The stabilizing effect of exchange rate regimes: An empirical investigation

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Abstract

This paper addresses the impact of exchange rate regimes on the cyclical properties of fiscal policy. Based on a panel of 118 developing countries (30 emerging market and 90 low income countries) over the period 1980-2007, we show first, after solving endogeneity issues, that fiscal policy is especially pro cyclical in developing countries. Using the IMF classifications to assess the impact of exchange rate regimes on procyclicality, we find that the magnitude of procyclicality is reduced for countries under pegged regimes compared to those under flexible ones. These results tend to support the "stabilizing effect" hypothesis of pegged exchange rate regimes as argued by the conventional wisdom. In addition, the stabilizing effect strongly depends on the fiscal policy indicator as well as the regime classification used.

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INTRODUCTION

In the aftermath of the crisis, the debate among economists should focus on how to prevent and/or face the detrimental effects of the crisis. An important tool used to stem deeper collapse of global economy remains fiscal policy. It appears to be one the most effective policy instrument at the disposal of the decision-makers. This raises the question of the stability of fiscal policy to be an optimal policy tool. The empirical literature thoroughly documents this question. Keynesian theorists find that optimal fiscal policy should be countercyclical, while the Neo-classical view supports that fiscal policy has to be neutral or acyclical[2].

A large body of work shows that fiscal policy in developing countries (DC) is procyclical (Gavin and Perotti, 1997; Tornell and Lane, 1999; Alesina and Tabellini, 2005; Talvi and Vegh, 2005; Thornton, 2008; and Diallo, 2009). Economists seem all together to support that procyclicality is harmful for economic activity in the sense that it worsens economic fluctuations[3]. This procyclicality also matters in terms of economic growth (Woo, 2006). The former authors find that procyclicality can be mitigated by better access to international capital markets, less corruption and strong institutions. This paper pursues this path of the literature and tests the hypothesis that stability of fiscal policy increases with the rigidity of the exchange rate (ER) regime.

The choice of an ER regime remains of crucial importance and depends on countries' macroeconomic objectives. The post Bretton Woods era in the early seventies was characterized by the free choice of ER regime. The 90s witnessed the prevalence of the *bipolar view* consisting in the choice between the two corner solutions *-to peg or to float-* which seemed more workable and effective. Literature on the macroeconomic performances of alternative regimes is strongly controversial. While authors seem close to consensus on the fact that pegged regimes deliver better performances in terms of inflation, no consensus emerges regarding the growth performance of alternative regimes. Pegged regimes are considered to be *crisis-prone* after the episodes of numerous crises even though floating[4] regimes are not spared. Moreover, under pegged regimes, countries loose the use of monetary

[2] Fiscal policy is considered to be pro cyclical (countercyclical) if in case of recession, government reduces (increases) public expenditures. In the situation where fiscal policy evolves independently from the business cycle, it is seen as neutral or acyclical.

[3] However, in some situations procyclicality might be desirable in a situation where fiscal multipliers are negative corresponding to a crowding out of private investments in case of fiscal expansion. Note that procyclicality can also be seen as a "*second best*" optimum following Alesina and Tabellini.

[4] Throughout the paper, we use interchangeably "floating" and "flexible" to describe the freely floating regimes.

policy as a stabilization tool. This is highlighted by the well-known impossible trinity which support that there is no way for a country to experience a pegged regime combined with capital mobility and independent monetary policy.

Despite the striking disadvantages of pegged regimes, why do countries still adopt these regimes? Our attempt is to analyze the consequences of ER regime's choice on the procyclicality of fiscal policy. In other words, this paper studies whether the pegged regimes stabilize the fiscal policy by reducing the magnitude of the procyclicality.

The rationale behind this stabilizing mechanism is attributable to the binding constraints imposed by pegged regimes in terms of discretionary policies. Such regimes contribute to alleviate the tendency of fiscal authorities to overspend during booms (Ghosh et *al.*, 2010). As one can say, pegged regimes *tie the hand* of policymakers by preventing them from lax fiscal policies and hence lead to more stable fiscal policy. However, the evidence on this issue is not clear-cut yet. Indeed, an influential strand of the literature on fiscal discipline rather supports that pegged regimes are not discipline enhancing and even less stabilizing (Schuknecht, 1999; Tornell and Velasco, 2000). More intriguing, other papers find that neither pegged regimes nor flexible ones influence the cyclical behavior of fiscal policy (Gavin and Perotti, 1997; Kaminsky et *al*., 2004). In this paper, we attempt to shed light on the existing controversy relative to the effects of alternative regimes on the cyclical behavior of fiscal policy.

Note that the aforementioned papers focus on the level of fiscal variables rather than the cyclicality. To our best knowledge, there is only one paper that analyses the effect of alternative regimes on the cyclicality of fiscal policy (Ghosh et *al.*, 2010). In this paper, we extend the emerging literature relative to the effects of alternative regimes on the cyclical behavior of fiscal policy by providing a more formal assessment of the aforementioned relationship.

The contribution of this paper to the existing literature is threefold. First of all, we use different variables to measure fiscal policy. Second, in addition to the International Monetary Fund (IMF) de jure and de facto classifications, we make use of Reinhart and Rogoff (RR) natural de facto classification within a composite sample of emerging market economies and low income countries. We also tackle the crucial endogeneity problem relative to the choice of ER regime by using the appropriate instrumental variable estimators. Our baseline estimations show that pegged regimes influence the cyclical behavior of fiscal policy in the sense that such regimes reduce or even reverse the magnitude of the procyclicality of fiscal policy. The stabilizing effect persists even when we operate an income level disaggregation

within the sample. In addition, this stabilizing effect is more pronounced in low income countries compared to other groups.

The rest of the paper is organized as follows. Section 2 presents an overview of the related literature while section 3 discusses widely the stabilizing mechanism of exchange rate regimes and presents the econometric model. Empirical findings and sensitivity analyses are detailed in section 4. Section 5 provides some policy implications before concluding.

