2011; Kadria et Aissa, 2014 ; Minea et Tapsoba, 2014;Kadria et Aissa, 2016 ; Combes *et al.*, 2017;Ciro et de Mendonça, 2017; Ardakani *et al.*, 2018). In addition to the discipline effect, many other effects have been documented in the literature. One of the effects highlighted in many different papers is the credibility effect. This credibility is measured in different ways and can take the form of exchange rate stability, lower volatility of inflation, lower inflation rate, lower volatility of GDP or growth and interest rates and more (Alesina et Summers, 1993;Mishkin et Posen, 1998;Hyvonen et Hyvonen, 2004;Levin *et al.*, 2004;Pétursson, 2005;Vega et Winkelried, 2005; Mishkin et Schmidt-Hebbel, 2007 ; Batini et Laxton, 2007; Rose, 2007;Gonçalves et Salles, 2008; Lin et Ye, 2009 ; Lin, 2010; Coulibaly et Kempf, 2010;De Mendonça et e Souza, 2012 ; Coulibaly et Kempf, 2019 ; López-villavicencio et Pourroy, 2019).The credibility raised here should therefore be useful for developing countries, where its relative weakness in the various policies generates time inconsistency. By limiting time inconsistency and sending the appropriate signals to international market, "good" policies such as IT would promote access to the necessary financing for these developing countries' growth and development. This credibility is raised in another way (explicitly or not) in the literature. Indeed, the adoption of the IT tends to lower the sovereign debt risk or increase the debt rating and lower government bond yield spreads or more (Minea *et al.*, 2015;Thornton et Vasilakis, 2016;Balima *et al.*, 2017). It also allows the target countries to borrow in their own currency (Ogrokhina et Rodriguez, 2018) . The latter situation saves them from, for example, exchange rate shocks that can cause the exchange rate fluctuations. Borrowing in their currency is an insurance against foreign currency shocks. This form of credibility also connects the debt of these countries to their reality instead of drawing on the reality of other countries by borrowing in foreign currency. The credibility involved here would come from low inflation that prevents the value of the debt from being eroded.

The concept of credibility mentioned above would be one of the consequences of the fiscal discipline provided by IT adoption. But how does this discipline work ? One way is to apply sustainability *à la* Bohn (2008). The target country in this situation will play a non-ponzi game by generating the surplus required for the sustainability of its debt. In order to do this, the government has only budgetary or fiscal efforts since the Central Bank becomes independent [2]. This fiscal effort can consist of increasing tax revenues or decreasing public expenditure [3] or increasing tax revenues while controlling (reducing) public expenditure. If the discipline just comes from the increase in tax performance, this discipline is likely to be unsustainable since the literature has shown that additional tax revenues are associated with higher public expenditure and higher debt (Le *et al.*, 2015;Le Van *et al.*, 2019). If this is confirmed, the increase in tax performance would initially lower consumption, which puts low pressure on inflation and would facilitate the success of IT. But the euphoria will not persist as the rise in public spending will result in a deficit which will have inflationary pressures since deficit and inflationary pressures are linked. This situation will hurt the Central Bank and worsen the standard of living of the population, the economic performance of the country (growth for instance) and the credibility brings by IT. Another fiscal discipline aspect is to increase fiscal (tax) performance while reducing public spending. In doing so, the government can try to respect its transversality constraint without pushing the Central Bank to deviate from its main objective of price stability. This situation will help the Central Bank to easily deliver its inflation targeting mission given the positive correlation between public expenditure and inflation according to the literature.

Although the effect of IT on tax performance has been documented (Minea et Villieu, 2009;Lucotte, 2012), the literature on the effect of inflation targeting on public expenditure remains to be explored. The literature is in fact divided about the effect of IT on public expenditure. According to Minea et Villieu (2009), inflation targeting will contribute to rationalize public spending and improve institutional quality for better fiscal or tax performance. But in their 2017 paper, Combes *et al.* (2017) argue that IT generates conflicts of interest. Indeed, delegation creates a trade-off between low inflation and excessive public expenditure. With different concerns, a government may see a conservative central banker *à la* Rogoff as very tight, which will encourage the fiscal authority to spend excessively (see Combes *et al.* (2017) for more details). This behaviour justifies the introduction of fiscal rules in the model of these authors to discipline public spending and thus avoid an expansionary bias that occurs when delegation takes place. The shift from discretion to delegation would thus pose a problem of conflict of objectives between two entities that do not have the same vision.

This article attempts to settle the debate by participating empirically to this literature. Its aim is to test whether the adoption of IT reduces public spending or, on the contrary, pushes it up. This approach allows us to tackle fiscal discipline from a different angle. Further, we will decompose public expenditure into current expenditure (less productive expenditure, which is more expensive to reduce) and public in-

2. In the case of non-independent Central Bank, the monetary instrument can also be used to build up the primary surplus required to meet sustainability of its public finance see Leeper et Li (2017) for instance.
3. Public expenditure and public spending are used alternatively in this paper.

vestment (more productive expenditure, which is less expensive to reduce). The aim is to analyse (a kind of) a composition effect of IT. This will allow us to analyse the origin of the effect observed at the aggregate level. The importance of public expenditure varies indeed according to the schools of thought in economy (Classical or Keynesian).By decomposing public spending, we will try to see whether there is a sacrifice effect of one expenditure over the other or whether there is a protection of one expenditure relative to the other or whether there is some other pattern that can emerge in the composition of public spending.

To identify the effect of IT on public expenditure, we have followed a methodology commonly used in the literature: Propensity Scores Matching (PSM) developed by Rosenbaum et Rubin (1983). This method allows us to estimate the Average Treatment Effect on Treated (ATT) of IT. It helps to correct the problems of endogeneity (selection bias in particular) associated with the adoption of IT. The study performed over the period 1990-2016 on 37 countries, including 15 target and 22 non target countries, shows that IT reduces public spending in developing countries' that adopt this policy. It also shows that IT tends to protect public investment from current expenditure. Given its high cost, the decrease in current spending sends a signal of credibility to the international market. It is also beneficial for public debt, which would tend to decrease [4]. Also, a more detailed analysis of current expenditure shows that social expenditure is the one that is most affected by IT.This result suggests that IT reduces the weight or intervention of the government in the economy (which is not always appreciated in developing countries, for example because of the search for self-interest or rent seeking of some politicians).The intervention of the latter would then be limited to actions that establish a good economic environment for the rest of the agents or the economy.

The results of this study on public expenditure and its two main components remain robust to the alternative definition of the treatment variable (IT), the addition of additional control variables to the baseline model, the modifications of the sample used to conduct our analysis, and the use of an alternative method. Also, the study shows some sensitivity of our results both to the type of treatment variable (IT) and to the structural characteristics of the countries.

The remainder of the work is organized as follows. Section 2 will be focused on stylized facts. Sections 3, 4, 5, 6, 7 and 8 will respectively present the data, testable hypotheses, methodology, results, robustness and sensitivity and Section 9 will conclude.

2 Stylized facts

This section presents some stylized facts that characterize the relationship between inflation targeting and government spending over the period 1990-2016. Far from showing causality [5], these facts provide a first view of the potential relationship that could exist between these two variables. Figure 1 below shows the average level of public expenditure, current expenditure and public investment in target (ITers) and non target (non ITers) countries. According to this Figure, public expenditure and its various components

4. By reducing less productive spending, the pressure on the debt would be reduced. It will also allow more productive investments (or investments in more productive projects) for better profitability to ensure debt repayment.

5. Causality is treated using an econometric method. A method that will allow us to address potential problems of endogeneity.

are lower in ITers than in non ITers.For before-after comparisons, we follow Mishkin et Schmidt-Hebbel (2007) and Minea et Tapsoba (2014) to calculate average public expenditure,average current expenditure and average public investment before and after IT for non ITers [6].Figure 2 and 3 below show a before-and-after picture of adopting inflation targeting.The analysis of these figures shows that public expenditure decreases in ITers after the adoption of IT, while it increases in non ITers after the adoption of IT (Figure 2). By disaggregating public expenditure and following the same approach as in Figure 2, we then show that current expenditure declines more in ITers. Public investment, on the other hand, declines in ITers after the adoption of IT but tends to increase in non ITers. Moreover, the decline of current expenditure in ITers seems to be more pronounced than the decline of public investment. This suggests the existence of a potential composition effect of IT on public expenditure. In fact, this finding leads us to assume the existence of a relative protection of public investment expenditure in ITers.

Before continuing the rest of the work, it should be stressed that the comparisons made between the two groups and all the other facts highlighted here may be subject to selection bias. For this reason, the results highlighted here are only correlations and not causalities.

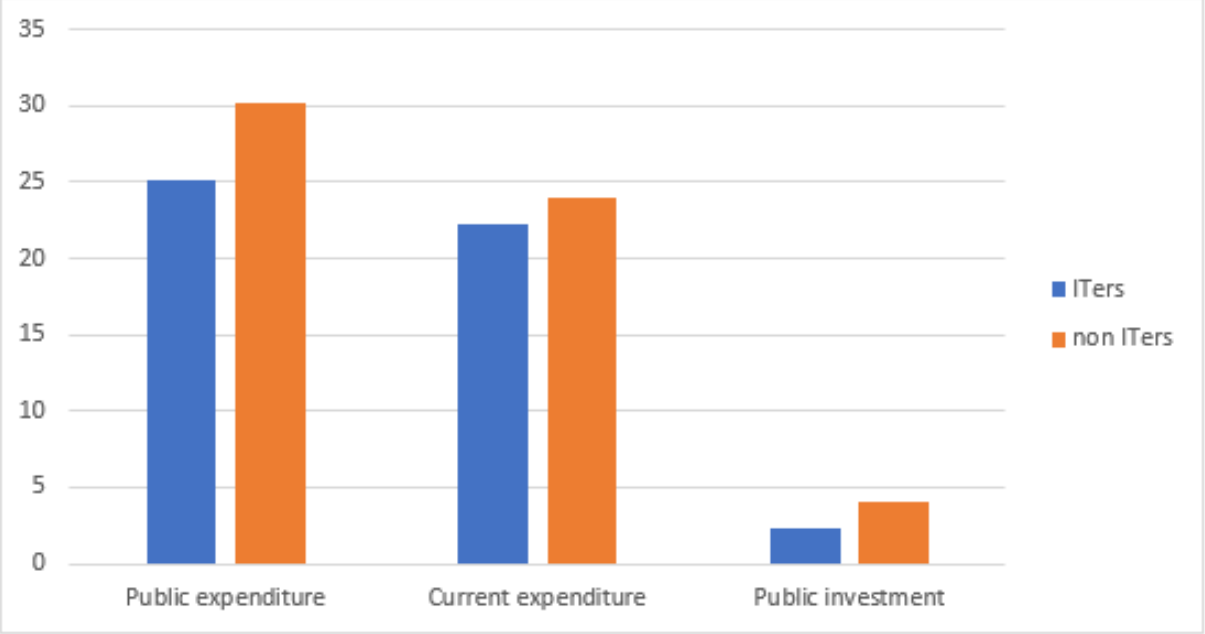

Figure 1 – Average level of public expenditure and its components over the period 1990-2016
Sources: Authors' calculations

6. The year of IT adoption by non ITers is 2007. It is obtained by adding the first year of adoption of the IT by an ITer (1999 in our case) and the end-year of our sample (2016 in our case) divided by two (2).

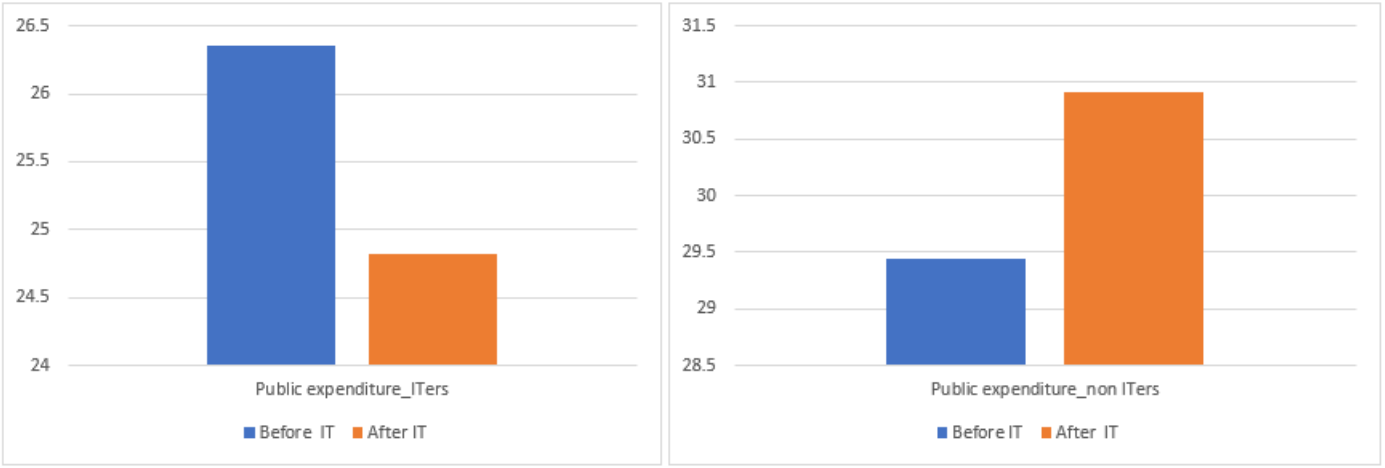

Figure 2 – Average level of public expenditure before and after IT adoption
Sources: Authors' calculations

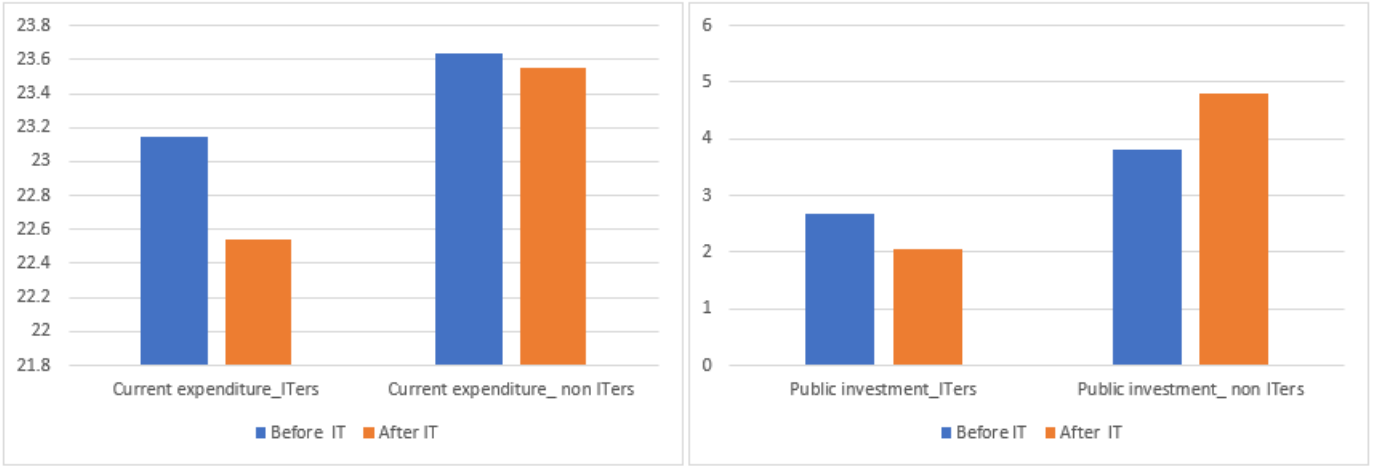

Figure 3 – Average level of current expenditure and public investment before and after IT adoption
Sources: Authors' calculations

3 Data

Our study is covering the period 1990-2016. The dataset used in this study consists of 37 developing countries in which 15 are ITers (treatment group) and 22 are non ITers (control group).The time horizon of our study is motivated by the availability of data but also by the period of IT adoption. The year 1990's, for example, is chosen as the beginning of the study due to the paucity of budgetary data before this date but also because it corresponds to the first wave of IT adoption.

Our main dependent variable, public expenditure consists of total expense and the net acquisition of non-financial assets. In order to identify a composition effect of inflation targeting on public spending, we defined two other dependent variables, namely current expenditure and public investment. Current expenditure is defined as cash payments for operating activities of the government in providing goods and services. It includes compensation of employees (such as wages and salaries), interest and subsidies, grants, social benefits, and other expenses such as rent and dividends. Given the mandatory character of interest, current expenditure is expressed net of interest payments.Public investment, on the other hand includes investment in fixed assets, inventories, valuables, and non produced assets but excludes consumption of fixed capital. Non-financial assets are stores of value and provide benefits either through their use in the production of goods and services or in the form of property income and holding gains.

Our treatment variable, IT is define as a dummy variable. It is equal to 1 if a country i at period t is under an IT regime, and to 0 otherwise [7]. IT variable is computed by referring to several sources including Roger (2010), Hammond *et al.* (2012),Sarwat (2012), Ogrokhina et Rodriguez (2018), Agénor et da Silva (2019) and the websites of the various Central Banks. Sarwat (2012)'s IT variable sources includes IMF classifications. These IMF classifications are based on the Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) database. Based on these sources, we distinguish two majors starting dates [8]: soft or informal IT (soft IT) and full-fledged or formal IT (full IT). This distinction is useful for robustness questions.

The remainder of other variables and the sources of every variable (dependent, controls and other interest variables) are presented in the Appendix 5.

4 Testable hypotheses

The conflict about the effect of IT on public expenditure briefly described in the introduction is the central motivation for this paper. While the effect of IT on fiscal behaviour (e.g. reduction of public debt, reduction of the public deficit) is relatively clear, the impact of IT on public expenditure remains unclear. Due to this conflict, the literature does not allow us to formulate clear hypotheses on the relationship between IT and public expenditure. But based on our stylised facts, we can try to bring out some hypotheses that will be supported or refuted by an empirical approach. Based on these facts, we can expect inflation

7. If for example the Central Bank uses money or exchange rate targeting.
8. The remainder of the starting dates of this monetary policy are presented in the Appendix)

targeting to decrease public expenditure in ITers. This hypothesis is in line with what can be expected from theoretical models. Indeed, public spending is financed by seigniorage revenues and tax revenues (see Barro et Gordon (1983),Alesina et Tabellini (1987),Minea et Villieu (2009);Combes *et al.* (2017) for instance). By adopting IT, the government is deprived of one source of funding for its expenditure. Even if the IT favours the improvement of tax revenues, this revenue improvement cannot fully compensate for the loss of seigniorage revenue due to the distorting nature of the tax or tax revenues. This failure to fully compensate public expenditure would be the cause of the reduction in the latter. Based on the desire for credibility, we formulate a second hypothesis according to which the adoption of IT will protect public investment against current expenditure. In other words, the reduction observed at the aggregate level will be more pronounced on current expenditure. This assumption sends a credibility signal given the high political cost of the cut in current expenditure.By sacrificing current expenditure (less productive), the government supports economic activity (through growth stimulation, for instance) with (more) productive expenditure (like public investment in infrastructure) in order to collect as much revenue as possible for a more sound and sustainable financing of its public engagement or its public finance. Also, inflation targeting is part of broader macroeconomic policy reforms aimed at improving the efficiency not only of monetary policy but also of fiscal policy. This then implies a reallocation of public expenditure towards more productive spending and may justify a possible change in the composition of public spending.

5 Methodology

The aim of this study is to identify the causal effect of inflation targeting (IT). The adoption of inflation targeting is not random according to the literature. It may occur following crisis or hyperinflation episode (Ogrokhina et Rodriguez, 2018). This is the case, for example, of emerging countries that adopted IT on a massive scale after the 1997 crisis, which according to Sarwat (2012) was a crisis that forced these countries to abandon the fixed exchange rate regime. An abandonment that would guarantee the success of the IT since the fixed exchange rate is an obstacle to the IT effectiveness. As a result, the decision to target inflation becomes endogenous, which would bias the effect of IT. This requires an appropriate method to identify the causal effect of IT. To do this, we will use an impact assessment method mainly matching based on Propensity Scores commonly known as Propensity Scores Matching (PSM). This method will allow us to study (or identify) the treatment effect of adopting inflation targeting. This method is in fact widely used in the literature to identify the effect of inflation targeting. It is a two-step method. First we estimate the propensity scores. These scores will then be used to estimate the treatment effect of adopting inflation targeting.

5.1 Theoretical model and Matching on propensity scores: treatment effect and selection bias

The purpose of our study is to assess the effect of adopting inflation targeting in target countries (ITers) relative to non target countries (non ITers). To do this, we use the Propensity Scores Matching (PSM) method to study the Average Treatment Effect on the Treated (ATT). The ATT is formally written

as follows [9] :

$$ATT = E[(Y_{i1} - Y_{i0})|IT_i = 1)] = E[(Y_{i1}|IT_i = 1)] - E[(Y_{i0}|IT_i = 1)] \quad (1)$$

Where IT_i is the inflation targeting that is a dummy variable, Y_{i1} is the outcome of the target country if it adopts the IT, Y_{i0} is the outcome of the target country if it had not adopted inflation targeting. The problem with this approach is that Y_{i0} is not observable. To deal with this problem, we use the estimated ATT to compare the treated group (ITers) with the non-treated or control group (non ITers), provided that the adoption of inflation targeting is random. However, the latter assumption is unlikely, and the existing literature on inflation targeting highlights several preconditions for IT adoption. To overcome the potential problem of omitted variables (correlated with outcome or interest variables and IT adoption) that leads to a selection bias problem that biases our results, we follow previous papers (Lin et Ye, 2007;Lin et Ye, 2009;Lin, 2010; Lucotte, 2012;Tapsoba, 2012; Minea et Tapsoba, 2014;Minea *et al.*, 2015;Balima *et al.*, 2017) using the propensity matching score (PSM) method.

The method mentioned above allows the treated (ITers) and control (non ITers) groups to be matched on their propensity scores or the probability of being treated (probability of adopting IT). This method also allows the treated groups and the controls ones to be matched on observable characteristics. With the PSM method, the difference between countries is only due to being treated or adopting the IT. In other words, this method ensures that the individuals in the treatment and control group are identical in all except on the treatment variable (IT adoption). The central idea of the Matching method is to use the control group to mimic a random experiment. It based on the central assumption of conditional independence, which is as follows: conditional on the vector of observable or control variables, the treatment (adoption of the IT) is independent of the dependent variable or outcome ($Y_{i0}, Y_{i1} \perp IT_i|X_i$). In the case of conditional independence, the average treatment effect (ATE) is equal to the average treatment effect on the treated (ATT). By replacing in the equation 1 the term $E[(Y_{i0}|IT_i = 1)]$ which is unobservable with the observable term $E[(Y_{i0}|ITi = 0, X_i)]$, we obtain the following equation:

$$ATT = E[(Y_{i1}|IT_i = 1, X_i)] - E[(Y_{i0}|IT_i = 0, X_i)] \quad (2)$$

As in Lin et Ye (2007);Lin et Ye (2009) Lucotte (2012);Tapsoba (2012); Minea et Tapsoba (2014);Minea *et al.* (2015);Balima *et al.* (2017) for instance, we address this issue of conditional independence by using several types of PSM methods but also by using Rosenbaum bounds sensitivity tests.