II. RELATED LITERATURE

This section reviews widely the literature on fiscal policy and exchange rate regimes. As aforesaid, literature on the stabilizing effect of ER regime is strongly limited. Therefore, we especially focus on those papers that study the disciplinary effect of alternative regimes as this latter effect seems closer to the stabilizing effect that we point here. If economists were widely consensual about the cyclical properties of fiscal policy, results remain deeply controversial regarding exchange rate regime effects. Whilst certain bring to the fore the disciplinary effects of fixed regimes -c*onventional wisdom*-, others support the opposite view that it is flexible regimes which are disciplinary rather than fixed. A third group emerges and argues that neither fixed regimes nor flexible ones are disciplinary and even less stabilizing. Such controversy is a source of perpetual revival. We will, in turn, present the main streams of these three different views relative to the ER regimes effects.

We proceed by those arguing that there is neither significant disciplinary effect nor stabilizing. After addressing the cyclicality, Gavin and Perotti, in the late 90s, focused on ER regime effects on fiscal policy. They found that, there is none significant relationship between fiscal policy and ER regimes. Contrary to the conventional belief, fixed regimes are not disciplinary. In the same vein, Kaminsky et *al*. (2004) asked the question of whether the cyclical properties of macroeconomic policy are different according to the ER regimes. Using –Reinhart and Rogoff- *de facto* classification of regimes, they found that public expenditures behavior are not related with either regime.

Let us consider those advocating for disciplinary properties of fixed regimes. Conventionally, exchange rate-based stabilizations induce more discipline than money-based programs in the sense that exchange rate anchor imposes more macroeconomic discipline than do other anchors. This view is partly fueled by Canavan and Tommasi (1997). They use the theoretical Barro-Gordon model, with incomplete information and show that serious stabilizers prefer more visible anchors such as the nominal exchange rate. They take their study one step further

and support that in some circumstances, stabilizers choose to fix the ER, even when fixing the ER have some costs. Moreover, Beetsma and Bovenberg (1998) through a theoretical paper support that monetary unification reduces inflation, taxes and public spending. These disciplining effects of monetary union become stronger as union's member increase. In the 2000s, Canzoneri et *al*. thought in distinguishing *Ricardian* and *Non-ricardian* regimes. They found that, under a Ricardian framework, ER regimes are disciplinary[5] in the sense that government respects its intertemporal fiscal constraint. Empirical studies also investigate the question with the same claim that fixed regimes are disciplinary. Alberola et *al*. (2007) test the disciplinary effect of fixed regime with a sample of emerging markets in the nineties. They found that announcing the peg has deleterious effect on fiscal discipline. However de facto peg which is not announced deliver superior fiscal outcomes. They explain such phenomenon by the credibility shock produced by the announcement of the peg which makes less costly the financing of the fiscal deficit. Recently, Ghosh et al. (2010) show that fixed regimes have disciplinary effect on fiscal policy. They point towards the unsustainability of pegged regime when government is money-financing the deficit. They also support that pegged regimes constraint the conduct of macroeconomic policies. Under such regimes, domestic monetary policy follows the anchor country's monetary policy. They qualify the pegged regimes as double-edged sword tool: they are useful for countries lacking institutional credibility and discipline, but, by the same token, constrain the use of stabilization tool as the interest rate to offset the macroeconomic shocks that countries should face.

Lastly, a few authors stand at odds of conventional view and support that fixed regimes are neither disciplinary nor stabilizing. On the theoretical ground, Fatas and Rose (2001) document this issue and study the case of members of multilateral currency unions, dollarized countries and currency "boarders". They come to the conclusion that, belonging to a currency area did not procure fiscal discipline. This "non-disciplinary" effect is especially pronounced for dollarized countries. Empirically, Tornell and Velasco (1995), analyzing the European and Sub-Saharan countries experience, strongly reject the conventional claim. They reach the same conclusion with the Latin American experience in 1998. Through their paper in the 2000s, these latter authors support that under fixed regimes, bad behavior i.e. lax fiscal policy

[5] Alberola and Molina (2004) showed that fixed regimes reduce significantly inflation and seignorage capacities. The combination of limited seignorage capacities and fiscal theory of price level vindicate the disciplinary effect of fixed regimes. However the link is somewhat weak. Ghosh et al. recently supported that pegged regimes impose sticky constraints in designing macroeconomic policies with monetary policy closely related to the anchor country.

today leads to punishment in the future; whereas under floating regime, the costs of lax fiscal policy manifest themselves immediately. So the difference lies on the intertemporal distribution of the costs of lax fiscal policy. Under such a scenario, floating regimes, by forcing the cost to be paid up-front, provide more fiscal discipline. Therefore, the disciplinary effects of ER regimes are conditional upon government behavior in terms of lax fiscal policy costs. Schuknecht (1999), among them, tackles the question through the political angle. He supports that governments, in pre-election periods, increase public spending and run fiscal deficit in order to guarantee their re-election. Such expansionary policy is costless under fixed regime with satisfactory foreign reserves. However, this behavior turns *–in fine-* to devaluation (fall in foreign reserves and increasing indebtedness) and rises inflation. This raises doubts about the usefulness of fixed regimes to discipline the fiscal policy in the sense that they ease the government fiscal constraint unless countries dispose a legal framework that constraint discretionary decision. Flexible regimes reduce considerably the hope for fiscal stimulus in the sense that flexible regimes lead to inflation and depreciation, situation that affects government popularity adversely. Alberola and Molina (2004) find a weak link between ER regime and fiscal discipline in emerging markets. They also sustain and prove that fixing the ER offsets the disciplinary effects on fiscal policy by relaxing the constraints on government budget. Moreover, Duttagupta and Tolosa (2006) found in turn that currency union *as fixed regime* encourage over-spending and *free-riding* behaviors unlike flexible regimes, such behaviors seem far from being stabilizing.

Pegged regimes, by their institutional commitment, ensure stability of the ER. Based upon a three-way classification, Ghosh et *al*. document the macroeconomic performances of exchange rate regimes and show that fixed regimes are associated with lower exchange rate fluctuations owing to the disciplinary effect of such regimes. This disciplinary effect is partly due to the political cost inherent to the collapse of the peg. However, their study was subject to several methodological criticisms from Edwards and Savastano, (1998) and Mussa et *al*. (2000). First of all, Ghosh and co-authors did not take into account the country-specific characteristics such as capital mobility, country size, degree of integration etc. To illustrate this for example one can argue that correlation between inflation and exchange rate regime is only due to fiscal lax rather than adoption of any regime. One other important issue is that the usage of only *de jure* classification rather than *de facto* can be misleading. Edwards et *al*. also criticized the hypothesis that regime choice is exogenous. They finally pointed out the

reverse causality which arises from ER regime choice and macroeconomic performances. Levy-Yeyati and Sturzenegger (2005) argued that the use of fixed regimes is due to the credibility and discipline imposed to fiscal and monetary policy as well. However the conflicts with other objectives can be an obstacle to support effectively the peg. Yagci (2001) finds that the fiscal discipline is positively related with a decline in flexibility. Paragraph below discusses the stabilizing mechanism and presents the hypothesis tested throughout the paper.