The difference with equation 1 is that unlike to this one, all the terms of equation 2 are observable. However, this last equation is not without difficulties. If it avoids us from observing an unobservable situation ($E[(Y_{i0}|IT_i$ =1), it requires to introduce as many control variables as possible to explain the possibility to be treated. However, including more controls poses a problem of reduced degrees of freedom, which can affect the quality of the results. To overcome these problems, Rosenbaum et Rubin (1983) sug-

9. The ATT formula is the difference between the mathematical expectation of the individual's outcome or income if treated and the mathematical expectation of the individual's income if not treated.

gest matching the treatment and control group according to their Propensity Scores (PS) or probability of being treated. PS is the individual probability of receiving the treatment, conditional to the observable characteristics. This definition is formalized as follows:

$$p(X_i) = E[IT_i|X_i] = Pr(IT_i = 1|X_i) \tag{3}$$

With this formalization (equation 3), we proceed to modify the equation 2. This gives us an ATT equation using the PS formula and under the common support assumption:

$$ATT = E[(Y_{i1}|IT_i = 1, p(X_i)] - E[(Y_{i0}|IT_i = 0, p(X_i)] \tag{4}$$

The equation 4 [10] is the one we will use to estimate the effect of adopting IT.

Following the empirical literature on the effects of IT, we select four (4) types of PSM to estimate the equation 4. First, we use the N-nearest-Neighbors Matching. It consists of matching each country under the inflation targeting regime (treated) with the N-nearest no inflation-targeting countries (non-treated) that have the closest Propensity Scores. By following Lin et Ye (2007);Lin et Ye (2009);Lin (2010);Tapsoba (2012);Lin et Ye (2013);Minea et Tapsoba (2014);Lin et Ye (2013);Minea *et al.* (2015);Balima *et al.* (2017), we consider three (3) types of neighbors other than matching on the basis of a single closer or nearest neighbour. This choice help us to improve the quality of our Matching. We therefore distinguish the matching according to a nearest (N=1), two nearest (N=2) and three nearest neighbours (N=3). Secondly, we perform another type of Matching. This is the radius method of Dehejia et Wahba (2002) which matches treated and untreated groups located at a certain distance based on the Propensity Scores (PS). We distinguish three cases of radius method. The small (r=0.005), the medium (r=0.01) and the wide (r=0.05). Third, we retain the Kernel Matching Method developed by Heckman *et al.* (1998). This method matches each treated with the distribution of untreated in the common support, with weights inversely proportional to the gap with respect to the PS of each treated (consistent with previous literature, we use an Epanechnikov kernel). The fourth and last method is local linear matching developed by Heckman *et al.* (1998). It is similar to kernel Matching. The difference is that it uses a linear term in its weight function.

Finally,in order to ensure that the two groups are comparable (or to check the overlap and the region of common support between treatment and comparison group), we rely on Minima and Maxima comparison related in Caliendo et Kopeinig (2008). The basic criterion of this approach is to delete all observations whose propensity score is smaller than the minimum and larger than the maximum in the opposite group (see Caliendo et Kopeinig (2008) for more details).

10. We should point out that Y represents each of our dependent variables and X is a vector that represents all our control variables.

6 Results

In this section, we present our main or baseline results. They are divided into three (3) points. After the estimation of propensity scores, we first estimate the effect of the IT on public expenditure as a percentage of GDP (level effects), second, we estimate the effect of the IT on two major components of public expenditure (current expenditure and public investment) to check a composition effect of adopting IT and we finish by examining the effect of IT on the various components of public or current expenditure.

6.1 The estimation of propensity scores

We estimate the PSs using a probit model. The dependent variable in this model is inflation targeting IT. It is a dummy variable. The control variables are divided into two groups.

First and following the literature (Lin et Ye, 2007;Lin et Ye, 2009; Tapsoba, 2012;Minea et Tapsoba, 2014;Ogrokhina et Rodriguez, 2018 and more), we include in the model variables that are the preconditions (Svensson, 2002;Truman, 2003; Mishkin, 2004 and Ogrokhina et Rodriguez, 2018 for instance) for the probability of adopting the IT regime. These are lag inflation, lag tax revenues, real per capita GDP growth rate, broad money growth, financial development and working age population. Lag inflation is expected to have a negative sign on the probability of adopting the IT. Indeed, according to Savastano *et al.* (1997),Truman (2003),Minella *et al.* (2003) and like related by Lin et Ye (2009), a country should adopt inflation targeting when its inflation is at reasonably low level, preferably after a successful disinflation. Announcing a target rate far from the realized can hurt the Central Bank's credibility. The sign of lag tax revenues is assumed to be ambiguous. Indeed, the target country must compensate for the loss of seigniorage revenue following the adoption of inflation targeting by increasing tax revenues according to the literature on the inflation targeting. A high level of tax revenues, according to the literature, would allow the government to have a good fiscal position. This can help avoid fiscal dominance by improving the government's fiscal balance. Tax revenues must then be a serious precondition for IT adoption.In reality, however, several developing countries are not free from fiscal dominance [11] before the IT regime is adopted. This situation infuses doubts about the ability of developing countries to have a strong tax administration or tax system prior the adoption of the IT regime. Rather than precede the IT regime, improving tax performance may rather follow the adoption of the IT regime (see Minea et Villieu, 2009;Lucotte, 2012).On the basis of these arguments, lag tax revenues may have a positive or negative effect on the probability of adopting IT. Then, we expect as Lin et Ye (2009) real per capita GDP growth rate which is a proxy for the size or level of development to have a positive effect on the probability of adopting the IT. Countries with high real per capita GDP growth rate would have great credibility when it comes to setting up the IT. Like Lin et Ye (2009), we expect a negative correlation between broad money growth and the probability of adopting IT. According to monetarist theory, inflation has monetary origin. This is also verified with the Fisher's quantitative money theory. To this end, any abundance of money in the economy would discourage or make difficult the probability of IT adoption. We expect a positive

11. This is the case of Brazil and Turkey, for example, mentioned in **?** which were confronted with fiscal dominance in 1999 and 2006.

correlation between IT adoption and financial development as measured by domestic credit provided by the financial sector. A good level of development would allow a good success of IT. In a country with a developed financial system, seigniorage is no longer the monopoly of the Central Bank as underlined in Minea et Villieu (2009). The sharing of seigniorage power between the Central Bank and commercial banks would strengthen the government's respect for the mandate given to the Central Bank by avoiding the risk of monetization. Weak financial development as highlighted in Agénor et da Silva (2019) prevents the Central Bank from manipulating the interest rate with a view to stabilising prices. While controlling inflation, the interest rate, according to the literature (as related by Alvarez *et al.* (2001), can play a crucial role.In the case of weak power on interest rate, a positive shock on interest rate would not only flood domestic banks with foreign assets, but would also lead to higher default levels among banks' borrowers and put pressure on their balance sheets. The first effect (capital inflows) may push the Central Bank to target the exchange rate (incompatible with the IT regime) and the second may push for government and/or Central Bank intervention to save the (financial) system. This intervention would create an obstacle to the Central Bank in its price stability mandate. In addition, a developed financial system is associated with better tax revenue collection (see Nnyanzi *et al.*, 2018 and Gnangnon, 2019 for instance). Strong financial development can also promote financial inclusion, which would likely be beneficial for tax revenue collection (see Mitchell et Scott, 2019 for instance) by broadening the number of potential taxpayers. On the other hand, a country with strong financial development compensates for its weak tax administration through the declaration of taxpayers by the banks. This would allow the collection of as much revenue as possible and the fight against fraud and tax evasion to ensure the success of IT. Finally, we hope that the working age population will have a positive effect on the adoption of inflation targeting. As pointed out in Juselius et Takáts (2016), working age population is deflationary and, as we pointed out earlier, adopting IT in a deflationary period gives it a better chance of success.As related in the literature in the spirit of the life cycle hypothesis,when the working-age cohort is large relative to the young and old, its higher savings, coupled with the output it produces, creates more aggregate supply relative to demand. At the same time, the rising labour supply puts downward pressure on wages and inflation.

The second group of variables captures the probability of adopting alternative monetary policy rules, such as monetary or exchange rate targeting. There are two (2) of these variables. Those are trade openness and a fixed exchange rate regime dummy . Indeed, a country cannot maintain both an IT regime and an exchange rate targeting regime, i.e. a country cannot target both inflation and the exchange rate. The two measures (targeting inflation and the exchange rate targeting) are therefore incompatible (Brenner et Sokoler, 2009). For these two variables,we expect a negative effect on the probability of IT adoption. As the literature points out, the more open a country is, the less likely it is to adopt a credible inflation-targeting regime. These countries would be tempted to target the exchange rate to hedge against exchange rate volatility. In other words, and as Lin et Ye (2009) point out, exchange rate targeting seems attractive for countries that are very open to trade.

Table 1 below presents the results of the PS estimation using the default starting dates or using the

soft IT [12]. The basic model is the one in column [1]. All variables have the expected signs. Lag inflation, trade openness, broad money growth and fixed exchange rate dummy have a negative impact on the probability of IT adoption. On the other hand, lag tax revenues, real GDP per capita growth,financial development and working age population have a positive impact on the probability of adopting the IT. The explanatory power of the model is reasonable with a McFadden R^2 or pseudo R^2 which is 34.4%.

12. Following Lin et Ye (2009) and Huang *et al.* (2019) to name a few and depending on the availability of data on both types of IT, we have chosen the soft IT as the treatment variable of our baseline model. Hard IT or full IT is used for robustness.

Table 1 – Probit estimates of the Propensity Scores

Dependent Variable : IT using default starting dates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
Lag inflation	-0.070***	-0.069***	-0.075***	-0.061***	-0.069**	-0.065***	-0.073***	-0.076***	-0.084***	-0.071***	-0.071***	-0.068***	-0.069***	-0.069***	-0.065***	-0.106***	-0.091***	-0.070***	-0.069***	-0.059***	-0.069***	-0.066***
	(0.0153)	(0.0154)	(0.0157)	(0.0147)	(0.0285)	(0.0167)	(0.0162)	(0.0160)	(0.0181)	(0.0157)	(0.0162)	(0.0160)	(0.0150)	(0.0157)	(0.0159)	(0.0206)	(0.0169)	(0.0153)	(0.0157)	(0.0141)	(0.0160)	(0.0156)
Lag tax revenues	0.005	0.005	0.005	0.010	0.002	0.007	-0.006	-0.011	0.006	0.003	-0.014	0.011	-0.005	0.008	0.001	-0.041***	-0.009	0.005	0.006	0.013	0.001	0.008
	(0.0084)	(0.0084)	(0.0084)	(0.0094)	(0.0112)	(0.0082)	(0.0096)	(0.0092)	(0.0129)	(0.0084)	(0.0111)	(0.0092)	(0.0092)	(0.0086)	(0.0092)	(0.0128)	(0.0096)	(0.0085)	(0.0085)	(0.0089)	(0.0086)	(0.0085)
Trade openness	-0.016***	-0.016***	-0.016***	-0.019***	-0.011***	-0.014***	-0.015***	-0.018***	-0.018***	-0.016***	-0.019***	-0.015***	-0.015***	-0.016***	-0.016***	-0.018***	-0.019***	-0.016***	-0.016***	-0.019***	-0.017***	-0.013***
	(0.0026)	(0.0026)	(0.0026)	(0.0026)	(0.0027)	(0.0019)	(0.0028)	(0.0026)	(0.0035)	(0.0027)	(0.0032)	(0.0024)	(0.0024)	(0.0027)	(0.0027)	(0.0027)	(0.0029)	(0.0026)	(0.0029)	(0.0027)	(0.0027)	(0.0025)
Real GDP per capita growth	0.074***	0.073***	0.072***	0.087***	0.065**	0.075***	0.056**	0.078***	0.071**	0.079***	0.060***	0.074***	0.066***	0.078***	0.067***	0.057**	0.073***	0.074***	0.075***	0.080***	0.074***	0.077***
	(0.0232)	(0.0234)	(0.0237)	(0.0301)	(0.0287)	(0.0217)	(0.0225)	(0.0224)	(0.0279)	(0.0222)	(0.0211)	(0.0227)	(0.0242)	(0.0232)	(0.0226)	(0.0259)	(0.0231)	(0.0232)	(0.0237)	(0.0246)	(0.0228)	(0.0247)
Broad money growth	-0.031***	-0.031***	-0.032***	-0.030***	-0.029***	-0.026***	-0.024***	-0.027***	-0.031***	-0.031***	-0.024***	-0.030***	-0.030***	-0.033***	-0.028***	-0.033***	-0.033***	-0.031***	-0.031***	-0.027***	-0.032***	-0.029***
	(0.0072)	(0.0072)	(0.0075)	(0.0079)	(0.0083)	(0.0070)	(0.0072)	(0.0069)	(0.0079)	(0.0073)	(0.0072)	(0.0073)	(0.0076)	(0.0077)	(0.0068)	(0.0077)	(0.0075)	(0.0071)	(0.0072)	(0.0071)	(0.0073)	(0.0074)
Fixed exchange rate dummy	-0.896***	-0.903***	-0.905***	-0.932***	-1.181***	-0.893***	-0.844***	-0.945***	-0.809***	-0.867***	-0.680***	-0.989***	-0.858***	-0.854***	-0.884***	-0.659***	-0.688***	-0.897***	-0.899***	-0.941***	-0.950***	-1.064***
	(0.1781)	(0.1784)	(0.1784)	(0.1974)	(0.2948)	(0.1884)	(0.1906)	(0.1918)	(0.1958)	(0.1798)	(0.1929)	(0.1869)	(0.1810)	(0.1777)	(0.1843)	(0.1991)	(0.1892)	(0.1787)	(0.1778)	(0.1838)	(0.1809)	(0.2212)
Financial development	0.004**	0.004**	0.003**	0.008***	0.003	0.005***	0.009***	0.006***	0.004**	0.005***	0.005**	0.005***	0.003*	0.005***	0.004**	0.005***	0.003*	0.004**	0.004**	0.008***	0.004**	0.003
	(0.0017)	(0.0017)	(0.0018)	(0.0020)	(0.0021)	(0.0017)	(0.0019)	(0.0018)	(0.0021)	(0.0017)	(0.0018)	(0.0017)	(0.0018)	(0.0018)	(0.0018)	(0.0018)	(0.0018)	(0.0017)	(0.0020)	(0.0022)	(0.0017)	(0.0019)
Working age population	0.083***	0.083***	0.072***	0.057***	0.090***	0.085***	0.063***	0.096***	0.093***	0.082***	0.119***	0.072***	-0.608***	0.086***	0.079***	0.126***	0.098***	0.083***	0.083***	0.063***	0.088***	0.085***
	(0.0149)	(0.0148)	(0.0163)	(0.0147)	(0.0234)	(0.0143)	(0.0157)	(0.0170)	(0.0213)	(0.0151)	(0.0191)	(0.0148)	(0.1515)	(0.0157)	(0.0145)	(0.0186)	(0.0158)	(0.0149)	(0.0150)	(0.0143)	(0.0149)	(0.0148)
Fiscal rules						0.774***																
						(0.1564)																
Central bank independence							1.661***															
							(0.3855)															
Fiscal balance								-0.062***														
								(0.0128)														
Unemployment rate									-0.014													
									(0.0162)													
IMF programme										0.563***												
										(0.1892)												
Current account balance											-0.041***											
											(0.0095)											
Financial openness												0.128**										
												(0.0575)										
Age dependency ratio													-0.295***									
													(0.0679)									
Institutional quality														-0.191								
														(0.1225)								
Government fragmentation															0.671***							
															(0.2473)							
Finite term in office dummy																2.969***						
																(0.7566)						
Chief executive years in office																	-0.105***					
																	(0.0189)					
Election years																		-0.031				
																		(0.2302)				
Parliamentary system																			-0.025			
																			(0.1955)			
Public debt																				-0.004		
																				(0.0038)		
Comm. Net Export Price Index																					0.004**	
																					(0.0018)	
Constant	-3.784***	-3.780***	-3.052***	-2.151**	-4.664***	-4.544***	-3.753***	-4.344***	-4.088***	-3.878***	-5.854***	-3.309***	57.301***	-3.527***	-3.717***	-8.436***	-3.726***	-3.779***	-3.794***	-2.495***	-4.335***	-4.005***
	(0.8770)	(0.8749)	(1.0066)	(0.8778)	(1.4079)	(0.9156)	(0.9172)	(0.9652)	(1.3721)	(0.9024)	(1.1331)	(0.8917)	(13.6377)	(0.8486)	(0.8651)	(1.4206)	(0.8973)	(0.8765)	(0.8632)	(0.8761)	(0.8907)	(0.8982)
Pseudo R^2	0.344	0.328	0.333	0.349	0.348	0.381	0.341	0.384	0.339	0.356	0.385	0.350	0.387	0.348	0.352	0.464	0.422	0.344	0.344	0.349	0.349	0.348
Observations	573	544	542	417	353	573	477	519	445	573	536	572	573	564	556	573	572	573	573	489	573	528

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

6.2 The results from Matching

6.2.1 The effect of IT on public expenditure

Based on the previously estimated PS, we estimated the treatment effect of IT for target countries (ITers) relative to non target countries (non ITers). Table 2 below presents the average treatment effect on treated (ATT) of the IT (using the default starting dates) on public expenditure. The first three columns present the Matching results based on the nearest neighbours (N=1,2,3), the next three columns present the Radius Matching results (r=0.005, 0.01, 0.05). The last two columns present respectively Kernel Matching and Local Linear Regression Matching. Since the estimation by PS does not provide good variances for judging the significance of the effects obtained, we used the bootstrap footnoteThis is highlighted in details by Caliendo et Kopeinig, 2008. to calculate the variances. As shown by our baseline results in line [1] of the Table 2, ATTs are independently of the Matching method adopted negative and statistically significant at 1%. In other words, adopting IT significantly reduces public expenditure in developing countries. The magnitude of this effect is from -8.29 percentage points (for the Local Linear Regression Matching) to -9.37 percentage points (for the small Radius Matching). These findings tend to support the hypothesis (or argument) that the adoption of inflation targeting reduces (on average) public expenditure in target countries relative to non target countries. In other words, the adoption of inflation targeting tends to motivate the government to rationalize its public expenditure.

Table 2 – ATT of IT adoption on public expenditure in %GDP (using default starting dates)

Dependent Variable	Nearest-Neighbor Matching			Radius Matching			Kernel Matching	Local Linear Regression Matching
Public expenditure	N=1	N=2	N=3	r=0.005	r=0.01	r=0.05		
	Treatment effect of IT on public expenditure, using the default starting dates							
[1] ATT	-9.201***	-9.263***	-8.957***	-9.366***	-8.859***	-8.543***	-8.567***	-8.288***
	(1.7860)	(1.7033)	(1.5582)	(1.8744)	(1.5188)	(1.1925)	(1.2546)	(1.3829)
Number of Treated Obs.	120	120	120	120	120	120	120	120
Number of Controls Obs.	290	290	290	290	290	290	290	290
Observations	410	410	410	410	410	410	410	410
	Robustness Checks							
[2] Excluding hyperinflation episode	-8.665***	-8.765***	-8.665***	-9.584***	-8.959***	-8.483***	-8.533***	-8.269***
	(1.7820)	(1.6592)	(1.6474)	(1.7861)	(1.4996)	(1.3207)	(1.2663)	(1.3338)
[3] Excluding monetary union,dollarization, de facto peg and currency- board	-7.155***	-7.888***	-8.045***	-8.529***	-8.412***	-8.491***	-8.353***	-7.821***
	(1.9621)	(1.7679)	(1.7763)	(1.8570)	(1.5429)	(1.3036)	(1.2797)	(1.2582)
[4] Post 90s	-10.407***	-10.515***	-10.533***	-11.121***	-10.624***	-10.126***	-10.155***	-10.193***
	(1.6944)	(1.6795)	(1.5742)	(2.0491)	(1.6959)	(1.2912)	(1.2931)	(1.2077)
[5] Before 2008	-7.364**	-6.850**	-6.606**	-8.397***	-7.915***	-7.186***	-7.692***	-5.637**
	(3.3063)	(2.9559)	(2.8633)	(2.9881)	(2.7255)	(2.3586)	(2.4577)	(2.4242)
[6] Including fiscal rules	-7.961***	-7.919***	-7.882***	-7.842***	-7.547***	-7.482***	-7.618***	-7.586***
	(2.2615)	(1.9416)	(1.7901)	(1.9584)	(1.8449)	(1.5965)	(1.6270)	(1.5652)
[7] Including central bank independence	-8.796***	-8.461***	-8.719***	-9.996***	-8.726***	-8.112***	-8.171***	-8.202***
	(2.2421)	(1.9515)	(1.7547)	(1.9990)	(1.7316)	(1.4239)	(1.5446)	(1.4253)
[8] Including fiscal balance	-11.340***	-10.145***	-9.575***	-10.842***	-9.968***	-9.068***	-9.077***	-9.046***
	(2.0121)	(1.8224)	(1.7922)	(1.8236)	(1.5551)	(1.3450)	(1.3615)	(1.3985)
[9] Including unemployment rate	-9.709***	-9.552***	-8.711***	-10.831***	-10.763***	-8.519***	-8.577***	-8.600***
	(1.8225)	(1.6365)	(1.5557)	(1.8392)	(1.5486)	(1.2139)	(1.2306)	(1.2179)
[10] Including IMF programme	-7.912***	-8.337***	-8.845***	-7.799***	-7.929***	-8.668***	-8.642***	-9.107***
	(1.9482)	(1.6801)	(1.6382)	(1.8419)	(1.4975)	(1.2862)	(1.2680)	(1.3979)
[11] Including current account balance	-8.115***	-7.973***	-8.222***	-7.379***	-7.519***	-7.964***	-8.023***	-7.853***
	(2.3870)	(2.3394)	(2.2215)	(1.9705)	(1.8803)	(1.8503)	(1.8874)	(1.8228)
[12] Including financial openness	-8.340***	-8.042***	-7.947***	-8.372***	-8.821***	-8.298***	-8.359***	-8.369***
	(2.1647)	(1.9833)	(1.9715)	(1.7766)	(1.6894)	(1.4937)	(1.4798)	(1.5974)
[13] Including age dependency ratio	-7.228***	-6.840***	-6.975***	-6.966***	-7.138***	-7.178***	-7.297***	-7.127***
	(1.9619)	(1.8612)	(1.7470)	(1.8386)	(1.5944)	(1.4040)	(1.4995)	(1.5102)
[14] Including institutional quality	-8.488***	-7.688***	-7.331***	-8.691***	-8.034***	-7.292***	-7.217***	-7.218***
	(1.9091)	(1.7385)	(1.5520)	(1.8535)	(1.6505)	(1.3652)	(1.3006)	(1.3623)
[15] Including the government fragmentation	-9.081***	-8.586***	-8.197***	-10.744***	-9.641***	-7.676***	-7.699***	-7.594***
	(1.8510)	(1.7343)	(1.6351)	(1.9645)	(1.6651)	(1.3421)	(1.3160)	(1.3348)
[16] Including finite term in office dummy	-6.686***	-6.310***	-5.740***	-6.338***	-6.222***	-6.460***	-6.461***	-6.610***
	(2.2033)	(1.9795)	(1.8344)	(2.1163)	(1.7955)	(1.4588)	(1.5199)	(1.4477)
[17] Including chief executive years in office	-8.874***	-9.485***	-8.290***	-9.229***	-8.186***	-7.383***	-7.657***	-7.266***
	(2.1081)	(2.0051)	(1.9189)	(2.1557)	(1.8563)	(1.3989)	(1.4169)	(1.4571)
[18] Including election years	-10.414***	-9.613***	-8.758***	-9.769***	-8.707***	-8.758***	-8.805***	-8.563***
	(1.9989)	(1.7599)	(1.5554)	(1.7650)	(1.5533)	(1.3784)	(1.4046)	(1.3735)
[19] Including parliamentary system	-8.482***	-7.649***	-7.322***	-8.084***	-8.138***	-8.523***	-8.522***	-8.268***
	(1.8382)	(1.6094)	(1.5091)	(1.8207)	(1.6274)	(1.2205)	(1.2747)	(1.2464)
[20] Including public debt	-8.843***	-9.048***	-9.281***	-9.302***	-9.196***	-9.293***	-9.374***	-9.304***
	(1.9135)	(1.6974)	(1.6279)	(1.8247)	(1.6394)	(1.2271)	(1.2531)	(1.2275)
[21] Including Comm. Net Export Price Index	-10.038***	-8.195***	-8.315***	-9.536***	-8.799***	-8.306***	-8.331***	-7.892***
	(1.9615)	(1.7987)	(1.6833)	(1.8673)	(1.5454)	(1.3362)	(1.3335)	(1.2701)
[22] Excluding new ITers	-7.565***	-8.020***	-7.011***	-7.410***	-8.227***	-8.165***	-8.183***	-8.082***
	(1.9402)	(1.6658)	(1.7546)	(1.9419)	(1.5921)	(1.2537)	(1.2663)	(1.5758)
Pseudo R^2	0.046	0.045	0.032	0.010	0.012	0.024	0.033	0.046
Rosenbaum bounds sensitivity tests	6.8	10.7	11.6	6.2	8.3	11.8	11.8	12.4

Bootstrapped standard errors based on 500 replications reported in brackets. *** p<0.01, ** p<0.05, * p<0.1

6.2.2 Effect of IT on the composition of public expenditure: current expenditure *versus* public investment

The purpose of the composition effect is to analyse the component of public expenditure (current and investment) most affected by the decline in the aggregate level of public expenditure. In other words, we check whether current expenditure (less productive expenditure) falls more than public investment expenditure (more productive expenditure) or *vice versa*. The aim is to test the well-documented fiscal discipline of IT targeting (see Minea et Tapsoba, 2014; Kadria et Aissa, 2014;Kadria et Aissa, 2016;Combes *et al.*, 2017;Agénor et da Silva, 2019) but also the credibility (see Minea *et al.*, 2015; Balima *et al.*, 2017;Ogrokhina et Rodriguez, 2018) that this "new" monetary policy framework promotes. Given that current expenditure is less productive and has a high political cost, reducing it will send a signal of credibility and sustainability to the international financial market. By reducing less productive expenditure, IT would improve fiscal discipline.Such discipline stems in other words from the reduction of less productive expenditure and the relative protection of productive expenditure (which lowers the aggregate level of public spending) while improving tax revenue mobilisation (see Minea et Villieu, 2009; Lucotte, 2012).

Using the same methodology, we assess the effect of the IT on the composition of public expenditure. We use the PS [13] estimated in the Table 1 to estimate the ATTs. This approach is repeated for each section involving several dependent variables. The same approach is adopted in Lin (2010).

The results in Table 3 line [1] below present the estimated ATT of IT on the current expenditure. ATTs are independently of the Matching method adopted negative and statistically significant at 1%. However, the magnitude of the estimated ATTs depends on the Matching method. It varies between -5.56 percentage (for the Local Linear Regression Matching) points and -6.52 percentage points (for the small Radius Matching). This result suggests that the adoption of the IT reduces current expenditure in target countries.

The results of Table 4 line[1] below present the estimate of the ATT of IT on the public investment. ATTs are negative and significant. The magnitude of the estimated ATTs depends on the Matching method. It varies between -1.65 percentage (for the small Radius Matching) points and -2.26 percentage points (for the Local Linear Regression Matching). This result suggests that the adoption of the IT reduces public investment in target countries.

In summary, we highlight a composition effect by comparing the ATTs in the two Tables. The estimated average ATT is around -6.05 for current expenditure and around -1.95 for public investment. The average ATT of current expenditure is 3.10 times greater than the average ATT of public investment, i.e., the IT reduces current expenditure by a factor of 3.10 relative to public investment. In other words, IT tends to protect public investment *vis-à-vis* current expenditure, thus creating a composition effect on public expenditure.

13. It helps us to make the analyses on the same basis.

Table 3 – ATT of IT adoption on current expenditure in %GDP (using default starting dates)

Dependent Variable	Nearest-Neighbor Matching			Radius Matching			Kernel Matching	Local Linear Regression Matching
Current expenditure	N=1	N=2	N=3	r=0.005	r=0.01	r=0.05		
	IT on current expenditure (using default starting dates)							
[1] ATT	-6.001***	-6.183***	-6.098***	-6.518***	-6.431***	-5.849***	-5.737***	-5.561***
	(1.9162)	(1.5819)	(1.7180)	(1.7816)	(1.6124)	(1.4638)	(1.4206)	(1.3659)
Number of Treated Obs.	124	124	124	124	124	124	124	124
Number of Controls Obs.	307	307	307	307	307	307	307	307
Observations	431	431	431	431	431	431	431	431
	Robustness Checks							
[2] Excluding hyperinflation episode	-5.539***	-5.963***	-6.052***	-7.077***	-6.895***	-5.707***	-5.609***	-5.515***
	(1.9453)	(1.8100)	(1.8454)	(1.9239)	(1.5849)	(1.3830)	(1.3708)	(1.4148)
[3] Excluding monetary union,dollarization, de facto peg and currency- board	-5.454***	-6.180***	-5.964***	-7.149***	-6.743***	-5.281***	-5.347***	-5.683***
	(1.8803)	(1.7449)	(1.6187)	(1.9350)	(1.6026)	(1.3582)	(1.3501)	(1.3269)
[4] Post 90s	-7.839***	-8.861***	-8.634***	-8.112***	-8.915***	-8.634***	-8.672***	-8.308***
	(1.9595)	(1.7298)	(1.7622)	(1.8886)	(1.6782)	(1.4383)	(1.3428)	(1.4508)
[5] Before 2008	-5.166*	-6.505**	-7.074***	-6.903**	-6.525***	-5.925***	-5.942***	-6.378***
	(2.9379)	(2.7038)	(2.5261)	(2.9129)	(2.4968)	(2.0685)	(2.1333)	(1.9944)
[6] Including fiscal rules	-6.258***	-5.362***	-6.125***	-5.759***	-5.694***	-6.560***	-6.557***	-6.475***
	(2.1617)	(1.8495)	(1.7688)	(1.9816)	(1.7184)	(1.6879)	(1.6217)	(1.5838)
[7] Including central bank independence	-5.087***	-6.228***	-5.853***	-4.824**	-4.564***	-6.927***	-6.737***	-7.123***
	(1.9338)	(1.8727)	(1.7578)	(2.0916)	(1.7182)	(1.3880)	(1.4281)	(1.3130)
[8] Including fiscal balance	-6.125***	-5.282***	-5.265***	-6.554***	-6.477***	-6.915***	-6.751***	-6.729***
	(2.0773)	(1.9746)	(1.7892)	(1.9245)	(1.5834)	(1.3984)	(1.4439)	(1.5713)
[9] Including unemployment rate	-6.782***	-7.358***	-6.825***	-9.382***	-8.605***	-6.814***	-6.694***	-6.571***
	(1.6975)	(1.6813)	(1.5508)	(1.7315)	(1.5700)	(1.2855)	(1.2650)	(1.3120)
[10] Including IMF programme	-7.053***	-6.642***	-7.583***	-6.550***	-6.691***	-6.540***	-6.561***	-6.576***
	(1.9761)	(1.7832)	(1.7296)	(1.8217)	(1.5582)	(1.4278)	(1.4197)	(1.4141)
[11] Including current account balance	-6.658***	-6.652***	-5.672***	-6.407***	-5.251***	-5.292***	-5.278***	-5.260***
	(2.3317)	(1.9544)	(1.9573)	(2.1424)	(1.8393)	(1.7068)	(1.7727)	(1.7128)
[12] Including financial openness	-7.488***	-6.817***	-6.529***	-8.325***	-7.462***	-6.142***	-6.300***	-6.213***
	(2.0402)	(1.9445)	(1.7391)	(1.9185)	(1.6596)	(1.5121)	(1.5574)	(1.4753)
[13] Including age dependency ratio	-4.488**	-5.146***	-5.858***	-4.627**	-5.976***	-5.626***	-5.739***	-5.809***
	(2.1097)	(1.8734)	(1.8305)	(1.9237)	(1.5705)	(1.5009)	(1.5145)	(1.4741)
[14] Including institutional quality	-4.535**	-4.579**	-4.732**	-6.102***	-6.599***	-4.573***	-4.430**	-4.619***
	(2.1532)	(1.9243)	(2.0101)	(1.8351)	(1.6559)	(1.6027)	(1.7325)	(1.5650)
[15] Including the government fragmentation	-9.155***	-8.174***	-7.105***	-8.399***	-7.377***	-6.521***	-6.521***	-6.201***
	(1.8663)	(1.7545)	(1.6062)	(1.8904)	(1.6673)	(1.3104)	(1.3560)	(1.3773)
[16] Including finite term in office dummy	-5.730**	-5.662**	-5.317***	-6.842***	-5.918***	-4.234**	-4.330***	-4.298**
	(2.2540)	(2.2125)	(1.9738)	(2.0122)	(1.8120)	(1.7017)	(1.6751)	(1.6766)
[17] Including chief executive years in office	-4.878**	-5.924***	-5.494***	-5.524**	-5.194***	-5.208***	-5.170***	-5.059***
	(2.1783)	(2.1232)	(1.7858)	(2.2472)	(1.7706)	(1.4650)	(1.4589)	(1.3741)
[18] Including election years	-6.056***	-5.622***	-6.109***	-6.692***	-5.887***	-6.010***	-5.931***	-5.725***
	(1.8297)	(1.8375)	(1.8229)	(1.8581)	(1.6619)	(1.4097)	(1.4770)	(1.5227)
[19] Including parliamentary system	-4.966***	-6.073***	-6.157***	-5.869***	-6.224***	-5.644***	-5.585***	-5.577***
	(1.8502)	(1.6871)	(1.6356)	(1.8488)	(1.5829)	(1.2809)	(1.2946)	(1.4177)
[20] Including public debt	-7.399***	-7.897***	-7.849***	-8.850***	-7.900***	-7.179***	-7.301***	-6.785***
	(1.9753)	(1.9154)	(1.7138)	(1.9294)	(1.5285)	(1.4177)	(1.5494)	(1.4736)
[21] Including Comm. Net Export Price Index	-4.912**	-5.979***	-6.853***	-6.697***	-5.668***	-5.859***	-5.718***	-5.359***
	(1.9738)	(1.8592)	(1.6737)	(1.8193)	(1.6331)	(1.3911)	(1.4236)	(1.4217)
[22] Excluding new ITers	-3.887*	-4.314**	-3.735*	-5.549***	-5.432***	-4.586***	-4.533***	-4.328**
	(2.2147)	(2.1348)	(2.0518)	(1.9135)	(1.8279)	(1.5420)	(1.6237)	(1.8753)
Pseudo R^2	0.038	0.056	0.048	0.031	0.014	0.039	0.039	0.038
Rosenbaum bounds sensitivity tests	2.3	3.7	3.9	2.8	3.5	4.6	4.7	4.7

Bootstrapped standard errors based on 500 replications reported in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 4 – ATT of IT adoption on public investment in %GDP (using default starting dates)

Dependent Variable	Nearest-Neighbor Matching			Radius Matching			Kernel Matching	Local Linear Regression Matching
Public investment	N=1	N=2	N=3	r=0.005	r=0.01	r=0.05		
	IT on public investment (using default starting dates)							
[1] ATT	-1.960**	-1.966***	-2.138***	-1.652***	-1.956***	-1.811***	-1.878***	-2.257***
	(0.8029)	(0.7372)	(0.6890)	(0.5263)	(0.4488)	(0.5549)	(0.6012)	(0.6544)
Number of Treated Obs.	120	120	120	120	120	120	120	120
Number of Controls Obs.	281	281	281	281	281	281	281	281
Observations	401	401	401	401	401	401	401	401
	Robustness Checks							
[2] Excluding hyperinflation episode	-2.017***	-1.808**	-2.033***	-1.212**	-1.672***	-1.791***	-1.861***	-2.262***
	(0.7644)	(0.7727)	(0.7185)	(0.5296)	(0.4505)	(0.5855)	(0.5812)	(0.6325)
[3] Excluding monetary union,dollarization, de facto peg and currency- board	-1.497*	-1.559**	-1.650**	-1.029**	-1.310***	-1.551***	-1.639***	-2.027***
	(0.7991)	(0.7294)	(0.6753)	(0.5067)	(0.4750)	(0.5453)	(0.5686)	(0.6202)
[4] Post 90s	-1.403*	-1.571**	-1.713***	-1.236**	-1.463***	-1.438***	-1.430***	-1.578***
	(0.7822)	(0.6435)	(0.5673)	(0.6209)	(0.5329)	(0.5447)	(0.5439)	(0.5326)
[5] Before 2008	-1.772***	-1.363***	-1.133***	-1.057*	-1.069**	-1.335***	-1.408***	-1.256***
	(0.5291)	(0.4650)	(0.4132)	(0.5907)	(0.4490)	(0.3481)	(0.3356)	(0.3218)
[6] Including fiscal rules	-1.239*	-1.129*	-1.024*	-1.173**	-1.028*	-1.020**	-1.030*	-1.222**
	(0.6929)	(0.6673)	(0.6192)	(0.5523)	(0.5353)	(0.4924)	(0.5267)	(0.5549)
[7] Including central bank independence	-0.776*	-0.740**	-0.730**	-0.860**	-0.879**	-0.923***	-0.929***	-0.949***
	(0.3971)	(0.3735)	(0.3323)	(0.4246)	(0.3595)	(0.2462)	(0.2514)	(0.2667)
[8] Including fiscal balance	-1.210	-1.282*	-1.357*	-1.137**	-1.182**	-1.493***	-1.386**	-1.485**
	(0.7819)	(0.7780)	(0.6964)	(0.4905)	(0.5087)	(0.5710)	(0.5625)	(0.6443)
[9] Including unemployment rate	-1.753**	-1.642**	-1.901***	-1.186**	-1.403***	-1.625***	-1.607***	-2.045***
	(0.7960)	(0.6751)	(0.6514)	(0.5818)	(0.5122)	(0.5565)	(0.5991)	(0.5697)
[10] Including IMF programme	-1.823**	-2.180***	-1.883***	-1.563***	-2.042***	-1.629***	-1.707***	-1.649***
	(0.7732)	(0.7310)	(0.6398)	(0.5061)	(0.5058)	(0.5442)	(0.5696)	(0.6376)
[11] Including current account balance	-1.346**	-1.359**	-1.258**	-1.081**	-1.231***	-1.358***	-1.360***	-1.371***
	(0.6016)	(0.5500)	(0.5048)	(0.4814)	(0.4487)	(0.4329)	(0.4496)	(0.4612)
[12] Including financial openness	-1.379*	-1.263*	-1.419**	-1.090**	-1.180**	-1.562***	-1.543**	-1.859***
	(0.8329)	(0.7580)	(0.7100)	(0.5312)	(0.4787)	(0.5540)	(0.6129)	(0.6499)
[13] Including age dependency ratio	-0.908	-0.987	-1.038*	-0.984*	-1.077**	-1.150***	-1.192**	-1.444***
	(0.6630)	(0.6167)	(0.5378)	(0.5028)	(0.4773)	(0.4376)	(0.4985)	(0.5387)
[14] Including institutional quality	-2.318**	-2.477***	-2.625***	-1.895***	-2.349***	-2.467***	-2.502***	-2.845***
	(0.9813)	(0.9003)	(0.9203)	(0.5712)	(0.6032)	(0.7720)	(0.7940)	(0.8013)
[15] Including the government fragmentation	-0.723	-1.541**	-1.412**	-1.400***	-1.297***	-1.238**	-1.209**	-1.375***
	(0.6238)	(0.6231)	(0.5857)	(0.5342)	(0.4834)	(0.4832)	(0.4788)	(0.4708)
[16] Including finite term in office dummy	-2.867***	-2.397***	-2.165**	-1.679**	-2.178***	-2.743***	-2.692***	-2.718***
	(0.9419)	(0.8512)	(0.8578)	(0.6904)	(0.6732)	(0.8045)	(0.7821)	(0.8125)
[17] Including chief executive years in office	-0.859	-1.105*	-1.234**	-1.632***	-1.601***	-1.231***	-1.192**	-1.480***
	(0.6591)	(0.5775)	(0.5673)	(0.5480)	(0.4646)	(0.4436)	(0.4758)	(0.4733)
[18] Including election years	-1.991**	-1.712**	-1.963***	-1.341***	-1.504***	-1.640***	-1.727***	-2.131***
	(0.9078)	(0.7363)	(0.7081)	(0.5047)	(0.4974)	(0.5577)	(0.6054)	(0.6820)
[19] Including parliamentary system	-1.938**	-1.877***	-1.811***	-0.521	-1.574***	-2.087***	-2.094***	-2.453***
	(0.8141)	(0.7113)	(0.6123)	(0.5024)	(0.4846)	(0.5678)	(0.5638)	(0.5910)
[20] Including public debt	-2.070***	-1.780**	-1.888***	-1.409**	-1.520***	-1.986***	-1.965***	-2.232***
	(0.7751)	(0.6956)	(0.6378)	(0.5971)	(0.5041)	(0.5962)	(0.6038)	(0.6431)
[21] Including Comm. Net Export Price Index	-2.008**	-1.909***	-1.984***	-1.524***	-1.887***	-1.859***	-1.907***	-2.282***
	(0.7898)	(0.6950)	(0.7147)	(0.5226)	(0.4903)	(0.5380)	(0.6005)	(0.6618)
[22] Excluding new ITers	-2.008**	-3.192***	-3.291***	-1.303**	-1.913***	-2.933***	-2.924***	-3.004***
	(0.7898)	(1.0524)	(1.0014)	(0.5661)	(0.5590)	(0.7262)	(0.7690)	(0.9665)
Pseudo R^2	0.044	0.056	0.059	0.003	0.013	0.043	0.042	0.044
Rosenbaum bounds sensitivity tests	2.3	5.3	6.4	4	4.9	5.5	6	11.6

Bootstrapped standard errors based on 500 replications reported in brackets. *** p<0.01, ** p<0.05, * p<0.1

6.3 IT and sub-components of current expenditure

In this part of the present work, we continue the analysis of the previous section by trying to see which sub-component of current expenditures suffers the most from the drop in current expenditure. Although classified as less productive, this category of expenditure is replete with substantial expenditures that have a distributive or social capacity, a power to help poor households in preference and reduce inequalities. The distributive nature would favour the support of poor households in the event of income shocks from various sources (climate, political or other crises) given their low adaptive capacity and resilience but also their high exposure to shocks. This expenditure also contains essential elements for the sound functioning of public administration and to some extent internal security. For our analysis in this section, we have selected the following expenditures: subsidies, wage and salaries, grants expenditure, social expenditure and use of goods and services

Using the same methodology, we assess the effect of the IT on the components of current expenditure. We use the PS estimated in the Table 1 to estimate the ATTs.The results in Table 5 below present the estimated ATT of the IT on the current expenditure component.The results of the ATTs show that social expenditure suffers most from the fall in current expenditure. Indeed, IT reduces social benefits expenditure more than other categories of current expenditure.

The negative sign obtained on social expenditure (shown in Table 5 above) but also on education (shown in Table 6 below) may come from a negative distributive effect of inflation targeting. In other words, the search for efficiency would be detrimental to equity. In addition,the (large) reduction in social benefits expenditure may stem from the effect of inflation targeting on the size of government. By ensuring economic stability and credibility, inflation targeting would allow the government to reduce its intervention in the economy to support a population that would already be benefiting from the effects of a relatively healthy economy. This will help the government to build up surplus and have good (fiscal) discipline to support the population in the event of negative shocks. This action will be worthy of a counter-cyclical policy, which is all that is desired in developing countries where public policies (fiscal or otherwise) are highly pro-cyclical and/or erratic, creating a downward spiral of public debt.

Table 5 – Main components of current expenditure

Dependent Variable	Nearest-Neighbor Matching			Radius Matching			Kernel Matching	Local Linear Regression Matching
Components of current expenditure (using default starting date)	N=1	N=2	N=3	r=0.005	r=0.01	r=0.05		
	ATT of IT on component of current expenditure (using default starting date)							
Subsidies	-1.785***	-1.961***	-1.977***	-1.331**	-1.529***	-2.039***	-2.037***	-2.046***
	(0.4616)	(0.4149)	(0.4201)	(0.6226)	(0.4702)	(0.3655)	(0.3702)	(0.3574)
Number of Treated Obs.	95	95	95	95	95	95	95	95
Number of Controls Obs.	119	119	119	119	119	119	119	119
Observations	214	214	214	214	214	214	214	214
Wage and salaries	-1.923***	-1.902***	-2.080***	-1.456	-1.733**	-2.040***	-2.000***	-1.984***
	(0.7139)	(0.6604)	(0.6876)	(1.1323)	(0.8306)	(0.5980)	(0.6210)	(0.6471)
Number of Treated Obs.	61	61	61	61	61	61	61	61
Number of Controls Obs.	101	101	101	101	101	101	101	101
Observations	162	162	162	162	162	162	162	162
Grants expenditure	0.005	0.020	0.039	-0.001	-0.009	0.042	0.043	0.042
	(0.1107)	(0.1069)	(0.1061)	(0.1647)	(0.1322)	(0.0961)	(0.0973)	(0.0975)
Number of Treated Obs.	87	87	87	87	87	87	87	87
Number of Controls Obs.	122	122	122	122	122	122	122	122
Observations	209	209	209	209	209	209	209	209
Social expenditure	-4.730***	-4.646***	-4.553***	-5.409**	-4.793***	-4.820***	-4.714***	-4.675***
	(1.6927)	(1.4840)	(1.4810)	(2.1134)	(1.7050)	(1.2344)	(1.2729)	(1.2306)
Number of Treated Obs.	95	95	95	95	95	95	95	95
Number of Controls Obs.	112	112	112	112	112	112	112	112
Observations	207	207	207	207	207	207	207	207
Use of goods and services	0.691	0.380	0.233	-0.231	-0.278	0.117	0.152	0.069
	(0.6769)	(0.6061)	(0.5813)	(0.9424)	(0.7006)	(0.5443)	(0.5515)	(0.5240)
Number of Treated Obs.	95	95	95	95	95	95	95	95
Number of Controls Obs.	133	133	133	133	133	133	133	133
Observations	228	228	228	228	228	228	228	228

Bootstrapped standard errors based on 500 replications reported in brackets. *** p<0.01, ** p<0.05, * p<0.1

6.4 Functional components of public expenditures

Beyond the legal classification of current expenditure, we opt for a functional classification of public expenditure [14]. This latter classification allows us to take into account the components of public expenditure that enter into human capital formation (education and health), (internal) security and others. Specifically, the expenditures included here are as follows:education and health (which have the capacity to build the human capital stock that a country needs), defense (included in public investment and/or security), transport (included in public investment and/or economic affairs).Transport indeed ,has a particular interest in economic activity since it can provide the connection between different markets with the aim of developing economic activities.