To sum up, the literature relative to ER regime effects is quite sparse and does not provide clear-cut responses on this issue. Authors like Gavin and Perotti showed that ER regimes are neither disciplinary nor stabilizing, whereas Ghosh et *al*. argue that fixed regimes are stabilizing regardless of the fiscal authorities' behavior and especially in developing countries. Tornell and Velasco support the opposite view. We expose in what follows a discussion on the stabilizing mechanism of pegged regimes on the cyclical properties of fiscal policy and present the econometric model.

III. HYPOTHESES AND ECONOMETRIC MODEL

3.1. Discussion on the stabilizing mechanism

The main thrust of taking-up fixed regimes is that under such regime fiscal and monetary policies are constrained in the sense that lax fiscal or monetary policy leads in fine to foreign reserves drying up and a collapse of the peg, which presents a huge political threat toward decision makers. Newly, the argument of fiscal discipline devoted to fixed regimes seems to be mitigated and called into question in theoretical and empirical grounds. In the early 2000s, Edwards (1997), Tornell and Velasco (2000) and Vuletin (2003) claimed that the disciplinary effect of fixed regimes is neither automatic nor guaranteed. The Mundell-Fleming framework predicts that in case of economic upturns, countries under fixed regimes limit public expenditures expansion despite the fact that they have only one efficient policy tool. Therefore, increase in public expenditures should be limited and by the way the procyclicality of fiscal policy.

We test whether fixed exchange rate regimes are fiscal policy stabilizing. *The theory does not yet provide any clear reason why this is so.* The rationale behind such intuition is that, government under fixed regime should be in accordance with their commitment and support the peg. In the addition of the loss of monetary policy, governments should also keep down

inflation. Such scenarios *tie the hand of fiscal authorities* and force them to moderate public expenditures in order to deal with reasonable inflation level. Moreover, authorities have a vested interest in supporting the pre-announced peg in order to avoid the political costs imbedded in the collapse of the peg. The demise of the peg also undermines the credibility of government on the international scene. So announcement of a fixed regime appear to be a commitment that will allow it to avoid any attempts of lax fiscal policy. Cannavan and Tommasi (1997) explain the link between an ER anchor and discipline with a model that assumes that the public can monitor the nominal ER more easily than it can do with the other variables. The ER is more visible than other anchors and thus, provides a better barometer of the government's behavior than do other variables. Public can gather and interpret informations relative to this anchor. Therefore, *serious stabilizers* choose to peg the ER.

Our empirical work consists in answering the following question: is there any fiscal policy stabilizing effect of (pegged) ER regimes. The ensuing sections describes the econometric model, presents the data and variables.

3.2.Econometric models

To answer our research question we proceed by an econometric model which deals first with the (pro) cyclicality of fiscal policy and pursues with the ER regimes effects on the (pro)cyclicality. For this purpose, we use the following specification:

$$F_{it} = \sim + \quad F_{it-1} + ¢ Y_{it}^{*} + ¥_{i}\left(RC_{it} * Y_{it}^{*}\right) + ¨_{i} RC_{i} + \sum_{k=1}^{K} ¤_{k} X_{kit} + «_{it} \quad (1) \quad \text{with } «_{it} = ¦_{i} + £_{it}$$

F_{it} corresponds to the fiscal policy variable of country *i* at time *t* and Y_{it}^{*}, the business cycle. X_{kit} , is a set of controls, $¦_{i}$ is a dummy variable which allow us to isolate own characteristics of each country and $£_{it}$, the error term. Including lagged dependent variable allow the measurement of the inertia and provides information on the sustainability of fiscal policy. With such specification, cyclical property of fiscal policy is seen through the coefficient ¢ . The interpretation of the sign of the coefficient ¢ depends on the variable used to measure fiscal policy. If one considers the government public expenditures as fiscal policy indicator, fiscal policy is considered to be pro cyclical (countercyclical) if $¢ > 0 (< 0)$ and statistically significant; otherwise, fiscal policy is acyclical or neutral. Our econometric model presents an interaction term $RC_{i} * Y_{it}^{*}$ and a dummy variable RC_{it} which corresponds to the ER regime of

country *i* at time t. It takes value 1 if the given country is under fixed (intermediate regime) and 0 otherwise. The floating regimes constitute our benchmark.

By deriving equation (1), we see that:

$$\frac{\partial F_{it}}{\partial Y_{it}^{*}} = ¢ + ¥_{i} RC_{it}$$

Here, the cyclical property of fiscal policy is conditional upon the exchange rate regime. Let us assume that ¯ is the cyclical property of fiscal policy under any ER regime, so ¯ ≡ ¢ + ¥ ; according to our hypothesis, we expect that ¯ < ¢ . This means that ¥ < 0 . Negative sign of coefficient ¥ implies that, fixed (intermediate) regime reduces the magnitude of the cyclicality of fiscal policy, ¢ [6]. We remind that the coefficient ¢ corresponds to cyclical property of fiscal policy under floating regimes. So we can compare the effect of two different regimes (fix [intermediate] vs. floating) by just confronting the coefficients ¯ and ¢ .

3.2.1. The data

Our study is conducted through a panel of 118 countries. According to the International Monetary Fund classification of countries regarding their level of development, we obtain 30 emerging market economies and 88 low income countries. Our sample period lies from 1980 to 2007. The temporal horizon of our sample is limited by the availability of the data. The paper focus only on developing countries for two main reasons. First of all, the optimality of fiscal policy does matter only in the case where fiscal policy is pro cyclical. While the literature broadly support that fiscal policy is pro cyclical in DC, authors strongly show that this is not the case for developed countries. Fiscal policy in these latter countries is considered to be countercyclical or neutral (Talvi and Vegh, 2005; Aghion and Marinescu, 2007). Second, we aim at capturing the effect of the exchange rate regimes on the cyclical behavior of discretionary policy of fiscal authorities. Such considerations lead us to isolate the effects of automatic stabilizers[7] which strongly influence the implementation of fiscal policy in

[6] This interpretation holds only if the fiscal policy variable is the government public expenditures. The effect of alternative regimes manifests differently if one considers the fiscal balance or government revenues as fiscal policy variable. This specification is described broadly in the body of the paper.

[7] According to Carlos Budnevich, automatic stabilizers are those elements of fiscal policy that tend to mitigate output fluctuations (in effective demand by reducing taxes and increasing government spending in recession) without any explicit government actions. Progressive income taxes, value added tax, taxes on corporate profits and unemployment premiums and benefits may play the role of automatic stabilizers.

developed countries. These effects are much less pronounced in DC. We define below the dependent variables, our variable of interests and the controls used throughout the paper.

- ***The dependent variable(s)***

As aforementioned, our dependent variable is fiscal policy. We rely on the overall fiscal balance as fiscal policy indicator. This choice is vindicated simply by the fact that this variable is the one commonly used through the literature to test fiscal discipline. Beside this variable, we make use of the government expenditure (current and capital expenditures) variables. These variables allow us to identify clearly the reaction of the fiscal authorities given the business cycle. In order to disaggregate the response of fiscal authorities to business cycle, we make use of government public expenditures and government total revenues[8]. Using these variables give informations in the extent that fiscal authorities rely on either expenditures or revenues to deal with the business cycle. All these three variables are expressed in percent of GDP. To apprehend the fact that fiscal authorities use discretionary fiscal policy to target short run fluctuations, it seems more appropriate to extract the short run component of fiscal policy. Therefore, we *"first- difference"* the fiscal variable to proxy the discretionary response of fiscal authorities to short run fluctuations[9]. We also use the real changes in the government public expenditures as dependent variable. The rightful question that can arises here is why this particular variable. The usage of this variable flows from Kaminsky et *al*. (2004) criticisms. They support that variables as fiscal balance or fiscal revenues are considered as results of fiscal policy rather than instrument unlike public expenditures or tax rates. If government would like to influence economic activity, it modifies its expenditures program or changes tax rates. Such effects reflect in tax revenue and fiscal balance. So, fiscal authorities cannot use directly these two latter variables as fiscal policy tools. Moreover, considering the fiscal variable as proportion of the GDP (as is most often the case in the literature) could yield misleading interpretation in the sense that cyclical behavior of fiscal variable may (or not) be dominated by the cyclical behavior of output[10]. However, to dismiss any suspicion of subjective or irrational choice, we conduct several robustness checks with other fiscal variables.

[8] In the best-case scenario, we must use the tax rates as in Talvi and Vegh (2005). However, we experience difficulties in collecting data relative to tax rates.
[9] By « first differencing » the fiscal variables, we hit two targets with one bullet. In addition in isolating the long-run components, we also avoid the non-stationarity problem. Econometric tests are implemented to confirm this.
[10] See Kaminsky et al. (2004) for further details.

- ***The explanatory variables***

The main explanatory variables here are the interactive variables which combine the output gap and the ER regimes (***Output gap*Fixed*** and ***Output gap*Intermediate***). We make use of the *de jure* and *de facto* classifications taken from the IMF as well as RR natural *de facto* classification. The choice of the IMF *de facto* classification is vindicated by the fact that it relies on ER movements but also on monetary policy framework and authorities formal or informal policy intentions with data on actual ER and reserves. It is also known as an hybrid classification. RR classification is also particular in the sense that it separates episodes of severe macroeconomic stress and incorporate information on dual/parallel market ER. It distinguishes regimes that are "freely falling"[11] as a separate category and use movements of dual/parallel market exchange rate movements to classify the regime. It also uses a five year horizon to gauge the true flexibility of the longer term exchange rate regime.

***Table 1**: Exchange rate regime classifications (IMF and RR)*

	IMF classification				Reinhart and Rogoff (2004)	
	De jure	*(%)*	*De facto*	*(%)*	*Freq.*	*(%)*
Fixed	1232	38.78	1522	47.65	900	33.11
Intermediate	1337	42.08	1388	43.46	1408	51.80
Floating	608	19.14	284	8.89	410	15.08
Total	**3177**	**100**	**3194**	**100**	**2718**	**100**

Table 1 displays the distribution of ER regimes throughout our time span. As we can see, the most frequent regimes in DC are the hard and soft pegged regimes i.e. fixed and intermediate regimes, the floating regimes cover less than the fourth of the available observations. Considering RR natural classification, the prevalence of pegged regimes persists. However, the floating regime covers almost 15% of the observations.

*The output gap (**OG**)* allows us to measure the business cycle. Using the Hodrick Prescott (HP) filter[12] applied on the real growth rate of the GDP, we obtain the GDP trend. The OG is defined as the difference between the real GDP growth rate and the trend. Given the fact that we use annual data, the smoothing parameter is set to $a = 100$[13].

[11] This category is excluded from the regressions.

[12] Note that HP filter is subject to several criticisms especially due the arbitrary choice of the smoothing parameter and the fact that it disregards the structural breakdowns. Moreover, literature points out the instability of the filter due to its symmetric design. Despite these criticisms, this filter is commonly used throughout the literature (Talvi and Vegh, 1998; Agenor et *al.*, 1999; Stein, 1999 and Guillaumont and Tapsoba, 2009). The altetnatives methods (Band-Pass filter implemented by Baxter and King) are not spared from criticisms.

[13] In our robustness checks, smoothing parameter is set to be 6.25 as shown by Ravn and Uhlig (2002)

- ***The control variables***

We add several control variables[14] often used in the literature to identify causal relationship between output growth and fiscal policy and further, exchange rate regimes and cyclical features of fiscal policy. Among the set of control variables, we have:

- *Lagged dependent variable* (***FP_{t-1}***): It corresponds to the fiscal policy variables with one time lag. As it is shown in the literature, this variable captures the inertia and accounts for the sustainability of fiscal policy;

- *Inflation*: It corresponds to the changes in the consumer price index. Controlling for inflation allows us to isolate any nominal variation from price evolutions in fiscal policy and output growth as well. It also takes into account effect of inflation on fiscal policy. To limit the effects of hyperinflation episodes, we compute a modified inflation index[15];

- *Level of development* (***GDP pc***): this variable is introduced in our regressions to control for characteristics inherent to the level of development measured as the GDP per capita. It allows us to see whether fiscal policy behavior depends on the wealth of countries;

- *Trade openness (**Open**)*: We compute an indicator of trade openness as the ratio of imports and exports over GDP. Inclusion of this variable is especially relevant in this case because it controls external shocks that countries faced, knowing that our group of countries – developing countries- rely heavily on external conditions and are vulnerable to external shocks. We mention also the fact that fiscal policy might be sensitive to external conditions.