Using the same methodology, we assess the effect of the IT on the functional components of public expenditures.We use the PS estimated in the Table 1 to estimate the ATTs.The results in Table 6 below present the estimated ATT of the IT on the functional components of public expenditures. These results show that IT reduces education and defense expenditure. On the other hand, the effect on transport expenditure is less clear and tends towards a protection of this expenditure (significant ATT in 4 cases out of 8) while it is not significant on health expenditure.

14. This classification allows us to take into account some components of current expenditure. This is the case, for instance, of education expenditure, which may contain wage and salaries.

Table 6 – Functional components of public expenditure

Dependent Variable	Nearest-Neighbor Matching			Radius Matching			Kernel Matching	Local Linear Regression Matching
Functional components of public expenditure (using default starting date)	N=1	N=2	N=3	r=0.005	r=0.01	r=0.05		
	ATT of IT on functional components of public expenditure (using default starting date)							
Education expenditure	-1.096***	-1.193***	-1.102***	-1.495***	-1.323***	-0.910***	-0.910***	-0.817***
	(0.4121)	(0.3772)	(0.3380)	(0.3510)	(0.2934)	(0.2887)	(0.2944)	(0.2832)
Number of Treated Obs.	75	75	75	75	75	75	75	75
Number of Controls Obs.	331	331	331	331	331	331	331	331
Observations	406	406	406	406	406	406	406	406
Health expenditure	-0.169	-0.264	-0.340	-0.040	-0.322	-0.313	-0.341	-0.295
	(0.4341)	(0.3611)	(0.3389)	(0.3864)	(0.3291)	(0.2822)	(0.2861)	(0.2731)
Number of Treated Obs.	75	75	75	75	75	75	75	75
Number of Controls Obs.	331	331	331	331	331	331	331	331
Observations	406	406	406	406	406	406	406	406
Defense expenditure	-1.704***	-1.580***	-1.674***	-2.316***	-2.081***	-1.755***	-1.695***	-1.710***
	(0.6475)	(0.5548)	(0.4841)	(0.5575)	(0.4570)	(0.3695)	(0.3547)	(0.3345)
Number of Treated Obs.	75	75	75	75	75	75	75	75
Number of Controls Obs.	314	314	314	314	314	314	314	314
Observations	389	389	389	389	389	389	389	389
Transport expenditure	-0.094	-0.240	-0.310	-0.336	-0.333*	-0.352***	-0.353**	-0.341**
	(0.2431)	(0.2178)	(0.1907)	(0.2302)	(0.2010)	(0.1357)	(0.1407)	(0.1340)
Number of Treated Obs.	74	74	74	74	74	74	74	74
Number of Controls Obs.	284	284	284	284	284	284	284	284
Observations	358	358	358	358	358	358	358	358

Bootstrapped standard errors based on 500 replications reported in brackets. *** p<0.01, ** p<0.05, * p<0.1

7 Robustness

An isolated result is not a result. To test the relevance of our baseline results illustrated above, we will conduct several robustness tests with different types of specifications in this Section.

7.1 Alternative definition of the treatment variable: using the IT of conservative starting dates (full IT or hard IT)

In this section, we analyze the sensitivity of our various baseline results to changes in the treatment variable using the IT of conservative starting dates (full IT or hard IT)

Following Lin et Ye (2009) and Huang *et al.* (2019) or De Mendonça et e Souza (2012) we use full IT for robustness. To do this, we replace in our baseline model IT (default starting dates) by full IT. It corresponds to the date on which the academic world considers that the country is under an inflation targeting regime. A country that adopts full IT is one that meets all the preconditions for adopting inflation targeting. We use this form of IT to test how changing the date of adoption of inflation targeting could affect our results. The results of this robustness test are presented in the Tables 13 for the estimation of PS (column[1] to [22] in Appendix 1) and 14, 15, 16 (Appendix 1) for the estimation of the ATTs. The results of the PS under full IT are consistent with our baseline model since the signs of the coefficient remain relatively stable. The ATTs of full IT on the public expenditure, current expenditure and public investment remain negative and significant. Also, as shown in our baseline results, IT tends to protect public investment against current expenditure (ATTs of IT on current expenditure are higher than those on public investment).This means that changing the measurement of our treatment variable does not qualitatively change our results.

These results allow us to say that IT significantly reduces public expenditure, current expenditure and public investment in developing countries. They also allow us to say that IT creates a composition effect

of public expenditure in ITers developing countries relative to others (non ITers).

7.2 Additional robustness

First,we perform regressions on different sub-sample. By following Lin et Ye (2009), we exclude hyper-inflation episode define as annual inflation rate of 40% or higher and pre-1990 observations. After this,we restrict our sample to 2007. This help us to exclude the collapse of the world economy due to 2008-2009's financial crisis. This collapse can pollute the ATTs of the IT by negatively or positively affecting public expenditure and its various components.In this case, ATTs could not be (without taking into account this crisis) interpreted as causalities. We also exclude de Facto Peg,monetary union and dollarized countries for counterfactual purpose. Indeed, these types of monetary policy according to the litterature are not compatible with IT adoption.To finish this first part of our robustness checks,we exclude new ITers in ITers.We therefore treat them as non ITers. This is justified by the delayed effect of inflation targeting and by the difficulty of a sound fiscal position and the absence of fiscal dominance which characterizes some developing countries at the beginning of the IT regime. This fiscal position, which is necessary for the effectiveness of IT, is built up over time and thus strengthens over time the credibility of these countries to successfully maintain this regime. So excluding these countries is like excluding extreme values which can bias the results.The results of these modifications are compiled in order in Table 1 column [2]-[5], and [22] in Table 1 for the propensity scores and in Table 2, 3 and 4 line [2]-[5], and [22] for the ATTs.Despite these series of changes, the results remain consistent with our baseline results. In other words, the effect of IT on public expenditure, current expenditure and public investment remains consistent with our main results.

Second, we perform several regressions to check the robustness of our main results. To this end, we sequentially introduce additional covariates likely to affect the treatment variable (or the adoption of IT) but to a certain extent the dependent variables (public expenditure, current expenditure and public investment). As illustrated by regressions [6]-[21] in Table 1 , these additional variables are:Fiscal rules,central bank independence,fiscal balance,unemployment rate,IMF programme,current account balance,financial openness,age dependency ratio,institutional quality,government fragmentation,finite term in office dummy,chief executive years in office,election years,parliamentary system,public debt,Comm. Net Export Price Index.

The inclusion of these variables is far from being ad-hoc. It has economic justification.Variables such as fiscal rules, fiscal balance, public debt (% of GDP) measure the fiscal or budgetary discipline required for better IT performance. Their choice is in line with the unpleasant monetary arithmetic argument but also with the fiscal price theory. From these two theories, one can say that a good budgetary position is essential for the success of IT.The choice of institutional and / or political variables such as institutional quality, government fragmentation, finite term in office dummy, chief executive years in office, election years, parliamentary system find their justification in the role that institutions can play for the success of IT. Indeed, "good" institutions can help the government to respect the mission assigned to the Central

Bank by avoiding political pressure on the Central Bank in order to stimulate economic activity. Or a government with "bad" institutions may choose IT to tie its own hands in order to improve the quality of its institutions. Considering these two points, we can argue that the effect of institutions on the IT can be ambiguous.The degree of independence of the Central Bank (or Central Bank independence) is included in the spirit that a high degree of independence of the Central Bank materialized by a clear objective of price stability helps the success of IT. The independence of the Central Bank also contributes to take into account the inflation tax problem.As reported by Agénor et da Silva (2019), in countries where the inflation tax is an important source of revenue for the government the independence of the Central Bank and the probability of success of the IT is limited. In such conditions (with inflation tax), fiscally induced inflationary pressures could undermine the effectiveness of monetary policy (such as IT), for instance by forcing the Central Bank to maintain low interest rates in an attempt to prevent unsustainable public debt dynamics.The unemployment rate on the other hand takes into account the problem of time inconsistency that can emerge in the conduct of inflation targeting. Indeed, in the case of high unemployment, the Central Bank will not be able to focus exclusively on prices stability since boosting output above its natural level confers a gain to any agent (Central Bank and government) that deviates from its initial objective in the case of a game with three players (Central Bank and government and private agents). We include financial openness to take into account its effect on the success of IT adoption. As Ogrokhina et Rodriguez (2019) point out, financially open countries have a more pronounced IT efficiency. As de Mendonça et da Silva Veiga (2014) relates, countries which have adopted inflation targeting and which combine low credibility, high public debt, and a high interest rate suffer from a typical problem. Increases in the interest rate to reduce departures of inflation from the target imply higher primary surplus for stabilizing public debt/GDP ratio. This tricky situation is known as “unpleasant fiscal arithmetic” (UFA). They point out that,increases in capital mobility and financial openness work as a commitment technology which contribute to the success of the inflation targeting and thus reduce the risk of UFA.Financial openness appears here as an independent control authority for the success of the IT. The IMF programme for its part is introduced to take account of the assistance that the IMF provides to ITers for the success of the IT.The current account balance is introduced to try to analyse to what extent this external balance can influence the adoption of the IT. Indeed, in the case of a bad (or negative) external balance, there is a strong demand for local products, thus causing inflationary pressure which may compromise the adoption of IT [15].Its inclusion also allows the twin deficit concept that characterizes many developing countries to be taken into account.We also include the Commodity Net Export Price Index to take into account supply and/or demand shocks that may cause the Central Bank to deviate from its inflation-targeting objective (see Agénor et da Silva, 2019 for more details).Finally, two characteristics of the population are introduced *via* age dependency ratio to take into account their inflationary nature as reported by Juselius et Takáts (2016). A characteristic that may discourage the adoption of IT but also may encourage its adoption if the government wishes to protect the assets of certain sections of the population such as the elderly.

After these manipulations, we can relate that our baseline results are qualitatively unchanged and ro-

15. This situation can promote other monetary policies adoption such as exchange rate targeting

bust as shown in Table 1 (column [6]-[21]) for PS and its corresponding ATTs in Tables 2, 3 and 4 despite some loss of significance of the ATTs.

7.3 Assessing the quality of the matching method

The use of propensity scores allowed us, as noted above, to avoid introducing into the model as many control variables as possible to explain the possibility of being treated . But this help is not without limits. This leads us to analyze whether the matching procedure is able to balance the distribution of the relevant variables in both the control and treatment group.The basic idea of this approach is to compare the situation before and after matching and check if there remain any differences after conditioning on the propensity score. In addition, the differences between the two groups can only be accepted before the matching (see Caliendo et Kopeinig, 2008).To test whether the two groups are comparable, we use the pseudo-R^2.As raised by Sianesi (2004),Caliendo et Kopeinig (2008),Minea *et al.* (2015),Balima *et al.* (2017) we re-estimate the propensity score on the matched sample, i.e. only on participants (treated or ITers) and matched non-participants (non treated or non ITers) and compare the pseudo-R^2's before and after matching. The pseudo-R^2 indicates how well the regressors X or covariates explain the participation (or the IT adoption) probability. After matching there should be no systematic differences in the distribution of covariates between both groups and therefore, the pseudo-R^2 should be fairly low or close to zero. Pseudo-R^2 is thus used as balanced scores.The results presented at the bottom of the Tables 2, 3 and 4 support the hypothesis of comparability of the two groups since the pseudo-R^2 are closed to zero.

The validity of the matching adopted is based on the Conditional Independence Assumption (CIA). In other words, this matching is based on the selection of observable characteristics. As related by Caliendo et Kopeinig (2008),if there are unobserved variables which affect assignment into treatment and the outcome variable simultaneously, a "hidden bias" might arise.To test the CIA, two methods can be adopted (Mantel et Haenszel, 1959;Rosenbaum, 2002). Since our dependent variables are continuous, we use the test developed by Rosenbaum (2002) named Rosenbaum bounds sensitivity tests and related again in DiPrete et Gangl (2004) to test how sensitive our different results may be to unobservables.In other word we seek to test the influence of confounding variable on our baseline findings. The idea is to estimate the extent to which the "selection on unobservables" may bias our qualitative and quantitative inferences about the effects of adopting IT. The procedure we use to test the unmeasured heterogeneity or endogeneity in treatment assignment expressed in odds ratio (Γ) calculate the Wilcoxon sign rank tests that give upper and lower bound estimates of significance levels at given levels of "hidden bias". The results presented at the bottom of the Tables 2, 3 and 4 which compile the Γ's corresponding to the level of test significance of Wilcoxon sign rank tests (or of Rosenbaum bounds sensitivity tests) support the hypothesis that our findings are robust to unobserved characteristics or to confounding variables. The cutting points from Rosenbaum sensitivity tests hover between 6.2 and 12.4 for public expenditure,2.3 and 4.7 for current expenditure and 2.3 and 11.6 for public investment.This odds ratio of Rosenbaum sensitivity tests or odds of adopting IT are large enough levels compared to the findings in the literature with cutting

point between 1.1 and 2.2 (see Aakvik, 2001;Rosenbaum, 2002;DiPrete et Gangl, 2004). In addition, our odds ratio is strictly higher than 1, indicating the robustness of our conclusions with regard to unobserved variables (see DiPrete et Gangl, 2004 for more details).

From these various tests, we can argue that the quality of the matching is relatively good. In addition to this,we can argue that the effect of IT on public expenditure,current expenditure and public investment is robust. In other words,inflation targeting reduces public expenditure and tends to protect public investment from current expenditure. The effect of the decline at the aggregate level is more supported by current expenditure.

7.4 Alternative estimation methods

Estimation by PS helps to correct the problem of endogeneity (mainly selection bias) that may be caused by the adoption of IT. But the estimation of these propensity scores can become complicated in case of missing data (see Mitra et Reiter, 2011) which can potentially bias our main results. Therefore, we choose an alternative method to test the robustness of our main results. The alternative method chosen is the inverse probability weighting (IPW). This method allows us to take into account the missing data bias (see Seaman et White, 2013) while addressing the correction of the endogeneity bias. As shown in Tables 17, 18 and 19 (Appendix 2), the use of an alternative method does not (qualitatively) change our main results. The adoption of IT reduces public expenditure and tends to protect public investment in developing countries.

8 Sensitivity

Our main results show that the adoption of inflation targeting reduces public expenditure. They also show that the adoption of IT reduces current expenditure more than public investment, thus creating a composition effect of public expenditure. This section will allow us to analyse the conditions under which the results highlighted in this work may change. These results are found in the context of developing countries. These countries are different in their characteristics from developed countries. Due to their different characteristics, these countries are also different from each other. The effectiveness of IT can, according to the literature (Mishkin, 2004;Mishkin et Savastano, 2001 Svensson, 2002; Lin et Ye, 2009) be affected by these differences (economic or institutional for instance). All these situations lead us to highlight the heterogeneity in the effect of adopting IT in developing countries. It is a conditional effect. These conditional effects highlight for example if countries' structural characteristics can affect ours mains results. To do this, we rely as Lin et Ye (2009) on a control function regression approach.

8.1 Sensitivity by starting dates

The adoption of inflation targeting means the loss of seigniorage revenues. These revenues contribute to the financing of public expenditure. Unlike tax revenues, which are distorting, seigniorage revenues do not distort in their use to finance public expenditure. To compensate the loss of seigniorage revenue, the

government must improve its tax performance in order to mitigate the effect of the slump in public expenditure following the IT. For this reason, tax revenues are considered in the literature as a precondition for the adoption of IT.But this precondition is not always met before the adoption of inflation targeting and can be constituted after the adoption of this type of monetary policy. Based on these facts, we want to test the sensitivity of our results to different starting dates of IT and to different types (or characteristics) of IT. Concretely, we are trying to test whether the effect of inflation targeting depends on the type of regime and the conditions preceding the adoption of the IT regime.

Table 7 reports the estimated treatment effect of public expenditure based on the control function regression approach. In the first column,we run a simple OLS regression of public expenditure on the inflation targeting dummy within the common support. The estimated coefficient, which catches the difference in mean public expenditure between ITers and non ITers, is negative and statistically significant. We then include the estimated propensity score (Pscore named PscoreIT here) obtained from our baseline probit model as a control function in the second column. The estimated coefficient on the propensity score is statistically significant at the 1% level, which is strong evidence for the presence of self-selectivity. The coefficient on the inflation targeting dummy is negative and significantly different from zero, and the magnitudes are close to the coefficients from the matching exercise in Table 2 above. Indeed, estimated average treatment effect after controlling for self-selection is about -7.18 percentage points , which is close to the average treatment effect obtained from our matching exercise. The same approach is used for the rest of the columns . The significance of the Pscores indicates the presence of selection bias. Different types of starting dates for the adoption of inflation targeting are considered: the default starting dates (soft IT which is the benchmark), the conservative starting dates (full IT),the anticipated starting dates (the starting date is two years before the adoption of the regime),constant IT (the starting date is the date on which the country starts targeting a constant inflation rate. It also measures the effectiveness of the IT),crisis IT (here, inflation targeting that takes place 2-3 years after a currency, market, debt or banking crisis are considered),currency crisis IT (IT that takes place 2-3 years after a currency crisis),stock market crisis IT (2-3 years after a market crash),debt crisis IT (2-3 years after a debt crisis),bank crisis IT (2-3 years after a banking crisis) and One-time IT (which takes 1 at the date of adoption of the IT and 0 otherwise).

As shown by the results in Table 7, IT reduces public expenditure less in the case of constant IT and crisis IT but more in the case of Full IT.This difference from our baseline results (column 2) comes from the conditions that precede the adoption of these types of regimes. In the case of constant IT, the prerequisites in terms of tax revenues, for example, would be well met, which guarantees a small reduction in public expenditure. This regime would also provide greater credibility for the target country. This credibility built through Full IT by meeting all key conditions (better fiscal performance, giving up the targeting of other aggregates such as the exchange rate and growth, better independence of the central bank and others) for a more complete effect of the IT (more pronounced decline in public expenditure), would provide access to external financing in order to mitigate the decline in expenditure resulting from

the loss of seigniorage revenues. These two types of regimes (Full IT and constant IT) usually follow the one used in our baseline model, thus indicating an improvement in tax or fiscal performance during the adoption of the regime. The case of the crisis IT [16] may come from a regime where all the preconditions are not met and where the Central Bank will be responsible for the stability of the post-crisis (financial) environment in addition to price stability.On the other hand, the effect is higher in the case of Anticipated IT indicating that the anticipation of the policy does not mitigate the effect of IT. Hence, decision-makers need to be constrained by the implementation of policies rather than being sent a constraining policy signal. The real implementation of the policy is the one that can help them to make efforts on the tax side, for example to mitigate the decline in public expenditure following the IT. But also, this result can be seen as a commitment of the decision-maker or the government to have a good fiscal position for the success of IT. A success that also includes the improvement of tax revenue collection through low inflation by mitigating the Keynes-Tanzi-Oliveira effect. By breaking down the crises into currency, market, debt and banking crisis, the results show heterogeneity according to the type of crisis that precedes IT. We note that IT preceding the currency , market banking crises lowered spending less than that preceding the debt crisis. Finally, we note that public spending is less reduced in the case of One-time IT . This may stem from a problem of (full) delegation of the mission of strict price stability to the Central Bank at the start of the adoption of the "new" monetary policy regime. This shows an effect of inertia or reluctance in the change of institutions and gives them a slower change.

The same approach applied to current expenditure and public investment presented in the Tables 8 and 9 shows the presence of selection bias. The results show that IT reduces current expenditure and public investment. The negative effect is low in the case of Full IT, constant IT, crisis IT, currency crisis IT, stock market crisis IT,bank crisis IT, one-time IT but high in the case of Anticipated IT and debt crisis IT for current expenditure.This negative effect is lower for constant IT and one-time IT but higher for Full IT, for Anticipated IT, crisis IT and the different types of IT crisis (currency crisis IT, stock market crisis IT,debt crisis IT and bank crisis IT) concerning public investment .Despite these changes, the result is always that IT tends to protect the public investment whatever the type of IT regime.

16. This approach is different from that of Fouejieu (2017) to the extent that we consider the crises preceding the adoption of the IT regime.