- *Remittances (**Remittances**):* the novel literature shows that workers' remittances influence the path of the government public consumption, even though those funds are remitted to households. Public authorities take part from these funds through the taxation and reduce considerably the public amounts devoted to sector as education and health as households should themselves fill the gap. The expected sign of the remittances depends on the fiscal policy variable.

- *Official development assistance (**Aid**):* It is especially important to control for the aid flows owing to our sample composition. Many countries of our sample are referred as aid receivers and these received funds impact strongly the authorities' decision to devise their expenditure program. We shall control for this effect to isolate any influence of external flows on cyclical features of fiscal policy.

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[14] Detailed descriptive statistics are given in Appendix B.

[15] The modified index of inflation is taken from Guillaumont Jeanneney and Tapsoba, 2010. It is computed as follows: $® ' = ® / 1 + ®$ with $®$ the inflation rate and $® '$ the modified inflation index

- *Public debt (**P.debt**$_{(-1)}$):* a crucial element of decision in term of designing public expenditures program is the level of public debt. It appears to be stringent in the process of fiscal authorities' decision making. Controlling for this variable seems somewhat compulsory in our model. Guillaumont-Jeanneney and Tapsoba (2010) argue that one should use the lagged public debt due to the fact that for a given government, current fiscal policy program is designed under the constraint of previous public debt level. Effects of public debt on fiscal policy are not clear-cut.

- *Natural resources (**Natural_ress**):* we also control for natural resources rents. Presence of natural resource can be considered as alternative source of financing especially for developing countries. It could heavily destabilize and modify the behavior of fiscal authorities in terms of public expenditures and/or tax collection. Effects of natural resource on fiscal policy appear mitigated. One can assume that natural resource make government to increase public expenditures and public investment whereas, other authors support that presence of natural resource contribute to weaken the social stability and lead the incumbent government to capture the whole benefits flowing from natural resource and reduce the public expenditures.

- *Democracy* (***Democ***): the political dimension matters in the implementation of fiscal policy. Political concerns also influence the business cycle and the reaction of fiscal authorities can be guided by political ideology rather than economic rationality. We introduce a dummy variable coded 1 if a given country rules under a democratic system and 0 otherwise.

Except for inflation and democracy variables, all other controls are log-transformed. The ensuing sections present our estimation strategies and econometric results' interpretation.

IV. EMPIRICAL FINDINGS AND ROBUSTNESS

4.1. Estimation strategies

Equation (1) contrasts the effects of fixed regimes (intermediate regimes) with those of the flexible regime. Using the classical estimator as the ordinary least squares or fixed effects lead undoubtedly to biased coefficients due to the endogeneity problem. In fact, one can argue that the choice of any ER regime depends on the macroeconomic performances of the given regimes rather than the reverse. So there is a reverse causality. Countries that have higher inflation tend to have floating regimes due to the need of adjustment of the ER. So, the regime choice is not exogenous at all! This reverse causality creates an endogeneity bias (Edwards and Savastano, 1998; Mussa et *al.*, 2000; Levy-Yeyati et *al*., 2010; and Berdiev et *al.*, 2011).

Also, as pointed by Rogoff et *al*., 2004, the harmful effects of a regime can be observed only when it collapses, leading the misattribution of the poor performances to the successor regimes. In this context lagged ER regime appears to be a good instrument of the present regime. We are also doubtful about the exogeneity of the output gap. One might rightfully think that fiscal stance influences the business cycle. We shall instrument the ER regime choice as well as the output gap.

The appropriate instrumental variable estimator appears to be the generalized method of moments also known as GMM estimators. The GMM estimators can be implemented in two ways: difference and system GMM. For convenience and efficiency concerns, we use the GMM-system estimator.

4.2. Results

This section presents the interpretation of the estimations results relative to the effect of the ER regimes on the procyclicality of fiscal policy. We proceed by the global effect of alternative regimes and further disaggregate the observed effect of regimes using the fine classification of ER regimes.

4.2.1. The stabilizing effects of exchange rate regimes

As aforesaid, we contrast the effects of fixed and intermediate regimes with those of flexible regimes. *Table 2* displays our baseline results. Estimations are made using the IMF de facto classification of ER regimes[16].

We first see that the coefficient of lagged dependent variable is statistically significant. Knowing that our dependent variable here is the fiscal balance, the negative and significant sign of lagged dependent variable means that, the government fiscal balance is constrained by the lagged fiscal stance. This is consistent with Aghion and Marinescu, (2007) and Ben Slimane and Ben Tahar, (2010). A one percentage point increase in the lagged fiscal balance leads from 0.28 to 0.33 percentage point (pp) reduction in the actual balance. The significance of lagged dependent variable validates the inertia of fiscal policy and let us think on the sustainability of fiscal policy.

[16] Estimations made with the IMF *de jure* classification display quite different results from those presented here. We do not report the formers, in accordance with Edwards and Savastano, (1999) and Rogoff et *al.*, (2004). They support that *de jure* classification lead to misleading statistical inference and by the way, wrong interpretation of ER regime effects.

***Table 2**: Effect of ERR on the procyclicality*

Dependent Variable: Overall fiscal balance				
	Diff-GMM		Sys-GMM	
	Pegged	Intermediate	Pegged	Intermediate
OFB $_{(-1)}$	-0.284***	-0.333***	-0.293***	-0.327***
	[5.10]	[6.81]	[6.63]	[6.27]
Output gap (OG)	**-20.28***	**5.138***	**-13.32***	**3.868***
	[1.86]	[1.74]	[1.85]	[1.74]
OG_Pegged	**31.63***		**21.75***	
	[1.80]		[1.86]	
OG_Intermediate		**-20.83***		**-15.44****
		[1.91]		[2.42]
Controls	Yes	Yes	Yes	Yes
N. obs (countries)	1518 (95)	1518 (95)	1615 (97)	1615 (97)
AR 1 p-value	0.0863	0.0837	0.0349	0.0230
AR 2	0.272	0.177	0.285	0.244
Hansen	0.551	0.206	0.315	0.474
Time dummies	Yes	Yes	Yes	Yes
Instruments	69	69	82	82

*Significance: * 10%, ** 5% and *** 1% with t-statistic in brackets. All GMM estimators include temporary dummies. Following Roodman (2006), instruments are limited in order to avoid the overfiting problem. All control variables are considered as predetermined. Given the fact that GMM estimators are implemented in two steps, we apply the Windmeijer correction to obtain robust standard errors.*

The output gap variable tells us how cyclical is the fiscal balance? The dependent variable – overall fiscal balance- corresponds to the difference between revenues and expenditures. In the whole sample, the average of the dependent variable i.e. the first difference of overall fiscal balance displays a positive sign. This means that, on average, countries experience fiscal surplus in the sense that public revenues exceeds expenditures. In this case, the interpretation of the OG coefficient changes. Negative sign of the OG coefficient unusually means that fiscal policy is pro cyclical. Given that the OG is log-transformed, the estimated coefficient should be interpreted as semi-elasticity. A 1% increase in the OG leads to a decrease in the fiscal stance of at least 0.13 pp of GDP. This result can be taken as follow: a positive OG (situation where real GDP exceeds potential GDP and identified as economic expansion) worsens fiscal stance. In other words, in time of expansion, fiscal authorities increase public expenditures and/or reduce taxes and hence revenues. We do not spend in interpreting the coefficients of the intermediate regime that display a counter cyclical behavior of fiscal policy.

Our coefficient of interest is the one the interactive variable. We remind that, according to the econometric specification (i.e. the flexible regime used as reference), the coefficient of OG describes the behavior of fiscal policy for countries under flexible regimes. Therefore we can

compare the effects of alternative regimes by just contrasting the OG coefficient (flexible regime) with the one of interactive variable (pegged regimes). This latter coefficient is positive and statistically significant. The positive sign of the coefficient of interactive variable means that the procyclicality of fiscal policy is mitigated in the presence of fixed regime. This result matches the expected *stabilizing effect* of pegged regimes and is consistent with Ghosh et *al*. (2010). In fact, there is a stabilizing effect of pegged regimes compared to the flexible one. Countries under pegged regimes experience a coefficient of procyclicality of 8.43 (-13.32+21.75) if one considers the system-GMM estimator. This means that the presence of pegged regime reduces strongly the magnitude of pro cyclicality, but rather turns it into counter-cyclicality. This coefficient should be interpreted as follow. Under pegged regime, a 1% increases in the output gap increases the fiscal stance -*surplus*- by 0.8 pp of GDP. We discuss further in detail the fiscal response of government in terms of discretionary policies by rising up fiscal revenues or cutting-down expenditures in good times[17]. According to the above discussion on the stabilizing mechanism of the ER regime, countries under pegged regime manage their incentive to overspend during booms in order to avoid rapid growth of money and inflation and therefore a threat on the peg. This can also be vindicated by the fact that, under pegged regimes, countries should not have adequate or even inexistent room to monetize the debt. Given that, authorities tend to monitor the money growth in order to hold down the inflation pressures that represent a major threat on the peg and deal with adequate level of fiscal deficit.

In the *table 3* below, control variables are introduced separately.

Columns [1] to [8] introduce successively control variables. Except for column [6], we see that the coefficient of interactive variable remain positive and statistically significant. The stabilizing effect of pegged regimes persists regardless of the control variables included in the model.

As seen before, a possible explanation of the stabilizing effect flows from the idea that pegged regimes tie the hand of fiscal authorities, whom are committed to support a peg, so they limit strongly the expansion of public expenditures, especially in economic boom, to hold down inflation pressures following the rise of public expenditures. Note that, this stabilizing effect makes sense only where fiscal policy is pro cyclical.

[17] The term "good times" refers to economic expansion or economic boom as used by Kaminsky et *al.* (2004), a situation where the real GDP growth rate is above its median during a five to ten years calculation; otherwise, economy is considered to be in "bad times"

***Table 3**: Effect of ERR on the procyclicality (by controls)*

Dependent Variable: Overall fiscal balance								
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
OFB $_{(-1)}$	-0.271***	-0.270***	-0.236***	-0.269***	-0.259***	-0.292***	-0.248***	-0.258***
	[4.51]	[4.03]	[2.62]	[3.92]	[3.33]	[4.38]	[4.30]	[3.35]
OG	**-9.109***	-0.453	-7.034	-5.652	-2.436	-3.749	-3.443	-4.405
	[1.72]	[0.12]	[1.39]	[1.52]	[0.77]	[1.01]	[1.18]	[1.21]
OG_Pegged	**18.65***	**16.34***	**28.84***	**21.10***	**21.34***	15.89	**22.22***	**24.22***
	[1.86]	[1.69]	[1.79]	[1.82]	[1.70]	[1.58]	[1.95]	[1.86]
GDP pc	-0.0267							
	[0.01]							
Inflation		1.835						
		[1.45]						
P. debt			2.622					
			[0.26]					
Aid				2.662				
				[0.50]				
Openness					-26.23			
					[1.14]			
Remittances						-0.527		
						[0.32]		
Natural ress.							-1.402	
							[0.37]	
Democracy								-10.18
								[1.13]
N. obs (countries)	2526 (114)	2248 (110)	2314 (113)	2417 (114)	2526 (114)	2066 (109)	2331 (107)	2525 (114)
AR 1 p-value	0.0287	0.0822	0.0991	0.0597	0.0910	0.0908	0.0853	0.0892
AR 2	0.256	0.194	0.840	0.405	0.491	0.509	0.405	0.560
Hansen	0.188	0.0238	0.325	0.0276	0.107	0.230	0.00446	0.0523
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Instruments	61	61	61	61	61	61	61	61

*Significance: * 10%, ** 5% and *** 1% with t-statistic in brackets.*

The stabilizing effect persists even when we separate the sample according to the income level. It is more pronounced in low income countries (28.24 pp of GDP) compared to the sample without BRIC (22.14 pp of GDP). This effect persists even when the East and Central Asian countries are excluded from the sample (20.31 pp of GDP)[18].