Table 7 – Exploring heterogeneity in the treatment effect on public expenditure (by starting dates)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
IT (Soft IT)	-4.056***	-7.179***																		
	(0.7760)	(1.0570)																		
Pscore Soft IT		13.679***																		
		(1.8063)																		
Full IT			-4.014***	-7.253***																
			(0.7740)	(1.1048)																
Pscore Full IT				13.396***																
				(1.8414)																
Anticipated IT					-4.345***	-7.530***														
					(0.7712)	(1.0244)														
Pscore Anticipated IT						13.400***														
						(1.6202)														
Constant IT							-1.503*	-5.987***												
							(0.8203)	(1.0825)												
Pscore Constant IT								14.916***												
								(1.9529)												
Crisis IT									-3.734***	-6.146***										
									(0.8261)	(1.0739)										
Pscore crisis IT										12.082***										
										(1.8377)										
Currency crisis IT											-2.845***	-5.319***								
											(0.8607)	(1.1060)								
Pscore Currency crisis IT												11.821***								
												(1.8338)								
Stock market crisis IT													-4.072***	-6.010***						
													(0.8813)	(1.0684)						
Pscore Stock market crisis IT														12.806***						
														(2.0719)						
Debt crisis IT															-10.366***	-9.543***				
															(0.5258)	(0.8394)				
Pscore Debt crisis IT																1.679				
																(3.4992)				
Bank crisis IT																	-5.287***	-6.776***		
																	(1.0498)	(1.1599)		
Pscore Bank crisis IT																		8.763***		
																		(3.0739)		
One-time IT																			-3.945**	-4.156**
																			(1.9005)	(1.9290)
Pscore One-time IT																				6.545
																				(14.9194)
Constant	28.873***	25.105***	28.869***	25.183***	29.158***	25.101***	27.910***	25.460***	28.561***	25.356***	28.262***	25.298***	28.501***	25.346***	28.503***	27.258***	28.200***	26.406***	27.777***	26.502***
	(0.5403)	(0.5259)	(0.5422)	(0.5235)	(0.5645)	(0.5397)	(0.4828)	(0.4702)	(0.5078)	(0.5211)	(0.4962)	(0.5121)	(0.4885)	(0.5285)	(0.4388)	(0.4542)	(0.4516)	(0.4712)	(0.4307)	(0.5423)
Observations	497	410	497	410	497	410	497	410	497	410	497	410	497	410	497	410	497	410	497	410

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 8 – Exploring heterogeneity in the treatment effect on current expenditure (by starting dates)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
IT (Soft IT)	-0.924	-5.265***																		
	(0.7581)	(1.0108)																		
Pscore Soft IT		15.651***																		
		(1.7054)																		
Full IT			-0.869	-5.261***																
			(0.7559)	(1.0595)																
Pscore Full IT				15.193***																
				(1.7516)																
Anticipated IT					-1.209	-5.632***														
					(0.7553)	(0.9788)														
Pscore Anticipated IT						15.137***														
						(1.5324)														
Constant IT							1.522*	-4.317***												
							(0.8338)	(0.9672)												
Pscore Constant IT								17.782***												
								(1.8478)												
Crisis IT									-0.543	-4.354***										
									(0.8057)	(1.0280)										
Pscore crisis IT										15.006***										
										(1.7513)										
Currency crisis IT											0.420	-3.770***								
											(0.8397)	(1.0607)								
Pscore Currency crisis IT												15.180***								
												(1.7730)								
Stock market crisis IT													-0.797	-4.262***						
													(0.8688)	(1.0124)						
Pscore Stock market crisis IT														16.612***						
														(1.9962)						
Debt crisis IT															-7.387***	-6.626***				
															(0.5352)	(0.8297)				
Pscore Debt crisis IT																0.126				
																(3.4239)				
Bank crisis IT																	-1.830*	-4.653***		
																	(1.0083)	(1.0355)		
Pscore Bank crisis IT																		10.886***		
																		(2.5735)		
One-time IT																			-2.582	-3.695**
																			(1.8774)	(1.6598)
Pscore One-time IT																				37.139***
																				(13.9599)
Constant	23.464***	19.961***	23.450***	20.047***	23.596***	19.884***	22.988***	20.625***	23.326***	20.155***	23.123***	20.143***	23.355***	20.092***	23.743***	22.914***	23.389***	21.834***	23.258***	21.699***
	(0.5260)	(0.4960)	(0.5276)	(0.4938)	(0.5497)	(0.5083)	(0.4615)	(0.4399)	(0.4934)	(0.4909)	(0.4791)	(0.4805)	(0.4742)	(0.4916)	(0.4309)	(0.4524)	(0.4422)	(0.4693)	(0.4152)	(0.5111)
Observations	535	431	535	431	535	431	535	431	535	431	535	431	535	431	535	431	535	431	535	431

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 9 – Exploring heterogeneity in the treatment effect on public investment (by starting dates)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
IT (Soft IT)	-1.673***	-1.290***																		
	(0.1981)	(0.2822)																		
Pscore Soft IT		-1.657***																		
		(0.6203)																		
Full IT			-1.702***	-1.337***																
			(0.1974)	(0.3001)																
Pscore Full IT				-1.485**																
				(0.6278)																
Anticipated IT					-1.701***	-1.428***														
					(0.2021)	(0.2836)														
Pscore Anticipated IT						-1.431**														
						(0.5662)														
Constant IT							-1.756***	-0.566*												
							(0.2229)	(0.3286)												
Pscore Constant IT								-2.980***												
								(0.5962)												
Crisis IT									-1.895***	-1.493***										
									(0.1913)	(0.2166)										
Pscore crisis IT										-1.885***										
										(0.5290)										
Currency crisis IT											-2.105***	-1.363***								
											(0.1710)	(0.2192)								
Pscore Currency crisis IT												-2.167***								
												(0.5324)								
Stock market crisis IT													-2.157***	-1.551***						
													(0.1673)	(0.1896)						
Pscore Stock market crisis IT														-2.053***						
														(0.5262)						
Debt crisis IT															-1.783***	-2.306***				
															(0.1485)	(0.2957)				
Pscore Debt crisis IT																3.693***				
																(1.4091)				
Bank crisis IT																	-2.040***	-1.342***		
																	(0.1816)	(0.2882)		
Pscore Bank crisis IT																		-2.152**		
																		(0.8670)		
One-time IT																			-0.949*	-0.835**
																			(0.5515)	(0.3901)
Pscore One-time IT																				-21.146***
																				(5.4000)
Constant	3.737***	3.950***	3.751***	3.930***	3.824***	4.050***	3.522***	3.642***	3.707***	3.929***	3.690***	3.898***	3.691***	3.896***	3.417***	3.109***	3.473***	3.502***	3.305***	3.617***
	(0.1514)	(0.1882)	(0.1519)	(0.1849)	(0.1581)	(0.1947)	(0.1330)	(0.1486)	(0.1437)	(0.1808)	(0.1399)	(0.1745)	(0.1393)	(0.1813)	(0.1281)	(0.1456)	(0.1289)	(0.1471)	(0.1225)	(0.1723)
Observations	490	422	490	422	490	422	490	422	490	422	490	422	490	422	490	422	490	422	490	422

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

8.2 Exploring the heterogeneity in treatment effects: the role of structural factors

In this part, we test the sensitivity of our results to the different characteristics prevailing in the ITers. Like in the previous section, we rely on the control function regression approach *à la* Lin et Ye (2009).By using this method,we study the sensitivity of our various baseline results to some structural characteristics of the countries, such as: the length of time the country is under IT, degree of compliance with the preconditions for IT adoption, fiscal discipline, position in the business cycle,financial vulnerability, institutions, natural resources, natural disaster and many others.

Table 10 below reports the estimated treatment effect of public expenditure based on the control function regression approach. In the first column,we run a simple OLS regression of public expenditure on a targeting dummy within the common support. The estimated coefficient, which catches the difference in mean public expenditure between ITers and non ITers, is negative and statistically significant. We then include the estimated propensity score (Pscore) obtained from our baseline probit model as a control function in the second column. The estimated coefficient on the propensity score is statistically significant at the 1% level, which is strong evidence for the presence of self-selectivity. The coefficient on the targeting dummy is negative and significantly different from zero, and the magnitudes are close to the coefficients from the matching exercise in Table 2 above. Indeed, estimated average treatment effect after controlling for self-selection is about -7.18 percentage points , which is close to the average treatment effect obtained from our matching exercise.

The heterogeneity in the treatment effect is presented in the other columns following both first and second columns.

The column [3] tests the role of the time length since the policy adoption by introducing an interaction term of the inflation targeting dummy and the time length since the policy adoption. We find that the interaction term is negative but not significant , which suggest that the performance of an inflation targeting regime is not affected by the time length since the policy adoption. In the column [4], in addition to the propensity score, we also include an interaction term of the inflation targeting dummy and the difference between the estimated propensity score and its sample average. This specification allows for varying treatment effect and tests if IT performs better in countries that better meet the preconditions for the adoption of this type of policy (high Pscore). The results show that treatment effect at the mean of the propensity is significant and is about 6.88% of GDP. In other word,IT reduces public expenditure in the ITers.The estimated coefficient on the interaction term is not significant , implying that there is no evidence that inflation targeting is more effective in countries that have higher estimated propensity scores or those with better meet the preconditions of policy adoption.

Columns [5]-[7] and [20] test how the government's fiscal position (or the fiscal space) can affect the effect of IT in the spirit of the unpleasant monetarist arithmetic of Sargent et Wallace (1984). The inter-

active terms are all significant. They are negative for the fiscal balance (in %GDP and in % of average tax revenues) and the primary balance suggesting that IT is more effective in countries with better fiscal position . In contrast, the term is positive for the fiscal stance, suggesting that IT is less effective in the most indebted countries. Indeed, these countries would use monetization to finance their debt, thus preventing the Central Bank from pursuing its mandated objective.

In the column [8]-[12] and [21]-[24], we investigate the role of fiscal rules to assure the success of the inflation targeting regime. The interactive term in column [8] is positive and significant, suggesting that IT is less efficient in the countries that have many fiscal rules. The critical threshold found here is 2.8 rules on average.In contrast to what can be expected, the interactive term in column [9] is positive and significant indicating that the fiscal rules are not complementary with the IT which tends to be consistent with the non significant relationship between fiscal rules and fiscal performance highlighted by Caselli *et al.* (2018);Eyraud *et al.* (2018). The multiplicity of rules, their sedimentation but their lack of flexibility in some cases would complicate their enforcement. And this situation would hurt fiscal performance for a better success of the IT.We then analyzed the effect of the design of the rules on the success of the IT columns [10]-[12]. The results show that the effect of IT is lower with BBR and DR while no kind of heterogeneity emerges with ER because of the non significance of the interactive term.To finish with the rules, we analyzed how the adoption of at least two rules can improve the effect of IT. As shown in columns [21]-[24], IT performs better when combined with ER and DR. On the other hand, IT is less efficient when combined with ER and BBR and BBR and DR. Finally, the combination of the three rules with IT does not bring out any evidence of possible heterogeneity. The design of the rules and the way of combining them matter for a better impact of IT.We have to stress that our results suggest that focusing on the combination of IT with BBR and DR tends to offset the effect of IT on public expenditure.

Column [13] tests if the effect of IT depends on the phase of the business cycle. In line with our intuition, IT performs better in times of high cycles (good time), which confers a counter-cyclical role of IT on fiscal policy (saving in times of high cycles for times of low cycles in order to avoid the deficit bias).

Column [14] tests whether the effect of the IT depends on the external (financial) vulnerability defined as the external debt ratio on exports (see IMF, 2000 for details on this indicator). This ratio is also an indicator of the sustainability of public debt. Consistent with our intuition, the IT is less efficient in the most vulnerable countries. The least exporting countries will have limited reserves to pay their debt, which may lead to a risk of default or a sustainability issue paving the way for the use of monetization.

In column [16] we test whether the effect of IT is sensitive in the countries receiving more aid. The results show that the IT has a lower effect in the countries receiving more aid. This can come from two sources: the positive correlation between aid and public expenditure (see Remmer, 2004;Njeru, 2003) or the question of fungibility (Swaroop et Devarajan (1999) of aid and the conditions to be fulfilled to benefit from this external financial flow may be in contradiction with those which ensure the success of the IT.

Columns [17] and [18] seek to test how natural resource endowment and dependence on fuel oil exports affect the performance of the IT. The idea here is to test the implications of the well-documented natural resource curse (see McGuirk, 2013;Sachs et Warner, 2001) on the performance of IT. The results instead show that IT performs better in resource-rich countries and oil exporters. This may be due to the discipline provided by the institutional constraint like the IT. A constraint that can lead to the constitution of reserves in times of boom for their use in times of collapse. This can help to limit demand shocks that may prevent the Central Bank from focusing exclusively on price stability.

We conclude our sensitivity analysis by testing the role of institutional quality (corruption, government stability), economic vulnerability and natural disasters in the efficiency of IT (Table 20 Appendix 3). the results show that IT is less effective in the most corrupt countries, the most vulnerable (from an economic perspective) and the countries most vulnerable to natural disasters. On the other hand, the stability of the government favours the success of the IT.

The same approach is used to analyze the heterogeneity in the treatment effect of the IT on current expenditure and public investment.The results presented in the Table 11 below show the heterogeneity in the effect of the IT on current expenditure. The results show the presence of a selection bias. They also show that there is no evidence that the effect of IT on current expenditure is more pronounced in the countries that better meet the prerequisites for implementing this policy. According to the results of this Table,other possible sources of heterogeneity are: fiscal balance (%GDP and % of average tax revenues),primary balance,fiscal stance,number of numerical rules in place,FR,ER,BBR,DR,phase of the economic cycle (output gap),external debt (%export),ODA,$ER*BBR$,$ER*DR$,$BBR*DR$,$ER*BBR*DR$. However, there is no evidence of heterogeneity for time length (Time). In addition, we highlight in Appendix 3 Table 21 that the level of corruption and natural disasters limit the efficiency of IT while no evidence emerges for government stability and economic vulnerability.To test these heterogeneity, we have, as in the previous Table, introduced the IT in interaction with the different variables mentioned above. The significance of the interactive term shows the presence of the heterogeneity.

The results presented in the Table 12 below present the heterogeneity in the effect of the IT on public investment. The results show the presence of a selection bias. They also show that the effect of the inflation targeting regime is deeply affected by the time length since the policy adoption. For one additional year of policy adoption, the treatment effect on lowering public expenditure becomes 0.11 percentage point larger. According to the results of this Table,other possible sources of heterogeneity are:fiscal balance (%GDP and % of average tax revenues),primary balance, fiscal stance,ER,BBR,external debt (%export),ODA,fuel exports,resource rich dummy (Resource-rich country),$ER*BBR$,$ER*DR$,$BBR*DR$,$ER*BBR*DR$.However, there is no evidence of heterogeneity for the role of meeting IT prerequisites,number of numerical rules in place,FR,DR,output gap. To test these heterogeneity, we have, as in the previous Table, introduced the IT in interaction with the different variables mentioned above. The significance of the

interactive term shows the presence of the heterogeneity.On the other hand, some results reported in this paragraph have opposite signs to the results presented in the previous Tables. Additional sensitivity analyses were carried out in relation to the institutional quality (corruption, stability of government), economic vulnerability and natural disasters. The results (Appendix 3 Table 22) show heterogeneity for government stability and economic vulnerability while no evidence was found for corruption and natural disasters.

Table 10 – Exploring heterogeneity in the treatment effect on public expenditure (the role of structural factors)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
IT	-4.056***	-7.179***	-4.164*	-6.882***	-10.598***	-9.032***	-8.658***	-9.446***	-8.906***	-7.376***	-8.662***	-8.758***	-6.333***	-9.938***	-8.668***	-6.052***	-5.527***	-9.290***	-7.532***	-7.401***	-8.594***	-7.734***
	(0.7760)	(1.0570)	(2.4167)	(1.0307)	(0.9670)	(0.9685)	(1.0397)	(0.9857)	(0.9724)	(1.0304)	(1.0099)	(0.9523)	(1.1951)	(1.3455)	(0.9403)	(1.1507)	(1.1659)	(0.9871)	(1.0590)	(1.0013)	(0.9988)	(1.0276)
Pscore		13.679***	14.150***	14.802***	13.655***	14.659***	15.442***	12.482***	12.169***	13.685***	12.023***	12.644***	14.751***	7.852***	12.275***	14.737***	13.948***	12.960***	13.689***	12.389***	13.161***	13.688***
		(1.8063)	(1.8518)	(2.8650)	(1.8153)	(1.7971)	(1.8087)	(1.9041)	(1.8640)	(1.9485)	(1.7521)	(1.8548)	(2.0699)	(1.6549)	(1.6447)	(1.8121)	(1.8245)	(1.7504)	(1.8193)	(1.9161)	(1.8060)	(1.8068)
IT*Time			-0.236																			
			(0.1563)																			
IT*(Pscore-$\overline{Pscore}$)				-2.513																		
				(3.4686)																		
IT*Fiscal balance (% GDP)					-1.551***																	
					(0.2264)																	
IT*Fiscal stance						4.849***																
						(1.5741)																
IT*Primary balance (%GDP)							-1.341***															
							(0.2437)															
IT* Number of numerical rules in place								3.330***														
								(0.7836)														
IT*FR									7.839***													
									(1.5788)													
IT*ER										4.495												
										(2.9253)												
IT*BBR											8.177***											
											(1.7512)											
IT*DR												7.731***										
												(1.7820)										
IT*Output gap													-3.984**									
													(1.8521)									
IT*External debt (%export)														4.005***								
														(0.8165)								
IT*ODA															1.909***							
															(0.2718)							
IT*Resource rich dummy																-3.820**						
																(1.6153)						
IT*Fuel exports																	-3.946***					
																	(1.4723)					
IT*Fiscal balance (% of average tax revenues)																		-0.215***				
																		(0.0333)				
IT*ER*BBR																			5.254*			
																			(3.0784)			
IT*ER*DR																				-6.880***		
																				(1.6883)		
IT*BBR*DR																					9.434***	
																					(2.5043)	
IT*ER*BBR*DR																						-1.847
																						(2.9134)
Constant	28.873***	25.105***	25.027***	24.921***	25.742***	24.756***	26.189***	26.466***	27.099***	25.288***	27.274***	26.035***	23.961***	26.559***	24.849***	23.685***	24.020***	25.210***	25.288***	25.202***	26.090***	24.993***
	(0.5403)	(0.5259)	(0.5272)	(0.5986)	(0.5743)	(0.7260)	(0.5853)	(0.6798)	(0.6267)	(0.5429)	(0.6162)	(0.6162)	(0.6193)	(0.8450)	(0.6699)	(0.7862)	(0.7017)	(0.5436)	(0.5345)	(0.5355)	(0.6099)	(0.5262)
Observations	497	410	410	410	373	410	349	410	410	410	410	410	341	340	351	410	410	373	410	410	410	410

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Only interactive terms are reported for space considerations.

Table 11 – Exploring heterogeneity in the treatment effect on current expenditure (the role of structural factors)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
IT	-0.924	-5.265***	-3.314	-4.870***	-7.940***	-6.329***	-6.639***	-7.667***	-7.210***	-5.581***	-7.033***	-6.777***	-3.908***	-5.239***	-6.749***	-5.046***	-4.896***	-7.373***	-5.721***	-5.296***	-6.739***	-5.615***
	(0.7581)	(1.0108)	(2.2948)	(0.9625)	(0.9865)	(0.9422)	(1.0342)	(0.9448)	(0.9513)	(0.9764)	(0.9675)	(0.9190)	(1.1123)	(1.2845)	(0.9766)	(1.1280)	(1.1467)	(1.0174)	(1.0038)	(0.9370)	(0.9552)	(0.9621)
Pscore		15.651***	15.980***	17.145***	16.459***	16.499***	16.971***	14.323***	13.393***	15.086***	13.195***	14.888***	17.094***	9.513***	13.917***	15.819***	15.941***	16.212***	15.197***	13.985***	15.452***	15.322***
		(1.7054)	(1.7626)	(2.7248)	(1.7921)	(1.7344)	(1.7685)	(1.9209)	(1.8412)	(1.9155)	(1.7218)	(1.7789)	(1.8906)	(1.6548)	(1.6430)	(1.7089)	(1.7464)	(1.7454)	(1.7730)	(1.7827)	(1.7351)	(1.6762)
IT*Time			-0.152																			
			(0.1508)																			
IT*(Pscore-$\overline{Pscore}$)				-3.350																		
				(3.2728)																		
IT*Fiscal balance (% GDP)					-1.025***																	
					(0.2234)																	
IT*Fiscal stance						3.054**																
						(1.4798)																
IT*Primary balance (%GDP)							-0.787***															
							(0.2404)															
IT* Number of numerical rules in place								3.184***														
								(0.8129)														
IT*FR									8.067***													
									(1.5025)													
IT*ER										4.058**												
										(1.9743)												
IT*BBR											8.670***											
											(1.6269)											
IT*DR												6.938***										
												(1.7132)										
IT*Output gap													-4.437**									
													(1.7567)									
IT*External debt (%export)														1.705**								
														(0.6688)								
IT*ODA															1.471***							
															(0.2562)							
IT*Resource rich dummy																-0.975						
																(1.5130)						
IT*Fuel exports																	-1.439					
																	(1.4030)					
IT*Fiscal balance (% of average tax revenues)																		-0.177***				
																		(0.0336)				
IT*ER*BBR																			4.821**			
																			(2.1098)			
IT*ER*DR																				-10.571***		
																				(1.5147)		
IT*BBR*DR																					9.448***	
																					(2.3986)	
IT*ER*BBR*DR																						-5.226*
																						(2.7760)
Constant	23.464***	19.961***	19.911***	19.733***	19.824***	19.194***	21.171***	21.434***	22.488***	20.417***	22.721***	20.747***	18.474***	20.963***	20.449***	19.764***	20.046***	19.785***	20.399***	20.025***	20.836***	19.826***
	(0.5260)	(0.4960)	(0.4977)	(0.5541)	(0.5128)	(0.7278)	(0.5972)	(0.7299)	(0.6311)	(0.5547)	(0.6218)	(0.5760)	(0.5878)	(0.8266)	(0.6507)	(0.7279)	(0.7383)	(0.5200)	(0.5453)	(0.5038)	(0.5724)	(0.4958)
Observations	535	431	431	431	388	431	345	431	431	431	431	431	351	345	375	431	431	388	431	431	431	431

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Only interactive terms are reported for space considerations.

Table 12 – Exploring heterogeneity in the treatment effect on public investment (the role of structural factors)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
IT	-1.673***	-1.290***	0.165	-1.159***	-1.729***	-2.387***	-1.313***	-1.199***	-1.210***	-1.310***	-1.123***	-1.214***	-1.039***	-2.536***	-1.774***	-0.378	-0.394	-1.742***	-1.374***	-1.285***	-1.184***	-1.362***
	(0.1981)	(0.2822)	(0.5490)	(0.2341)	(0.2781)	(0.4051)	(0.3048)	(0.2983)	(0.2879)	(0.2741)	(0.3169)	(0.2851)	(0.2136)	(0.5092)	(0.3432)	(0.2336)	(0.2680)	(0.3065)	(0.2917)	(0.2792)	(0.3100)	(0.2938)
Pscore		-1.657***	-1.430**	-1.165	-1.712**	-1.480**	-1.531**	-1.577**	-1.563**	-1.510**	-1.511**	-1.512**	-1.884***	-1.729**	-2.018***	-0.741	-1.693***	-1.569**	-1.642***	-1.444**	-1.418**	-1.545**
		(0.6203)	(0.6402)	(1.0677)	(0.6784)	(0.6103)	(0.6714)	(0.6295)	(0.6426)	(0.6448)	(0.6288)	(0.6345)	(0.5651)	(0.6698)	(0.6874)	(0.5675)	(0.5910)	(0.6766)	(0.6109)	(0.6470)	(0.6401)	(0.6280)
IT*Time			-0.114***																			
			(0.0383)																			
IT*(Pscore-$\overline{Pscore}$)				-1.104																		
				(1.1302)																		
IT*Fiscal balance (% GDP)					-0.214***																	
					(0.0597)																	
IT*Fiscal stance						2.127***																
						(0.4275)																
IT*Primary balance (%GDP)							-0.355***															
							(0.0513)															
IT* Number of numerical rules in place								-0.175														
								(0.1547)														
IT*FR									-0.459													
									(0.4118)													
IT*ER										2.627***												
										(0.3301)												
IT*BBR											-0.813**											
											(0.3879)											
IT*DR												-0.700										
												(0.4428)										
IT*Output gap													-1.061									
													(0.6763)									
IT*External debt (%export)														0.822***								
														(0.2508)								
IT*ODA															0.448***							
															(0.1420)							
IT*Resource rich dummy																-2.925***						
																(0.3843)						
IT*Fuel exports																	-1.888***					
																	(0.3767)					
IT*Fiscal balance (% of average tax revenues)																		-0.031***				
																		(0.0082)				
IT*ER*BBR																			2.860***			
																			(0.3039)			
IT*ER*DR																				1.944***		
																				(0.2423)		
IT*BBR*DR																					-0.937**	
																					(0.4253)	
IT*ER*BBR*DR																						2.605***
																						(0.3382)
Constant	3.737***	3.950***	3.913***	3.870***	4.134***	4.681***	4.006***	3.840***	3.795***	4.048***	3.752***	3.754***	3.576***	4.525***	4.213***	2.681***	3.164***	4.012***	4.069***	3.940***	3.707***	3.956***
	(0.1514)	(0.1882)	(0.1902)	(0.2355)	(0.2059)	(0.2927)	(0.2087)	(0.2144)	(0.2188)	(0.1914)	(0.2168)	(0.2119)	(0.1962)	(0.3972)	(0.2557)	(0.1842)	(0.2098)	(0.2018)	(0.1884)	(0.1907)	(0.2118)	(0.1890)
Observations	490	422	422	422	385	422	363	422	422	422	422	422	353	352	365	422	422	385	422	422	422	422

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.Only interactive terms are reported for space considerations.