Another important feature of this paper is that it goes step further than just contrasting the *three-way* coarse classification ("Pegged (Intermediate) Vs. Flexible"). In what follows, we make use of the fine classification of ER regimes to disentangle among pegged and

[18] Estimations results are presented in Appendix D. BRIC refers to Brazil, Russia, India and China

intermediate regimes: which one is more stabilizing? We therefore answer the question of how constraining each type of regime included in the group of hard pegs is[19].

- ***The case of hard pegs***

In addition to the coarse classification, the IMF makes a fine classification of the ER regimes. This latter classification includes different types of regimes. The hard pegs or fixed regimes group the following arrangements:

- Countries which adopt another currency as legal tender (AC)
- The currency union (CU)
- Currency boards (CB)
- The economic and monetary unions (EMU)
- Countries with conventional fixed peg (CP)

Previous estimation results showed that fixed or *hard pegged* regimes are stabilizing. Here, we disaggregate the fixed regimes into five different fixed arrangements and compare the effect of each of them within the hard peg group. We use the same specification as the previous and change the dummy variable of the coarse classification ER regimes with the fine classification. To test the mechanism at stakes, we generate five dummy variables for each arrangement included in the hard peg group. As our previous estimations, we build an interactive variable with OG and each of five dummies previously generated. So the variable *Another currency* is an interaction between the OG and the dummy variable that takes value 1 if country adopts another currency as legal tender and 0 otherwise. The remaining interactive variables (*Currency union, Currency board, Economic and Monetary union and Conventional peg*) are built using the same process. All of these specifications include control variables. The interrogation we tackle here is to see whether there exist any significant differences in the extent that these different types of arrangements affect the procyclicality within the hard peg. Results are gathered in *Table 4.*

At first blush, we find that the stabilizing effect is not generalizable to all types of fixed arrangements. Our estimation results show that the coefficients of *Another currency* and *Conventional pegs* are positive, but only the latter is statistically significant. So, the stabilizing effect is effective only for countries under a conventional pegged arrangement.

[19] The same exercise is done for intermediate regimes. None of the arrangement comprised in the soft peg group display a statistically significant coefficient. We fail to identify any significant relationship between the intermediate regimes and the pro cyclicality. No stabilizing effect exists for this type of regime.

Table 4: *Effect of ERR on the procyclicality (within pegged regimes)*

Dependent Variable: Overall fiscal balance					
	ACL	CB	CU	EMU	CP
OFB $_{(-1)}$	-0.329***	-0.327***	-0.329***	-0.327***	-0.209***
	[6.63]	[6.88]	[6.66]	[6.50]	[2.60]
OG	0.270	0.895	0.289	0.773	**-5.880***
	[0.93]	[1.04]	[1.00]	[1.26]	[1.75]
Another currency (ACL)	**0.0387**				
	[0.04]				
Currency Board (CB)		-1.555			
		[0.92]			
Currency Union (CU)			-1.607		
			[0.66]		
Econ. Mon union (EMU)				-20.78	
				[0.72]	
Conventional peg (CP)					**34.53****
					[2.02]
Controls	Yes	Yes	Yes	Yes	Yes
N. obs (countries)	1615 (97)	1615 (97)	1615 (97)	1615 (97)	1615 (97)
AR 1 p-value	0.125	0.120	0.125	0.077	0.040
AR 2	0.190	0.192	0.190	0.222	0.419
Hansen	0.00738	0.00346	0.00842	0.00412	0.332
Time dummies	Yes	Yes	Yes	Yes	Yes
Instruments	82	82	82	81	82

*Significance: * 10%, ** 5% and *** 1% with t-statistic in brackets.*

Another important consideration is that the estimated coefficient of stabilizing effect is greater than those obtained above with the coarse classification (34.53 > 21.75). The fact that only one type of arrangements within the hard pegs displays stabilizing properties is due to the specific features of each type of arrangement *per se*. Among the hard pegs, the adoption of another currency as legal tender with the currency board and currency union turn to be the most constraining arrangements in the eyes of decision-makers. Countries under fixed arrangements cannot use the nominal ER to face external shocks. As one might know, under such arrangements, monetary authorities relinquish independent monetary policy and import monetary policy of the issuing countries. The need for authorities to rely more on fiscal policy to deal with internal imbalances or face external shocks might outpace the advantages of fixing the ER in terms of credibility and stability. Considering the Economic and monetary union arrangements, the absence of any significant stabilizing effect can be justified by the behavior of the union member countries. Economic and monetary unions are characterized by important cross country interactions qualified as positive or negative externalities. The ongoing economic situation prevailing in the European monetary union describes clearly the detrimental effects that can arise from a *poorly-managed* union. The compulsory reaction of

"good performers" in assisting "bad performers" to support the peg leads implicitly to a *free riding* behavior a moral hazard problem among the members union. Thus, the trade-off turns in favor of the Conventional peg arrangements. Countries benefit from the "announcement effect" of a pegged regime that helps to ensure credibility of monetary authorities. This latter arrangement is not fully-stringent in the sense that there is no commitment to keep the parity irrevocably. Authorities limit their use of fiscal policy but rather adopt the policy-mix to better handle the economy vis-à-vis the business cycle.

4.3. Sensitivity analyses and robustness

We pursue by implementing some sensitivity analyses in order to gauge how robust our estimation results are. For this purpose, two different approaches are used. First, we modify the fiscal policy indicator. Instead of the overall fiscal balance, we resort on the general government consumption expenditures and the total government revenues. Secondly, rather than the IMF *de facto* classification, we make use of the natural *de facto* classification developed by Reinhart and Rogoff (2004). We test the same hypothesis that the stability of fiscal policy increases with the rigidity of the ER regime. GMM estimators are used in order to obtain correct estimations. We present in turn results relative to these modifications.

- ***Changing the fiscal policy indicator***

Here, we make use of two novels dependent variables: the general government consumption expenditures and the total government revenues. These two variables are considered to be the main components of the fiscal balance. So, disaggregating our former measure of fiscal policy –*fiscal balance*- solves the following interrogation: to what extent, governments use these two policy tools in designing discrete fiscal reactions to the short-run fluctuations.

Table 5 below describes the results obtained using the total government revenues as fiscal policy variable. Except for the lagged dependent variable none the remaining variable is statistically significant. We see that the coefficients of output gap with negative sign suggest in specifications [1] and [3] a pro cyclical fiscal policy. The positive sign of the coefficients of interactive variables support the stabilizing effect of pegged and intermediate regimes. However these coefficients are not statistically significant.