9 Conclusion

The purpose of this paper is to assess the effect of inflation targeting on public expenditures in developing countries. To do so, we investigated the effect of inflation targeting on public expenditure as a percentage of GDP (the level effect) and on the composition of public expenditure (current *versus* public investment expenditure). To identify the causal effect of inflation targeting, we rely on the Propensity Scores Matching (PSM) method developed by Rosenbaum et Rubin (1983). This method allows us to address any selection bias problems that may remain and estimate the Average Treatment Effect on the Treated (ATT) of inflation targeting. Our study covers 37 developing countries including 15 ITers and 22 non ITers over 1990-2016. Our results show that inflation targeting significantly reduces public expenditure (level effect) in developing countries that are under inflation targeting regime. At the same time, we show that inflation targeting has a composition effect on public expenditure. Indeed, according to our results, inflation targeting more significantly reduces current expenditure than public investment. These results remain valid to various robustness tests carried out in our work.

Later, we highlighted heterogeneity effects or sensitivity analysis. The aim is to assess the conditions under which our results may change. We have shown that the results are sensitive to the type of inflation targeting adopted, but also to different structural characteristics.

To sum up, this article assesses the disciplinary effect of inflation targeting by precisely focusing on public expenditure. The results found here show that the fiscal discipline of inflation targeting in developing countries should lead to lower public expenditure. A further analysis that allows the decomposition of public expenditure shows that IT tends to protect public expenditure (more productive expenditure) from current expenditure (less productive expenditure). In addition, we must stress that the effect of the decline in public expenditure is more concentrated on social expenditure than on any other category of current expenditure. The observed decrease in current expenditure seems to be good news for developing countries. Indeed, most of these countries are burdened by debt. Despite debt restructuring and reduction or other programmes, the debt problem of these countries remains a major challenge. Above all, this problem stems from erratic fiscal policies with uncontrolled public expenditure. From this perspective, inflation targeting appears to be a useful constraint in disciplining the fiscal behaviour of developing countries and thus reducing the less productive expenditures that increase their debt burden by putting them in an infinite debt spiral. The spiral in question here also complicates the access of these countries to the required financing at lower borrowing costs.

The present paper may be extended in forthcoming work. Indeed, the analysis has focused on public expenditure as a percentage of GDP. To analyse the composition effect, we are limited to the differences between the coefficients resulting from the regressions on current expenditure and public investment. Future studies may analyse the composition effect in other ways, for example by relating these expenditures to total expenditures or to other categories of public expenditures or by analyzing the variation of one of

these expenditures (current expenditure and public investment) relative to the other.

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Appendix

Appendix 1

Table 13 – Probit estimates of the Propensity Scores

Dependent Variable : IT using conservative starting dates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
Lag inflation	-0.082***	-0.081***	-0.087***	-0.064***	-0.105***	-0.080***	-0.089***	-0.089***	-0.100***	-0.084***	-0.087***	-0.081***	-0.082***	-0.080***	-0.077***	-0.121***	-0.105***	-0.082***	-0.083***	-0.070***	-0.083***	-0.077***
	(0.0153)	(0.0153)	(0.0152)	(0.0150)	(0.0262)	(0.0165)	(0.0167)	(0.0166)	(0.0173)	(0.0156)	(0.0164)	(0.0158)	(0.0145)	(0.0156)	(0.0157)	(0.0207)	(0.0171)	(0.0154)	(0.0155)	(0.0143)	(0.0159)	(0.0150)
Lag tax revenues	0.008	0.008	0.008	0.012	0.002	0.009	-0.001	-0.011	0.009	0.006	-0.013	0.014	-0.001	0.010	0.002	-0.041***	-0.007	0.008	0.006	0.014	0.002	0.008
	(0.0086)	(0.0086)	(0.0086)	(0.0094)	(0.0122)	(0.0084)	(0.0095)	(0.0093)	(0.0132)	(0.0086)	(0.0113)	(0.0095)	(0.0092)	(0.0088)	(0.0095)	(0.0132)	(0.0098)	(0.0087)	(0.0087)	(0.0090)	(0.0087)	(0.0087)
Trade openness	-0.014***	-0.014***	-0.013***	-0.017***	-0.010***	-0.013***	-0.013***	-0.016***	-0.016***	-0.014***	-0.016***	-0.013***	-0.013***	-0.014***	-0.014***	-0.016***	-0.016***	-0.014***	-0.014***	-0.017***	-0.015***	-0.013***
	(0.0024)	(0.0024)	(0.0023)	(0.0024)	(0.0023)	(0.0017)	(0.0025)	(0.0025)	(0.0033)	(0.0025)	(0.0031)	(0.0020)	(0.0022)	(0.0025)	(0.0024)	(0.0024)	(0.0027)	(0.0024)	(0.0028)	(0.0025)	(0.0025)	(0.0024)
Real GDP per capita growth	0.082***	0.081***	0.080***	0.087***	0.089***	0.084***	0.063***	0.087***	0.080***	0.087***	0.067***	0.083***	0.074***	0.086***	0.076***	0.067**	0.081***	0.083***	0.081***	0.088***	0.083***	0.085***
	(0.0244)	(0.0247)	(0.0250)	(0.0299)	(0.0278)	(0.0226)	(0.0237)	(0.0233)	(0.0299)	(0.0231)	(0.0222)	(0.0237)	(0.0253)	(0.0246)	(0.0237)	(0.0271)	(0.0242)	(0.0243)	(0.0249)	(0.0259)	(0.0239)	(0.0261)
Broad money growth	-0.032***	-0.032***	-0.034***	-0.031***	-0.030***	-0.027***	-0.026***	-0.028***	-0.033***	-0.032***	-0.026***	-0.032***	-0.032***	-0.034***	-0.029***	-0.035***	-0.035***	-0.033***	-0.032***	-0.028***	-0.034***	-0.029***
	(0.0075)	(0.0075)	(0.0078)	(0.0080)	(0.0088)	(0.0073)	(0.0076)	(0.0073)	(0.0083)	(0.0075)	(0.0078)	(0.0076)	(0.0078)	(0.0079)	(0.0071)	(0.0081)	(0.0078)	(0.0073)	(0.0074)	(0.0073)	(0.0077)	(0.0075)
Fixed exchange rate dummy	-1.132***	-1.138***	-1.140***	-1.128***	-1.475***	-1.140***	-1.149***	-1.187***	-1.069***	-1.102***	-0.926***	-1.227***	-1.095***	-1.096***	-1.142***	-0.912***	-0.948***	-1.142***	-1.126***	-1.179***	-1.204***	-1.152***
	(0.1796)	(0.1800)	(0.1802)	(0.2019)	(0.2767)	(0.1896)	(0.1897)	(0.1986)	(0.2027)	(0.1824)	(0.1937)	(0.1860)	(0.1874)	(0.1784)	(0.1825)	(0.2072)	(0.1904)	(0.1797)	(0.1797)	(0.1886)	(0.1804)	(0.2183)
Financial development	0.003	0.003	0.002	0.007***	0.004*	0.004**	0.007***	0.004**	0.003	0.003**	0.003*	0.004**	0.002	0.003*	0.002	0.004**	0.001	0.003	0.002	0.007***	0.003	0.003
	(0.0017)	(0.0017)	(0.0018)	(0.0019)	(0.0022)	(0.0017)	(0.0018)	(0.0018)	(0.0021)	(0.0017)	(0.0018)	(0.0017)	(0.0018)	(0.0018)	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0019)	(0.0021)	(0.0017)	(0.0019)
Working age population	0.086***	0.086***	0.076***	0.061***	0.084***	0.090***	0.069***	0.102***	0.099***	0.086***	0.124***	0.076***	-0.504***	0.089***	0.083***	0.134***	0.104***	0.086***	0.086***	0.068***	0.092***	0.084***
	(0.0156)	(0.0155)	(0.0170)	(0.0150)	(0.0247)	(0.0154)	(0.0170)	(0.0182)	(0.0218)	(0.0158)	(0.0197)	(0.0153)	(0.1242)	(0.0162)	(0.0151)	(0.0198)	(0.0166)	(0.0157)	(0.0157)	(0.0152)	(0.0158)	(0.0154)
Fiscal rules						0.780***																
						(0.1602)																
Central bank independence							1.617***															
							(0.3854)															
Fiscal balance								-0.067***														
								(0.0135)														
Unemployment rate									-0.016													
									(0.0165)													
IMF programme										0.554***												
										(0.1955)												
Current account balance											-0.045***											
											(0.0103)											
Financial openness												0.127**										
												(0.0566)										
Age dependency ratio													-0.253***									
													(0.0574)									
Institutional quality														-0.152								
														(0.1216)								
Government fragmentation															0.820***							
															(0.2492)							
Finite term in office dummy																3.105***						
																(0.8148)						
Chief executive years in office																	-0.112***					
																	(0.0206)					
Election years																		-0.188				
																		(0.2325)				
Parliamentary system																			0.068			
																			(0.1988)			
Public debt																				-0.003		
																				(0.0038)		
Comm. Net Export Price Index																					0.005***	
																					(0.0018)	
Constant	-3.881***	-3.877***	-3.134***	-2.272**	-4.073***	-4.672***	-3.918***	-4.583***	-4.219***	-3.978***	-6.012***	-3.424***	48.432***	-3.664***	-3.894***	-8.885***	-3.913***	-3.847***	-3.851***	-2.750***	-4.569***	-3.925***
	(0.9126)	(0.9101)	(1.0488)	(0.8916)	(1.4219)	(0.9678)	(0.9846)	(1.0240)	(1.4051)	(0.9389)	(1.1588)	(0.9213)	(11.2953)	(0.8820)	(0.8988)	(1.5165)	(0.9376)	(0.9131)	(0.9016)	(0.9313)	(0.9445)	(0.9200)
PseudoR^2	0.365	0.349	0.354	0.356	0.381	0.402	0.366	0.407	0.364	0.376	0.412	0.371	0.400	0.368	0.379	0.488	0.444	0.366	0.365	0.366	0.372	0.360
Observations	573	544	542	417	353	573	477	519	445	573	536	572	573	564	556	573	572	573	573	489	573	528

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 14 – ATT of IT adoption on public expenditure in %GDP (using conservative starting dates)

Dependent Variable	Nearest-Neighbor Matching			Radius Matching			Kernel Matching	Local Linear Regression Matching
Public expenditure	N=1	N=2	N=3	r=0.005	r=0.01	r=0.05		
	Treatment effect of IT on public expenditure, using conservative starting dates							
[1] ATT	-8.116***	-8.786***	-8.832***	-9.517***	-8.630***	-8.644***	-8.575***	-8.191***
	(1.7198)	(1.8812)	(1.7203)	(1.8462)	(1.5924)	(1.3321)	(1.3842)	(1.4425)
Number of Treated Obs.	122	122	122	122	122	122	122	122
Number of Controls Obs.	288	288	288	288	288	288	288	288
Observations	410	410	410	410	410	410	410	410
	Robustness Checks							
[2] Excluding hyperinflation episode	-8.626***	-9.218***	-9.001***	-9.788***	-8.593***	-8.662***	-8.627***	-8.275***
	(1.9811)	(1.7742)	(1.7023)	(1.7443)	(1.5760)	(1.4106)	(1.3616)	(1.4923)
[3] Excluding monetary union,dollarization, de facto peg and currency- board	-7.851***	-8.333***	-7.578***	-7.003***	-7.776***	-8.099***	-8.177***	-7.695***
	(2.0915)	(1.8765)	(1.7115)	(1.8779)	(1.5489)	(1.4094)	(1.5299)	(1.6358)
[4] Post 90s	-11.938***	-10.917***	-10.568***	-10.554***	-11.492***	-10.532***	-10.550***	-10.276***
	(1.9868)	(1.7944)	(1.6640)	(1.8904)	(1.7177)	(1.4116)	(1.3108)	(1.3991)
[5] Before 2008	-6.384*	-6.295**	-6.752**	-7.953**	-8.497***	-6.617***	-6.920***	-5.422**
	(3.3806)	(3.0686)	(2.6608)	(3.1719)	(2.7105)	(2.4051)	(2.6251)	(2.4602)
[6] Including fiscal rules	-8.826***	-8.556***	-7.808***	-6.849***	-7.760***	-8.639***	-8.333***	-7.871***
	(2.4430)	(2.1510)	(2.0968)	(1.9875)	(1.8213)	(1.6561)	(1.6721)	(1.7938)
[7] Including central bank independence	-10.242***	-10.304***	-9.786***	-9.362***	-9.649***	-8.598***	-8.595***	-8.248***
	(2.1785)	(2.0115)	(1.8644)	(2.1599)	(1.8573)	(1.6753)	(1.6093)	(1.6019)
[8] Including fiscal balance	-8.362***	-8.441***	-8.086***	-9.602***	-9.747***	-9.235***	-9.248***	-8.753***
	(2.0149)	(2.1900)	(1.9357)	(2.0605)	(1.6100)	(1.4985)	(1.6770)	(1.8772)
[9] Including unemployment rate	-7.057***	-8.671***	-8.827***	-6.865***	-7.892***	-8.579***	-8.480***	-8.374***
	(1.9054)	(1.6961)	(1.5538)	(1.9988)	(1.6959)	(1.3420)	(1.3150)	(1.2972)
[10] Including IMF programme	-9.342***	-8.880***	-8.932***	-8.820***	-8.855***	-9.105***	-9.400***	-9.718***
	(2.0380)	(1.8932)	(1.6752)	(1.8769)	(1.5563)	(1.4228)	(1.4350)	(1.5567)
[11] Including current account balance	-8.462***	-8.480***	-8.827***	-7.639***	-8.287***	-8.915***	-8.911***	-8.670***
	(2.6101)	(2.4072)	(2.3327)	(2.1227)	(1.8696)	(2.0109)	(2.0753)	(2.0389)
[12] Including financial openness	-6.649***	-8.304***	-8.188***	-9.379***	-9.194***	-7.627***	-7.662***	-8.256***
	(2.3470)	(2.2311)	(2.1228)	(1.9233)	(1.5841)	(1.6376)	(1.7062)	(1.9111)
[13] Including age dependency ratio	-7.772***	-7.852***	-7.146***	-8.577***	-8.071***	-7.023***	-7.280***	-7.290***
	(2.1549)	(2.0513)	(1.9585)	(1.9565)	(1.8509)	(1.5780)	(1.6037)	(1.7564)
[14] Including institutional quality	-6.701***	-7.631***	-7.013***	-7.844***	-7.457***	-6.928***	-7.088***	-7.325***
	(1.9547)	(1.8933)	(1.7907)	(2.0279)	(1.6891)	(1.4118)	(1.4678)	(1.5260)
[15] Including the government fragmentation	-7.119***	-7.432***	-7.097***	-8.375***	-7.480***	-7.061***	-6.859***	-7.316***
	(1.9547)	(1.7104)	(1.7010)	(1.8950)	(1.7517)	(1.2993)	(1.3324)	(1.3040)
[16] Including finite term in office dummy	-5.912***	-7.462***	-7.316***	-5.762**	-7.585***	-6.977***	-6.983***	-7.036***
	(2.1719)	(2.0542)	(1.8493)	(2.3072)	(1.9239)	(1.7224)	(1.7339)	(1.6309)
[17] Including chief executive years in office	-7.970***	-7.787***	-7.437***	-7.573***	-7.844***	-7.773***	-7.765***	-8.227***
	(2.2328)	(2.1110)	(1.8820)	(2.3107)	(1.8157)	(1.6109)	(1.4799)	(1.4704)
[18] Including election years	-10.101***	-9.605***	-9.023***	-9.457***	-9.449***	-9.175***	-9.159***	-8.656***
	(1.9953)	(1.9054)	(1.8489)	(1.9344)	(1.5550)	(1.5209)	(1.4606)	(1.6187)
[19] Including parliamentary system	-8.221***	-9.039***	-8.474***	-7.845***	-8.422***	-8.677***	-8.660***	-8.396***
	(1.8141)	(1.7376)	(1.7023)	(1.7444)	(1.5382)	(1.3533)	(1.3236)	(1.4823)
[20] Including public debt	-8.693***	-9.500***	-9.657***	-10.176***	-9.347***	-9.720***	-9.691***	-9.138***
	(1.8772)	(1.7379)	(1.7057)	(2.0516)	(1.5876)	(1.2783)	(1.3131)	(1.4416)
[21] Including Comm. Net Export Price Index	-6.457***	-7.218***	-7.259***	-6.845***	-7.464***	-7.828***	-7.804***	-7.665***
	(1.9149)	(1.7630)	(1.7414)	(1.8848)	(1.5535)	(1.4410)	(1.3356)	(1.4544)
[22] Excluding new ITers	-8.975***	-8.391***	-7.854***	-8.808***	-8.673***	-7.976***	-8.130***	-7.911***
	(1.9162)	(1.8815)	(1.6776)	(2.0138)	(1.6868)	(1.3515)	(1.3509)	(1.5648)
Pseudo R^2	0.072	0.049	0.053	0.012	0.011	0.036	0.037	0.072
Rosenbaum bounds sensitivity tests	3.6	6	8	4.9	6.3	12.6	11.9	11.8

Bootstrapped standard errors based on 500 replications reported in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 15 – ATT of IT adoption on current expenditure in %GDP (using conservative starting dates)

Dependent Variable	Nearest-Neighbor Matching			Radius Matching			Kernel Matching	Local Linear Regression Matching
Current expenditure	N=1	N=2	N=3	r=0.005	r=0.01	r=0.05		
	Treatment effect of IT on current expenditure, using conservative starting dates							
[1] ATT	-6.428***	-7.032***	-6.396***	-7.828***	-7.269***	-5.797***	-5.840***	-5.421***
	(1.9984)	(1.8655)	(1.9022)	(1.9724)	(1.7121)	(1.5454)	(1.5519)	(1.6679)
Number of Treated Obs.	126	126	126	126	126	126	126	126
Number of Controls Obs.	305	305	305	305	305	305	305	305
Observations	431	431	431	431	431	431	431	431
	Robustness Checks							
[2] Excluding hyperinflation episode	-6.140***	-6.417***	-6.730***	-7.184***	-7.060***	-5.987***	-5.999***	-5.601***
	(2.0740)	(1.9799)	(1.9455)	(1.9346)	(1.6834)	(1.5333)	(1.6086)	(1.6398)
[3] Excluding monetary union,dollarization, de facto peg and currency- board	-6.423***	-6.013***	-5.872***	-6.818***	-6.855***	-5.670***	-5.928***	-5.587***
	(2.1114)	(2.0144)	(1.8442)	(1.9088)	(1.7586)	(1.5556)	(1.5607)	(1.7095)
[4] Post 90s	-6.233***	-7.263***	-7.452***	-7.685***	-7.041***	-7.397***	-7.384***	-6.777***
	(2.0863)	(2.1396)	(1.8603)	(2.0796)	(1.6955)	(1.7195)	(1.5698)	(1.6588)
[5] Before 2008	-8.626***	-6.494**	-5.641**	-4.859	-5.965**	-7.619***	-7.743***	-4.744**
	(2.9796)	(2.6025)	(2.5116)	(3.0833)	(2.6505)	(2.0332)	(2.1074)	(2.1854)
[6] Including fiscal rules	-7.363***	-7.219***	-7.480***	-7.396***	-6.967***	-6.235***	-6.518***	-6.282***
	(2.3102)	(2.1822)	(1.9840)	(2.0487)	(1.9064)	(1.7235)	(1.8076)	(1.7058)
[7] Including central bank independence	-5.038**	-6.607***	-7.044***	-6.630***	-6.737***	-7.085***	-7.061***	-7.021***
	(2.1737)	(2.0289)	(1.9051)	(2.1830)	(1.8696)	(1.5928)	(1.6104)	(1.6229)
[8] Including fiscal balance	-6.168***	-6.215***	-6.712***	-6.494***	-5.720***	-7.122***	-7.111***	-6.511***
	(2.3798)	(2.3781)	(2.3877)	(2.0444)	(1.7930)	(1.6957)	(1.8304)	(1.9642)
[9] Including unemployment rate	-6.240***	-7.108***	-6.560***	-8.503***	-7.029***	-6.436***	-6.365***	-5.907***
	(1.9651)	(1.8679)	(1.7569)	(2.0327)	(1.5893)	(1.4686)	(1.4118)	(1.5901)
[10] Including IMF programme	-7.017***	-6.558***	-6.761***	-8.162***	-7.263***	-6.893***	-6.982***	-6.544***
	(2.0882)	(1.8506)	(1.9669)	(2.0170)	(1.7742)	(1.5802)	(1.4961)	(1.7785)
[11] Including current account balance	-6.692***	-5.396**	-4.994**	-6.731***	-4.699**	-5.964***	-6.056***	-5.873***
	(2.4693)	(2.3168)	(2.2986)	(2.2526)	(1.9636)	(1.9423)	(2.0381)	(2.0939)
[12] Including financial openness	-6.368***	-6.981***	-6.036***	-8.452***	-7.433***	-5.864***	-5.673***	-5.657***
	(2.1732)	(2.1332)	(2.1196)	(1.9501)	(1.6765)	(1.6071)	(1.6662)	(1.7462)
[13] Including age dependency ratio	-5.175**	-5.892***	-5.050**	-5.249***	-5.433***	-5.791***	-5.721***	-5.210***
	(2.1546)	(2.0028)	(2.0610)	(2.0011)	(1.6650)	(1.7459)	(1.7006)	(1.7981)
[14] Including institutional quality	-5.039**	-4.161**	-3.934*	-6.139***	-6.128***	-4.094**	-3.998**	-3.865**
	(2.2642)	(2.1093)	(2.0378)	(2.0184)	(1.7375)	(1.7044)	(1.7292)	(1.8202)
[15] Including the government fragmentation	-7.666***	-7.655***	-6.778***	-7.438***	-7.308***	-5.933***	-5.747***	-5.653***
	(2.0503)	(1.8746)	(1.8021)	(2.0319)	(1.8130)	(1.4633)	(1.4826)	(1.5326)
[16] Including finite term in office dummy	-5.693**	-4.238*	-4.502**	-7.165***	-6.461***	-4.439**	-4.381**	-4.087**
	(2.4499)	(2.3842)	(2.2114)	(2.3961)	(2.1050)	(1.7710)	(1.8490)	(1.8536)
[17] Including chief executive years in office	-5.083**	-5.098**	-5.417***	-5.186**	-5.622***	-5.310***	-5.271***	-5.363***
	(2.2522)	(2.0843)	(1.8661)	(2.3845)	(1.8790)	(1.5355)	(1.6757)	(1.6125)
[18] Including election years	-5.572***	-6.065***	-6.280***	-6.321***	-5.791***	-5.837***	-5.941***	-5.893***
	(2.0707)	(2.1582)	(1.9617)	(2.0406)	(1.6703)	(1.6153)	(1.5676)	(1.6691)
[19] Including parliamentary system	-6.464***	-6.158***	-6.098***	-7.674***	-6.725***	-6.154***	-6.231***	-5.748***
	(1.9147)	(1.8891)	(1.7558)	(1.9791)	(1.6649)	(1.4380)	(1.5254)	(1.5958)
[20] Including public debt	-5.444**	-7.487***	-7.077***	-7.939***	-6.970***	-6.336***	-6.062***	-5.350***
	(2.1200)	(2.1457)	(1.9810)	(2.0157)	(1.7160)	(1.6393)	(1.6353)	(1.7226)
[21] Including Comm. Net Export Price Index	-4.325**	-5.398***	-5.389***	-5.888***	-4.629***	-5.262***	-5.111***	-4.846***
	(2.0910)	(1.9595)	(1.7626)	(1.9327)	(1.6446)	(1.5160)	(1.6303)	(1.4875)
[22] Excluding new ITers	-3.895*	-4.179*	-3.684*	-5.508***	-5.427***	-4.768***	-4.622***	-4.739***
	(2.2297)	(2.1446)	(1.9679)	(2.0465)	(1.8238)	(1.6475)	(1.6226)	(1.8294)
Pseudo R^2	0.134	0.099	0.078	0.044	0.033	0.041	0.043	0.134
Rosenbaum bounds sensitivity tests	2.6	4.4	5	4.6	4.6	3.8	4	4.3

Bootstrapped standard errors based on 500 replications reported in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 16 – ATT of IT adoption on public investment in %GDP (using conservative starting dates)

Dependent Variable	Nearest-Neighbor Matching			Radius Matching			2[2]*Kernel Matching	Local Linear Regression Matching
Public investment	N=1	N=2	N=3	r=0.005	r=0.01	r=0.05		
	IT on public investment (using conservative starting dates)							
[1] ATT	-3.067***	-2.289***	-2.538***	-1.355**	-1.612***	-2.930***	-2.904***	-2.899***
	(1.0010)	(0.8746)	(0.8186)	(0.5629)	(0.5461)	(0.6767)	(0.6940)	(0.8421)
Number of Treated Obs.	122	122	122	122	122	122	122	122
Number of Controls Obs.	300	300	300	300	300	300	300	300
Observations	422	422	422	422	422	422	422	422
	Robustness Checks							
[2] Excluding hyperinflation episode	-2.708***	-2.140**	-2.298***	-1.231**	-1.518***	-2.791***	-2.761***	-2.777***
	(0.9368)	(0.9228)	(0.8189)	(0.5077)	(0.5108)	(0.6526)	(0.6951)	(0.7639)
[3] Excluding monetary union,dollarization, de facto peg and currency- board	-2.772***	-2.330***	-2.387***	-1.456***	-1.605***	-2.292***	-2.254***	-2.315***
	(0.9386)	(0.8228)	(0.7755)	(0.4988)	(0.4922)	(0.6154)	(0.6876)	(0.7202)
[4] Post 90s	-2.429***	-1.774**	-1.843***	-1.398**	-1.897***	-2.194***	-2.193***	-2.523***
	(0.9111)	(0.7827)	(0.7088)	(0.7081)	(0.6139)	(0.6796)	(0.7004)	(0.7356)
[5] Before 2008	-1.653***	-1.666***	-1.565***	-1.079*	-1.174**	-1.436***	-1.380***	-1.190***
	(0.5080)	(0.4497)	(0.4129)	(0.6464)	(0.5020)	(0.3465)	(0.3408)	(0.3313)
[6] Including fiscal rules	-2.121**	-1.467*	-1.745***	-1.859***	-1.965***	-1.657***	-1.615***	-1.879***
	(0.8315)	(0.7800)	(0.6668)	(0.5961)	(0.5760)	(0.6286)	(0.6031)	(0.6247)
[7] Including central bank independence	-1.144***	-0.764**	-0.853**	-0.878*	-0.910**	-0.977***	-0.977***	-1.031***
	(0.4128)	(0.3730)	(0.3453)	(0.4788)	(0.3715)	(0.2611)	(0.2457)	(0.2374)
[8] Including fiscal balance	-2.537***	-2.308**	-2.340***	-1.784***	-2.178***	-1.791**	-1.846**	-2.007**
	(0.9812)	(0.9240)	(0.8406)	(0.5649)	(0.5845)	(0.7221)	(0.7932)	(0.8297)
[9] Including unemployment rate	-1.968**	-1.899**	-1.984***	-0.942	-1.175**	-2.377***	-2.434***	-2.626***
	(0.9026)	(0.8136)	(0.7467)	(0.5915)	(0.5433)	(0.6485)	(0.6351)	(0.7239)
[10] Including IMF programme	-1.434*	-2.112***	-2.156***	-1.113**	-1.412***	-2.120***	-2.114***	-2.309***
	(0.8330)	(0.7639)	(0.8283)	(0.5176)	(0.5220)	(0.6167)	(0.6768)	(0.7180)
[11] Including current account balance	-2.237***	-1.934***	-1.859***	-1.718***	-1.726***	-1.794***	-1.729***	-1.912***
	(0.7010)	(0.6409)	(0.5589)	(0.5049)	(0.4914)	(0.5129)	(0.5354)	(0.5613)
[12] Including financial openness	-2.014**	-1.839**	-1.917**	-1.204**	-1.575***	-1.963***	-1.988***	-2.185***
	(0.9109)	(0.8538)	(0.7528)	(0.5579)	(0.5322)	(0.6171)	(0.6439)	(0.7641)
[13] Including age dependency ratio	-2.098***	-1.908**	-1.705***	-1.292**	-1.424***	-1.797***	-1.858***	-2.001***
	(0.7983)	(0.7694)	(0.6505)	(0.5295)	(0.4924)	(0.5781)	(0.6129)	(0.6623)
[14] Including institutional quality	-3.376***	-3.026***	-3.199***	-1.730***	-2.320***	-2.924***	-3.086***	-3.277***
	(1.0387)	(1.0111)	(0.9320)	(0.6371)	(0.5823)	(0.7571)	(0.8290)	(0.8805)
[15] Including the government fragmentation	-0.950	-1.078*	-1.498**	-1.041**	-1.080**	-1.414***	-1.438***	-1.666***
	(0.7103)	(0.5883)	(0.5902)	(0.5267)	(0.5081)	(0.5170)	(0.5133)	(0.5117)
[16] Including finite term in office dummy	-3.782***	-3.008***	-2.891***	-2.241***	-2.251***	-2.966***	-3.093***	-3.177***
	(1.0978)	(1.0571)	(1.0404)	(0.7170)	(0.7505)	(0.8579)	(0.9293)	(0.9638)
[17] Including chief executive years in office	-2.172***	-1.517**	-1.517***	-1.313**	-1.501***	-1.517***	-1.574***	-1.550***
	(0.6749)	(0.5979)	(0.5465)	(0.5860)	(0.5049)	(0.4627)	(0.4468)	(0.5351)
[18] Including election years	-2.654***	-2.308**	-2.342***	-1.738***	-1.686***	-2.363***	-2.505***	-2.746***
	(0.9315)	(0.9023)	(0.8300)	(0.5745)	(0.5371)	(0.6480)	(0.6846)	(0.7794)
[19] Including parliamentary system	-2.734***	-2.168**	-2.486***	-1.225**	-1.587***	-2.802***	-2.854***	-2.825***
	(0.9360)	(0.8630)	(0.8103)	(0.5153)	(0.5198)	(0.6446)	(0.6677)	(0.7512)
[20] Including public debt	-1.844*	-1.692*	-1.997**	-1.581**	-1.571***	-2.519***	-2.501***	-2.861***
	(0.9599)	(0.8810)	(0.7800)	(0.6156)	(0.5616)	(0.7203)	(0.7922)	(0.8202)
[21] Including Comm. Net Export Price Index	-2.842***	-2.246***	-2.519***	-1.480***	-1.884***	-2.929***	-2.818***	-2.820***
	(0.9781)	(0.8417)	(0.8216)	(0.4934)	(0.5033)	(0.7010)	(0.6742)	(0.7398)
[22] Excluding new ITers	-3.679***	-3.285***	-3.301***	-2.064***	-2.428***	-3.001***	-3.082***	-2.682***
	(1.1031)	(1.0383)	(0.9897)	(0.6068)	(0.5261)	(0.7228)	(0.8098)	(0.9552)
Pseudo R^2	0.033	0.042	0.051	0.009	0.009	0.039	0.039	0.033
Rosenbaum bounds sensitivity tests	3.4	5.1	9.4	2.8	4.3	8.8	9.2	13

Bootstrapped standard errors based on 500 replications reported in brackets. *** p<0.01, ** p<0.05, * p<0.1

Appendix 2

Table 17 – ATT (IPW) of IT adoption on public expenditure in %GDP (using default starting dates)

Dependent variable Public expenditure	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
ATT	-7.702*** (1.0855)	-7.716*** (1.0837)	-7.583*** (1.0799)	-8.595*** (1.0852)	-6.545*** (1.6111)	-6.569*** (1.1818)	-7.871*** (1.2372)	-8.034*** (1.0983)	-8.321*** (0.9837)	-8.081*** (1.1122)	-6.917*** (1.2734)	-7.634*** (1.1428)	-7.012*** (1.1401)	-7.348*** (1.1036)	-7.107*** (1.1047)	-6.806*** (1.1942)	-6.065*** (1.1423)	-7.688*** (1.0814)	-8.003*** (1.0793)	-7.853*** (1.0540)	-7.387*** (1.0929)	-7.858*** (1.0849)
Lag inflation	-0.082*** (0.0188)	-0.082*** (0.0188)	-0.093*** (0.0207)	-0.074*** (0.0178)	-0.074** (0.0322)	-0.072*** (0.0193)	-0.083*** (0.0192)	-0.081*** (0.0190)	-0.088*** (0.0209)	-0.084*** (0.0191)	-0.078*** (0.0193)	-0.081*** (0.0197)	-0.086*** (0.0196)	-0.082*** (0.0198)	-0.079*** (0.0196)	-0.104*** (0.0222)	-0.091*** (0.0192)	-0.082*** (0.0190)	-0.079*** (0.0189)	-0.069*** (0.0172)	-0.080*** (0.0188)	-0.075*** (0.0193)
Lag tax revenues	0.023 (0.0155)	0.023 (0.0155)	0.020 (0.0155)	0.030 (0.0189)	0.014 (0.0199)	0.020 (0.0149)	-0.001 (0.0174)	0.000 (0.0181)	0.033* (0.0190)	0.018 (0.0155)	-0.025 (0.0216)	0.025 (0.0157)	0.010 (0.0162)	0.038** (0.0166)	0.022 (0.0156)	-0.014 (0.0185)	0.013 (0.0152)	0.023 (0.0156)	0.029* (0.0167)	0.033* (0.0169)	0.016 (0.0175)	0.039** (0.0168)
Trade openness	-0.016*** (0.0028)	-0.016*** (0.0029)	-0.015*** (0.0027)	-0.019*** (0.0027)	-0.009*** (0.0023)	-0.015*** (0.0024)	-0.015*** (0.0029)	-0.018*** (0.0028)	-0.018*** (0.0033)	-0.016*** (0.0029)	-0.017*** (0.0032)	-0.014*** (0.0027)	-0.013*** (0.0024)	-0.017*** (0.0031)	-0.016*** (0.0029)	-0.018*** (0.0029)	-0.020*** (0.0032)	-0.016*** (0.0029)	-0.015*** (0.0031)	-0.019*** (0.0028)	-0.017*** (0.0029)	-0.011*** (0.0024)
Real GDP per capita growth	0.056** (0.0234)	0.054** (0.0238)	0.051** (0.0239)	0.067** (0.0284)	0.046 (0.0310)	0.061*** (0.0221)	0.042* (0.0231)	0.063*** (0.0227)	0.061** (0.0285)	0.059*** (0.0227)	0.045** (0.0221)	0.055** (0.0230)	0.045* (0.0242)	0.060*** (0.0225)	0.051** (0.0227)	0.055** (0.0255)	0.065*** (0.0230)	0.056** (0.0233)	0.058** (0.0238)	0.063*** (0.0245)	0.058** (0.0236)	0.056** (0.0236)
Broad money growth	-0.025*** (0.0077)	-0.025*** (0.0078)	-0.026*** (0.0083)	-0.021** (0.0085)	-0.027*** (0.0088)	-0.022*** (0.0074)	-0.022*** (0.0075)	-0.023*** (0.0075)	-0.030*** (0.0090)	-0.025*** (0.0077)	-0.021*** (0.0079)	-0.025*** (0.0077)	-0.026*** (0.0083)	-0.026*** (0.0082)	-0.024*** (0.0074)	-0.030*** (0.0085)	-0.028*** (0.0083)	-0.025*** (0.0076)	-0.026*** (0.0078)	-0.020** (0.0078)	-0.026*** (0.0078)	-0.021*** (0.0081)
Fixed exchange rate dummy	-0.596*** (0.1980)	-0.604*** (0.1986)	-0.623*** (0.1982)	-0.571*** (0.2130)	-0.809** (0.3146)	-0.607*** (0.2041)	-0.585*** (0.2110)	-0.661*** (0.2092)	-0.554*** (0.2082)	-0.600*** (0.1981)	-0.498** (0.2031)	-0.703*** (0.2114)	-0.650*** (0.1937)	-0.443** (0.1992)	-0.614*** (0.2026)	-0.417** (0.2108)	-0.363* (0.2085)	-0.598*** (0.1989)	-0.618*** (0.1998)	-0.582*** (0.2019)	-0.637*** (0.2029)	-0.852*** (0.2672)
Financial development	0.001 (0.0020)	0.001 (0.0020)	0.000 (0.0021)	0.005** (0.0022)	0.001 (0.0024)	0.003 (0.0020)	0.005** (0.0025)	0.004* (0.0020)	0.002 (0.0024)	0.002 (0.0020)	0.004* (0.0021)	0.002 (0.0020)	-0.000 (0.0021)	0.002 (0.0020)	0.001 (0.0020)	0.004* (0.0020)	0.001 (0.0020)	0.001 (0.0020)	0.002 (0.0021)	0.005** (0.0022)	0.001 (0.0020)	-0.002 (0.0024)
Working age population	0.099*** (0.0166)	0.099*** (0.0166)	0.076*** (0.0203)	0.076*** (0.0159)	0.087*** (0.0280)	0.101*** (0.0164)	0.083*** (0.0194)	0.099*** (0.0173)	0.071*** (0.0235)	0.096*** (0.0167)	0.106*** (0.0182)	0.090*** (0.0166)	-0.470*** (0.1749)	0.110*** (0.0189)	0.093*** (0.0167)	0.118*** (0.0181)	0.099*** (0.0168)	0.099*** (0.0167)	0.100*** (0.0161)	0.076*** (0.0146)	0.101*** (0.0162)	0.112*** (0.0173)
Fiscal rules						0.589*** (0.1760)																
Central bank independence							1.104*** (0.4192)															
Fiscal balance								-0.044*** (0.0155)														
Unemployment rate									-0.023 (0.0177)													
IMF programme										0.378* (0.2161)												
Current account balance											-0.037*** (0.0121)											
Financial openness												0.129** (0.0655)										
Age dependency ratio													-0.230*** (0.0734)									
Institutional quality														-0.365*** (0.1416)								
Government fragmentation															0.440* (0.2622)							
Finite term in office dummy																2.366*** (0.6242)						
Chief executive years in office																	-0.097*** (0.0185)					
Election years																		-0.126 (0.2579)				
Parliamentary system																			-0.186 (0.2135)			
Public debt																				-0.005 (0.0041)		
Comm. Net Export Price Index																					0.003 (0.0030)	
Constant	-4.929*** (1.0540)	-4.927*** (1.0509)	-3.316** (1.3844)	-3.545*** (1.0262)	-4.701*** (1.7913)	-5.552*** (1.1200)	-4.585*** (1.1690)	-4.631*** (1.0263)	-2.852* (1.5904)	-4.736*** (1.0600)	-4.907*** (1.1219)	-4.555*** (1.0785)	44.756*** (15.4699)	-4.924*** (1.0423)	-4.695*** (1.0762)	-7.773*** (1.2252)	-4.171*** (1.0230)	-4.903*** (1.0539)	-5.156*** (1.0084)	-3.483*** (0.9530)	-5.233*** (1.0191)	-6.045*** (1.1573)
Observations	410	389	382	310	236	410	334	373	329	410	396	409	410	401	401	410	409	410	410	347	410	368

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 18 – ATT (IPW) of IT adoption on current expenditure in %GDP (using default starting dates)

Dependent variable Current expenditure	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
ATT	-5.453*** (1.1725)	-5.445*** (1.1717)	-5.539*** (1.1732)	-6.564*** (1.2077)	-5.285*** (1.4764)	-4.909*** (1.2664)	-6.568*** (1.2331)	-5.575*** (1.2031)	-6.329*** (1.0977)	-6.086*** (1.2509)	-4.944*** (1.2807)	-5.527*** (1.1977)	-5.444*** (1.2015)	-3.929*** (1.0348)	-5.329*** (1.1722)	-4.124*** (1.2003)	-4.078*** (1.1665)	-5.358*** (1.1445)	-5.791*** (1.2608)	-5.456*** (1.1222)	-5.037*** (1.1443)	-4.067*** (1.0605)
Lag inflation	-0.088*** (0.0195)	-0.088*** (0.0195)	-0.099*** (0.0210)	-0.077*** (0.0199)	-0.085** (0.0368)	-0.077*** (0.0202)	-0.090*** (0.0200)	-0.085*** (0.0200)	-0.094*** (0.0211)	-0.087*** (0.0194)	-0.082*** (0.0205)	-0.086*** (0.0201)	-0.090*** (0.0204)	-0.089*** (0.0204)	-0.086*** (0.0207)	-0.110*** (0.0226)	-0.103*** (0.0212)	-0.088*** (0.0199)	-0.085*** (0.0194)	-0.072*** (0.0189)	-0.085*** (0.0199)	-0.075*** (0.0216)
Lag tax revenues	0.009 (0.0168)	0.009 (0.0167)	0.007 (0.0167)	0.015 (0.0208)	0.015 (0.0184)	0.006 (0.0160)	-0.007 (0.0180)	-0.007 (0.0183)	0.018 (0.0208)	0.006 (0.0167)	-0.037* (0.0219)	0.010 (0.0170)	0.004 (0.0168)	0.024 (0.0174)	0.011 (0.0169)	-0.019 (0.0178)	-0.012 (0.0169)	0.008 (0.0169)	0.017 (0.0178)	0.021 (0.0177)	-0.002 (0.0186)	0.025 (0.0178)
Trade openness	-0.017*** (0.0028)	-0.017*** (0.0028)	-0.016*** (0.0027)	-0.020*** (0.0028)	-0.010*** (0.0021)	-0.016*** (0.0022)	-0.016*** (0.0029)	-0.018*** (0.0028)	-0.018*** (0.0033)	-0.017*** (0.0028)	-0.017*** (0.0032)	-0.015*** (0.0025)	-0.014*** (0.0025)	-0.018*** (0.0031)	-0.017*** (0.0029)	-0.019*** (0.0029)	-0.020*** (0.0032)	-0.017*** (0.0029)	-0.015*** (0.0030)	-0.019*** (0.0028)	-0.018*** (0.0029)	-0.012*** (0.0016)
Real GDP per capita growth	0.037 (0.0233)	0.035 (0.0240)	0.033 (0.0237)	0.047 (0.0290)	0.038 (0.0284)	0.044** (0.0222)	0.028 (0.0234)	0.052** (0.0230)	0.041 (0.0277)	0.042* (0.0229)	0.032 (0.0225)	0.036 (0.0229)	0.034 (0.0237)	0.043* (0.0225)	0.036 (0.0229)	0.046* (0.0251)	0.043* (0.0234)	0.037 (0.0231)	0.040* (0.0238)	0.047* (0.0251)	0.040* (0.0236)	0.038 (0.0234)
Broad money growth	-0.023*** (0.0073)	-0.023*** (0.0075)	-0.024*** (0.0078)	-0.019** (0.0082)	-0.023*** (0.0080)	-0.020*** (0.0070)	-0.020*** (0.0071)	-0.020*** (0.0072)	-0.027*** (0.0085)	-0.023*** (0.0074)	-0.019*** (0.0075)	-0.022*** (0.0073)	-0.024*** (0.0077)	-0.024*** (0.0079)	-0.022*** (0.0071)	-0.027*** (0.0081)	-0.026*** (0.0081)	-0.023*** (0.0072)	-0.024*** (0.0075)	-0.018** (0.0076)	-0.024*** (0.0075)	-0.019** (0.0078)
Fixed exchange rate dummy	-0.613*** (0.1956)	-0.623*** (0.1964)	-0.630*** (0.1952)	-0.550*** (0.2116)	-0.885*** (0.3084)	-0.612*** (0.2000)	-0.627*** (0.2066)	-0.672*** (0.2073)	-0.558*** (0.2065)	-0.615*** (0.1956)	-0.514** (0.2022)	-0.719*** (0.2076)	-0.655*** (0.1915)	-0.448** (0.1971)	-0.625*** (0.1991)	-0.440** (0.2086)	-0.407* (0.2103)	-0.613*** (0.1963)	-0.638*** (0.1980)	-0.570*** (0.1999)	-0.671*** (0.2014)	-0.945*** (0.2691)
Financial development	0.001 (0.0020)	0.001 (0.0020)	0.001 (0.0021)	0.005** (0.0022)	0.002 (0.0024)	0.003 (0.0020)	0.005** (0.0025)	0.004* (0.0020)	0.002 (0.0023)	0.002 (0.0020)	0.004* (0.0022)	0.002 (0.0020)	0.000 (0.0021)	0.002 (0.0020)	0.001 (0.0020)	0.004* (0.0020)	0.002 (0.0020)	0.001 (0.0020)	0.002 (0.0022)	0.005** (0.0022)	0.002 (0.0020)	-0.002 (0.0024)
Working age population	0.109*** (0.0180)	0.110*** (0.0180)	0.088*** (0.0221)	0.086*** (0.0172)	0.079*** (0.0275)	0.110*** (0.0173)	0.089*** (0.0203)	0.105*** (0.0179)	0.086*** (0.0252)	0.106*** (0.0180)	0.116*** (0.0193)	0.102*** (0.0180)	-0.304* (0.1599)	0.119*** (0.0199)	0.103*** (0.0182)	0.120*** (0.0184)	0.114*** (0.0186)	0.110*** (0.0182)	0.112*** (0.0175)	0.084*** (0.0156)	0.114*** (0.0177)	0.127*** (0.0197)
Fiscal rules						0.584*** (0.1745)																	
Central bank independence							0.970** (0.4120)																
Fiscal balance								-0.038** (0.0150)															
Unemployment rate									-0.018 (0.0176)														
IMF programme										0.387* (0.2106)													
Current account balance											-0.035*** (0.0125)												
Financial openness												0.117* (0.0639)											
Age dependency ratio													-0.165*** (0.0629)										
Institutional quality														-0.379*** (0.1408)									
Government fragmentation															0.306 (0.2635)								
Finite term in office dummy																2.242*** (0.6147)							
Chief executive years in office																	-0.095*** (0.0170)						
Election years																		-0.174 (0.2502)					
Parliamentary system																			-0.278 (0.2166)				
Public debt																				-0.005 (0.0042)			
Comm. Net Export Price Index																					0.004 (0.0029)		
Constant	-5.291*** (1.1005)	-5.295*** (1.0971)	-3.790*** (1.4575)	-3.864*** (1.0409)	-4.056** (1.8090)	-5.814*** (1.1330)	-4.669*** (1.2054)	-4.845*** (1.0506)	-3.558** (1.6542)	-5.154*** (1.1075)	-5.307*** (1.1747)	-4.983*** (1.1280)	30.599** (13.8551)	-5.147*** (1.0627)	-4.990*** (1.1184)	-7.637*** (1.1969)	-4.571*** (1.0704)	-5.272*** (1.1025)	-5.616*** (1.0491)	-3.743*** (0.9584)	-5.753*** (1.0760)	-6.595*** (1.2546)
Observations	431	409	402	318	255	431	353	388	347	431	416	430	431	422	422	431	430	431	431	364	431	387

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 19 – ATT (IPW) of IT adoption on public investment in %GDP (using default starting dates)

Dependent variable Public investment	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
ATT	-2.169*** (0.6484)	-2.181*** (0.6588)	-2.081*** (0.6645)	-2.026*** (0.5780)	-1.372*** (0.2015)	-1.797*** (0.4637)	-1.032*** (0.2186)	-2.319*** (0.8591)	-2.170*** (0.6981)	-1.966*** (0.5890)	-1.888*** (0.5959)	-2.034*** (0.6087)	-1.822*** (0.5430)	-3.109*** (0.9473)	-1.842*** (0.5187)	-2.893*** (1.0255)	-1.351*** (0.3159)	-2.194*** (0.6566)	-2.293*** (0.6976)	-2.295*** (0.5735)	-2.145*** (0.6350)	-3.297*** (0.8579)
Lag inflation	-0.082*** (0.0191)	-0.082*** (0.0190)	-0.091*** (0.0207)	-0.075*** (0.0180)	-0.072** (0.0325)	-0.073*** (0.0196)	-0.083*** (0.0196)	-0.080*** (0.0193)	-0.085*** (0.0209)	-0.084*** (0.0194)	-0.079*** (0.0199)	-0.081*** (0.0201)	-0.085*** (0.0196)	-0.081*** (0.0200)	-0.079*** (0.0198)	-0.103*** (0.0223)	-0.089*** (0.0195)	-0.082*** (0.0192)	-0.078*** (0.0192)	-0.070*** (0.0175)	-0.081*** (0.0191)	-0.074*** (0.0194)
Lag tax revenues	0.027* (0.0156)	0.027* (0.0156)	0.025 (0.0156)	0.037** (0.0186)	0.017 (0.0202)	0.025* (0.0150)	0.000 (0.0177)	0.007 (0.0179)	0.036* (0.0194)	0.023 (0.0155)	-0.015 (0.0205)	0.028* (0.0157)	0.012 (0.0160)	0.042** (0.0168)	0.025 (0.0157)	-0.008 (0.0182)	0.019 (0.0153)	0.027* (0.0156)	0.033** (0.0166)	0.039** (0.0166)	0.025 (0.0166)	0.042** (0.0169)
Trade openness	-0.015*** (0.0029)	-0.015*** (0.0029)	-0.014*** (0.0028)	-0.018*** (0.0027)	-0.008*** (0.0023)	-0.014*** (0.0023)	-0.014*** (0.0029)	-0.017*** (0.0028)	-0.016*** (0.0034)	-0.016*** (0.0029)	-0.016*** (0.0032)	-0.014*** (0.0025)	-0.012*** (0.0023)	-0.016*** (0.0030)	-0.016*** (0.0029)	-0.018*** (0.0028)	-0.018*** (0.0031)	-0.016*** (0.0029)	-0.014*** (0.0030)	-0.018*** (0.0028)	-0.016*** (0.0028)	-0.010*** (0.0022)
Real GDP per capita growth	0.058** (0.0239)	0.056** (0.0243)	0.055** (0.0244)	0.070** (0.0290)	0.049 (0.0324)	0.062*** (0.0227)	0.045* (0.0237)	0.066*** (0.0236)	0.066** (0.0290)	0.061*** (0.0233)	0.048** (0.0225)	0.056** (0.0233)	0.045* (0.0244)	0.062*** (0.0232)	0.053** (0.0231)	0.057** (0.0260)	0.068*** (0.0237)	0.058** (0.0238)	0.061** (0.0243)	0.064** (0.0249)	0.059** (0.0241)	0.057** (0.0241)
Broad money growth	-0.026*** (0.0077)	-0.026*** (0.0078)	-0.027*** (0.0083)	-0.023*** (0.0086)	-0.028*** (0.0089)	-0.023*** (0.0075)	-0.022*** (0.0075)	-0.024*** (0.0075)	-0.031*** (0.0090)	-0.026*** (0.0078)	-0.022*** (0.0079)	-0.025*** (0.0078)	-0.027*** (0.0083)	-0.027*** (0.0083)	-0.024*** (0.0073)	-0.030*** (0.0085)	-0.029*** (0.0083)	-0.026*** (0.0076)	-0.027*** (0.0079)	-0.021*** (0.0078)	-0.026*** (0.0078)	-0.022*** (0.0082)
Fixed exchange rate dummy	-0.636*** (0.2005)	-0.644*** (0.2009)	-0.667*** (0.2017)	-0.617*** (0.2142)	-0.846*** (0.3209)	-0.650*** (0.2060)	-0.634*** (0.2135)	-0.720*** (0.2112)	-0.599*** (0.2128)	-0.644*** (0.2006)	-0.549*** (0.2041)	-0.749*** (0.2094)	-0.677*** (0.1933)	-0.507** (0.2009)	-0.650*** (0.2054)	-0.458** (0.2119)	-0.447** (0.2083)	-0.638*** (0.2016)	-0.659*** (0.2017)	-0.616*** (0.2026)	-0.648*** (0.2063)	-0.906*** (0.2686)
Financial development	0.001 (0.0020)	0.001 (0.0020)	0.000 (0.0021)	0.005** (0.0022)	0.001 (0.0025)	0.002 (0.0020)	0.006** (0.0025)	0.004* (0.0020)	0.002 (0.0024)	0.002 (0.0020)	0.003 (0.0021)	0.002 (0.0020)	-0.000 (0.0021)	0.001 (0.0020)	0.001 (0.0020)	0.003* (0.0020)	0.001 (0.0020)	0.001 (0.0020)	0.002 (0.0021)	0.005** (0.0022)	0.001 (0.0020)	-0.002 (0.0023)
Working age population	0.104*** (0.0172)	0.103*** (0.0171)	0.085*** (0.0205)	0.084*** (0.0164)	0.091*** (0.0291)	0.106*** (0.0168)	0.087*** (0.0201)	0.105*** (0.0182)	0.085*** (0.0230)	0.101*** (0.0172)	0.112*** (0.0188)	0.092*** (0.0170)	-0.547*** (0.1925)	0.114*** (0.0196)	0.097*** (0.0171)	0.122*** (0.0187)	0.107*** (0.0177)	0.104*** (0.0173)	0.105*** (0.0166)	0.081*** (0.0148)	0.105*** (0.0167)	0.116*** (0.0176)
Fiscal rules						0.566*** (0.1713)																	
Central bank independence							1.210*** (0.4262)																
Fiscal balance								-0.041*** (0.0151)															
Unemployment rate									-0.017 (0.0176)														
IMF programme										0.335 (0.2102)													
Current account balance											-0.033*** (0.0116)												
Financial openness												0.151** (0.0627)											
Age dependency ratio													-0.265*** (0.0815)										
Institutional quality														-0.313** (0.1400)									
Government fragmentation															0.488* (0.2610)								
Finite term in office dummy																2.329*** (0.6059)							
Chief executive years in office																	-0.092*** (0.0185)						
Election years																		-0.091 (0.2615)					
Parliamentary system																			-0.234 (0.2092)				
Public debt																				-0.006 (0.0041)			
Comm. Net Export Price Index																					0.001 (0.0026)		
Constant	-5.332*** (1.0833)	-5.329*** (1.0795)	-4.029*** (1.3783)	-4.220*** (1.0411)	-5.026*** (1.8700)	-5.905*** (1.1397)	-4.954*** (1.2058)	-5.123*** (1.0742)	-3.946*** (1.5316)	-5.189*** (1.0900)	-5.473*** (1.1461)	-4.807*** (1.1040)	51.651*** (17.0653)	-5.436*** (1.0866)	-5.026*** (1.0951)	-8.074*** (1.2620)	-4.842*** (1.0685)	-5.321*** (1.0839)	-5.581*** (1.0282)	-3.882*** (0.9591)	-5.451*** (1.0628)	-6.397*** (1.1783)
Observations	422	401	394	322	244	422	346	385	341	422	410	421	422	413	411	422	421	422	422	361	422	380

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Appendix 3

Table 20 – Exploring heterogeneity in the treatment effect on public expenditure (the role of structural factors)

	[23]	[24]	[25]	[26]
IT	-8.668***	-5.688***	-7.839***	-11.990***
	(1.0916)	(1.3479)	(0.9661)	(1.9676)
Pscore	13.028***	13.977***	15.026***	13.802***
	(2.0021)	(1.8116)	(1.7677)	(1.7895)
IT*Corruption dummy	3.287**			
	(1.6388)			
IT*Government stability		-3.752***		
		(1.4112)		
IT*Economic Vulnerability Index			2.572*	
			(1.4746)	
IT*Damage				5.552***
				(2.0712)
Constant	26.053***	24.243***	22.960***	27.248***
	(0.7795)	(0.8297)	(0.7293)	(1.0543)
Observations	410	410	410	410

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Only interactive terms are reported for space considerations.

Table 21 – Exploring heterogeneity in the treatment effect on current expenditure (the role of structural factors)

	[23]	[24]	[25]	[26]
IT	-6.867***	-4.714***	-5.958***	-10.744***
	(1.0982)	(1.3079)	(0.9815)	(1.7254)
Pscore	14.972***	15.887***	16.617***	15.741***
	(1.8981)	(1.7223)	(1.7034)	(1.6889)
IT*Corruption dummy	3.421**			
	(1.5527)			
IT*Government stability		-2.020		
		(1.3625)		
IT*Economic Vulnerability Index			2.369	
			(1.4497)	
IT*Damage				6.303***
				(1.8163)
Constant	21.146***	20.143***	18.566***	22.634***
	(0.7916)	(0.8555)	(0.7509)	(1.0759)
Observations	431	431	431	431

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Only interactive terms are reported for space considerations.

Table 22 – Exploring heterogeneity in the treatment effect on public investment (the role of structural factors)

	[23]	[24]	[25]	[26]
IT	-1.642***	-0.871***	-1.845***	-1.159**
	(0.3701)	(0.3097)	(0.2759)	(0.5787)
Pscore	-1.495**	-1.606**	-1.566**	-1.597**
	(0.6526)	(0.6252)	(0.6352)	(0.6179)
IT*Corruption dummy	0.497			
	(0.3935)			
IT*Government stability		-0.749*		
		(0.3908)		
IT*Economic Vulnerability Index			1.217***	
			(0.3518)	
IT*Damage				-0.130
				(0.6140)
Constant	4.406***	3.466***	4.033***	4.220***
	(0.3002)	(0.2121)	(0.2345)	(0.4236)
Observations	422	422	422	422

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Only interactive terms are reported for space considerations.

Appendix 4

Table 23 – Statistics description of variables in the baseline model (ITers)

Variable	Obs	Mean	Std. Dev.	Min	Max
Public expenditure	261	25.501	7.505	11.916	43.774
Current expenditure	266	22.802	7.819	9.695	43.509
Public investment	247	2.348	1.895	0.012	12.732
Soft IT	405	0.420	0.494	0	1
Full IT	405	0.422	0.495	0	1
Lag inflation	393	111.843	619.223	-0.9	7481.7
Lag tax revenues	267	15.721	4.097	5.1175	27.596
Trade openness	385	68.049	30.632	15.162	143.024
Real GDP per capita growth	397	2.368	5.459	-40.745	14.746
Broad money growth	376	71.541	401.577	-73.974	6384.916
Fixed exchange rate dummy	405	0.568	0.496	0	1
Financial development	389	54.376	44.652	4.378	192.660
Working age population	390	63.046	6.054	47.678	74.338

Table 24 – Statistics description of variables in the baseline model (non ITers)

Variable	Obs	Mean	Std. Dev.	Min	Max
Public expenditure	236	30.110	10.706	14.101	60.288
Current expenditure	269	23.602	10.814	9.511	55.460
Public investment	243	4.240	2.987	0.117	17.694
Soft IT	594	0	0	0	0
Full IT	594	0	0	0	0
Lag inflation	573	36.004	242.002	-8.5	4146
Lag tax revenues	362	14.478	7.779	0.086	45.253
Trade openness	518	90.046	72.247	21.447	441.604
Real GDP per capita growth	564	1.806	5.195	-26.412	32.997
Broad money growth	521	30.416	191.198	-43.738	4105.573
Fixed exchange rate dummy	594	0.864	0.344	0	1
Financial development	554	47.511	35.786	-14.755	184.753
Working age population	572	60.175	8.906	45.633	85.872

Appendix 5

Variabe	Description	Source
Public expenditure	Total expense plus the net acquisition of nonfinancial assets	WDI and International Monetary Fund's Government Finance Statistics Yearbook
Current expenditure	Cash payments for operating activities of the government in providing goods and services. It includes compensation of employees (such as wages and salaries) and subsidies, grants, social benefits, and other expenses such as rent and dividends but excludes interest payment	WDI and International Monetary Fund's Government Finance Statistics Yearbook
Public investment	It includes fixed assets, inventories, valuables, and non produced assets but excludes consumption of fixed capital. Non-financial assets are stores of value and provide benefits either through their use in the production of goods and services or in the form of property income and holding gains	WDI and International Monetary Fund's Government Finance Statistics Yearbook
IT (soft IT)	Dummy variable equal to 1 if a country is under IT regime in a given year; 0 otherwise. Soft IT or default starting dates are related to partial IT adoption	Hammond *et al.* (2012);Roger (2010);Sarwat (2012);Agénor et da Silva (2019);Websites of the various Central Banks
IT (full IT)	Dummy variable equal to 1 if a country is under IT regime in a given year; 0 otherwise. Full IT or conservative starting dates are related to full-fledged IT adoption	Hammond *et al.* (2012);Roger (2010);Agénor et da Silva (2019)
Constant IT	It is a dummy variable that takes 1 if the country is targeting a constant rate of inflation and 0 otherwise	Ogrokhina et Rodriguez (2018); Websites of the various Central Banks
Anticipated IT	IT lagged two years	Authors' calculations based on Hammond *et al.* (2012);Roger (2010);Sarwat (2012);Agénor et da Silva (2019);Websites of the various Central Banks
Crisis IT	IT that takes place 2-3 years before a currency, market, debt or banking crisis	Authors' calculations based on Hammond *et al.* (2012);Roger (2010);Sarwat (2012);Agénor et da Silva (2019);Websites of the various Central Banks and Reinhart et Rogoff (2009)
currency crisis IT;stock market crisis IT;debt crisis IT;bank crisis IT	IT that takes place 2-3 years before a currency; 2-3 years before a market;2-3 years before a debt; 2-3 years before a banking crisis	Authors' calculations based on Hammond *et al.* (2012);Roger (2010);Sarwat (2012);Agénor et da Silva (2019);Websites of the various Central Banks and Reinhart et Rogoff (2009)
One-time IT	Dummy variable takes 1 at the date of adoption of the IT and 0 otherwise	Authors' calculations based on Hammond *et al.* (2012);Roger (2010);Sarwat (2012);Agénor et da Silva (2019);Websites of the various Central Banks
Inflation	Inflation rate, average consumer prices (Annual percent change)	WEO
Lag inflation	Inflation lagged one years	Authors' calculations based on WEO
Tax revenue	Tax revenue refers to compulsory transfers to the central government for public purposes. Certain compulsory transfers such as fines, penalties, and most social security contributions are excluded. Refunds and corrections of erroneously collected tax revenue are treated as negative revenue.	WDI
Lag tax revenue	Tax revenue lagged one years	Authors' calculations based on WDI
Trade openness	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.	WDI
Real GDP per capita growth	Annual percentage growth rate of GDP per capita based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. GDP per capita is gross domestic product divided by midyear population. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.	WDI
Broad money growth	Broad money is the sum of currency outside banks; demand deposits other than those of the central government; the time, savings, and foreign currency deposits of resident sectors other than the central government; bank and traveler's checks; and other securities such as certificates of deposit and commercial paper.	WDI
Fixed exchange rate dummy (fine classification)	Dummy variable equal to 1 if a country is classified as having a de facto fixed exchange rate regime (hard or soft peg) and 0 otherwise	Ilzetzki *et al.* (2017)
Financial development proxied by Domestic credit provided by the financial sector	Domestic credit provided by the financial sector includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The financial sector includes monetary authorities and deposit money banks, as well as other financial corporations where data are available (including corporations that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange companies.	WDI
Working age population	Total population between the ages 15 to 64 as a percentage of the total population. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship.	WDI
Fiscal rules	Dummy variable equal to 1 if a country had in place, at the national level, a numerical limit on fiscal aggregates (expenditure, revenue, budget balance, debt)and 0 otherwise	IMF Fiscal Rules Dataset
ER (Expenditure Rules)	Dummy variable equal to 1 for expenditure rules and 0 otherwise	IMF Fiscal Rules Dataset
BBR (Balanced Budget Rules)	Dummy variable equal to 1 for Balanced Budget Rules and 0 otherwise	IMF Fiscal Rules Dataset
DR (Debt Rules)	Dummy variable equal to 1 for Debt Rules and 0 otherwise	IMF Fiscal Rules Dataset
Central bank independance	Score measuring the degree of Central Bank independence	Garriga (2016)
Fiscal balance	General government revenues minus expenditures (% ofGDP)	WEO
Unemployment rate	Unemployment rate (Percent of total labor force)	WEO
IMF programme	IMF Standby Arrangement in effect for at least 5 months in a particular year, dummy.	Dreher (2006)
Current account balance	The current account is the record of all transactions in the balance of payments covering the exports and imports of goods and services, payments of income, and current transfers between residents of a country and nonresidents.	WEO
Financial openness	Capital Account Openness index	Chinn et Ito (2006)
Age dependency ratio (% of working-age population)	Age dependency ratio is the ratio of dependents–people younger than 15 or older than 64–to the working-age population–those ages 15-64. Data are shown as the proportion of dependents per 100 working-age population.	WDI

Variabe	Description	Source
Democratic Accountability	Democratic Accountability index, 0–6	ICRG
Bureaucracy quality	Bureaucracy quality index, 0–4	ICRG
Law and Order	Law and Order index, 1–6	ICRG
Corruption	Corruption index, 0–5	ICRG
Institutional quality	Simple average of the above four institutional variables	Authors' calculations
Government fragmentation	The probability that two deputies picked at random from among the government parties will be of different parties	Database of Political Institutions (2017)
Finite term in office dummy	It's a dummy variable that answers the following question:is there a constitutional limit on the number of years the executive can serve before new elections must be called? Deviating from the convention, a 0 is recorded if a limit is not explicitly stated. This gets a 0 in the cases where the constitution with year limits is suspended or unenforced.	Database of Political Institutions (2017)
Chief executive years in office	Measures the number of years in power,1-46	Database of Political Institutions (2017)
Election years	1 if there was an executive election in this year and 0 otherwise.	Database of Political Institutions (2017)
Parliamentary system	"1" if there Parliamentary system or if Assembly-Elected President and 0 otherwise.	Database of Political Institutions (2017)
Public debt	It consists of all liabilities that require payment or payments of interest and/or principal by the debtor to the creditor at a date or dates in the future. This includes debt liabilities in the form of SDRs, currency and deposits, debt securities, loans, insurance, pensions and standardized guarantee schemes, and other accounts payable. Thus, all liabilities in the GFSM 2001 system are debt, except for equity and investment fund shares and financial derivatives and employee stock options. Debt can be valued at current market, nominal, or face values (GFSM 2001, paragraph 7.110).	WEO
Comm. Net Export Price Index	Commodity Net Export Price Index .	Gruss et Kebhaj (2019)
Education expenditure	Percentage of education expenditure in total gdp	IFPRI SPEED database
Health expenditure	Percentage of health expenditure in total gdp	IFPRI SPEED database
Defense expenditure	Percentage of defense expenditure in total gdp	IFPRI SPEED database
Transport expenditure	Percentage of transport expenditure in total gdp	IFPRI SPEED database
Compensation of employees	Compensation of employees expenditure	IMF GFS
Subsidies	Subsidies expenditure	IMF GFS
Wage and salaries	Wage and salaries expenditure	IMF GFS
Grants expenditure	Grants expenditure	IMF GFS
Social assistance benefits expenditure	Social assistance benefits expenditure	IMF GFS
Social benefits expenditure	Social benefits expenditure	IMF GFS
Use of goods ans services	Use of goods ans services expenditure	IMF GFS
Fiscal stance	Dummy variable equal 1 if external debt (%GNI) is above its median value and 0 otherwise	Authors' calculations based on WDI
Primary balance	Primary balance, % of GDP	Kose *et al.* (2017)
Number of numerical rules in place	Number of numerical rules in place, % of GDP	IMF Fiscal Rules Dataset
Output gap	Dummy variable equal 1 if output gap (%GNI) is above 0 and 0 otherwise	Authors' calculations based on WDI
External debt (%export)	External debt in percentage of export of goods and services	Authors' calculations based on WDI
Resource rich dummy	Dummy variable equal 1 if Total natural resources rents (% of GDP) is above its median value and 0 otherwise	Authors' calculations based on WDI
Fuel exports	Fuels comprise the commodities in SITC section 3 (mineral fuels, lubricants and related materials).	WDI
Fiscal balance (% of average tax revenues)	Fiscal balance in percentage of average tax revenues	Kose *et al.* (2017)
Time	Time length since the country is under the IT regime.	Authors' calculations
Corruption dummy	Dummy variable equal 1 if corruption is above its median value and 0 otherwise.	Authors' calculations based on ICRG
Government stability	Dummy variable equal 1 if government stability is above its median value and 0 otherwise.	Authors' calculations based on ICRG
Economic Vulnerability Index	Dummy variable equal 1 if Economic Vulnerability Index (% of GDP) is above its median value and 0 otherwise.	Authors' calculations based on FERDI databasee
Damage	Dummy variable equal 1 if disaster (economic) loss as a share of GDP is above its median value and 0 otherwise.	Authors' calculations based on Our World in Data and United Nations Statistics Division