***Table 5**: Effect of ERR on the procyclicality*

Dependent Variable: Government Total Revenues (% GDP)				
	Diff-GMM		Sys-GMM	
	[1]	[2]	[3]	[4]
OFB $_{(-1)}$	-0.0852**	-0.0836**	-0.195***	-0.188***
	[2.26]	[2.25]	[2.69]	[2.85]
Output gap (OG)	**-0.213**	**0.0518**	**-0.237**	**0.0224**
	[0.89]	[0.32]	[1.26]	[0.20]
OG_Pegged	**0.381**		**0.412**	
	[0.99]		[1.48]	
OG_Intermediate		**-0.00472**		**0.0698**
		[0.01]		[0.15]
Controls	Yes	Yes	Yes	Yes
N. obs (countries)	869 (88)	869 (88)	961 (92)	961 (92)
AR 1 p-value	0.001	0.000	0.004	0.003
AR 2	0.138	0.117	0.137	0.133
Hansen	0.767	0.600	0.549	0.267
Time dummies	Yes	Yes	Yes	Yes
Instruments	69	69	82	82

*Significance: * 10%, ** 5% and *** 1% with t-statistic in brackets.*

In the *table 6*, we focus on the government public expenditures. We identify three different measures. Columns [1] and [2] refers to the government consumption expenditures expressed in percentage of GDP as dependent variable, while columns [3] and [4] use the government expenditures devoted to capital formation as fiscal policy variable. This variable proxies the amount of public investment. In the remaining columns [5] and [6], the dependent variable used to gauge fiscal policy refers to the real changes in government consumption expenditures[20] i.e. the growth rate of public expenditures. This latter variable is log-transformed. The estimation results confirm the inertia of the fiscal policy with coefficients of lagged dependent variables statistically different from zero. Regarding the cyclicality, we see that the OG coefficient is positive and statistically significant. This means that fiscal policy measured through the government expenditures is pro cyclical. A positive OG i.e. an economic expansion leads to an increase in public expenditures. The procyclicality is not observed for specifications [5] and [6].

Table 6 also shows that pegged regimes are stabilizing. The coefficients of interactive variable are negative and statistically significant. The pro cyclicality of fiscal policy is mitigated for countries under pegged regimes. If one considers the government current expenditures (column [1]), the cyclical coefficient of fiscal policy is of -0.18 (0.191-0.347).

[20] This choice flows from Kaminsky et *al.* (2004). These authors criticize the usage of fiscal variable expressed over the GDP in the sense that evolution of the ration can be influenced by the evolution of the GDP *per se*. Also, Thornton in his explanation of procyclicality of fiscal policy in African countries used also the *growth rate of public expenditures expressed in logarithm.*

***Table 6**: Effect of ERR on the procyclicality*

Dependent Variable: Government Expenditures						
	Government consumption (%GDP)		Gross capital formation (% GDP)		Government expenditure (real changes in %)	
	[1]	[2]	[3]	[4]	[5]	[6]
OFB $_{(-1)}$	-0.160***	-0.150***	-0.166***	-0.176***	0.187***	0.188***
	[2.92]	[2.94]	[3.14]	[3.42]	[3.28]	[3.05]
Output gap (OG)	**0.191****	-0.117**	**0.521*****	-0.0584	0.0566	-0.0182
	[2.08]	[2.43]	[2.94]	[0.54]	[1.00]	[1.02]
OG_Pegged	**-0.374*****		**-0.482***		**-0.0757**	
	[2.69]		[1.92]		[0.98]	
OG_Intermediate		0.284*		0.951***		**0.0966**
		[1.91]		[2.72]		[1.00]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N. obs (countries)	1725 (98)	1725 (98)	1719 (98)	1719 (98)	690 (77)	690 (77)
AR 1 p-value	0.000	0.000	0.000	0.000	0.000	0.000
AR 2	0.903	0.898	0.633	0.793	0.782	0.791
Hansen	0.512	0.341	0.179	0.334	0.960	0.948
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Instruments	82	82	82	82	60	60

*Significance: * 10%, ** 5% and *** 1% with t-statistic in brackets*

Pro cyclicality of fiscal policy (0.19) is strongly mitigated but rather turned into countercyclicality (-0.18) for countries under pegged regimes. Regarding the investment expenditures (column [3]), the cyclicality coefficient is of 0.04 (0.521-0.482). Pro cyclicality is also mitigated with the coefficient which varies from 0.521 to 0.04. However we note any *reversal effect*[21] as it is the case for current expenditures. Considering the government consumption growth rates (columns [5] and [6]), none of the interactive variables is statistically significant. Thus, there is no stabilizing effect of pegged regime if the measurement of fiscal policy is based upon the real changes in public expenditures.

- ***Using Reinhart and Rogoff regime classification***

As robustness checks, we estimate our models using RR natural *de facto* classification of ER regimes. We test the same hypothesis that stability of ER increases with the rigidity of the peg. To do so, we estimate the previous model where the overall fiscal balance is taken as dependent variable using the GMM estimator. Table 7 below presents the detailed results.

As it is previously shown the lagged dependent variable remains statistically significant and negatively correlated with the dependent variable, results which confirm the inertia of fiscal policy. However, the remaining results seem quite intriguing.

[21] The term « *reversal effect* » is used to describe a fiscal policy behavior that turns from being pro cyclical to countercyclical

***Table** 7: Effect of ERR on the procyclicality*

Dependent Variable: Overall fiscal balance				
	Reinhart and Rogoff classification			
	Diff-GMM		Sys-GMM	
OFB $_{(-1)}$	-0.355***	-0.320***	-0.342***	-0.295***
	[5.12]	[6.49]	[5.21]	[6.80]
Output gap (OG)	**10.22***	4.962	4.950	3.599
	[1.85]	[1.61]	[1.49]	[1.44]
OG_Pegged	**-18.73***		-9.288	
	[1.91]		[1.46]	
OG_Intermediate		**-19.06****		**-13.87***
		[2.02]		[1.93]
Controls	Yes	Yes	Yes	Yes
N. obs (countries)	1367 (89)	1367 (89)	1458 (91)	1458 (91)
AR 1 p-value	0.0802	0.0644	0.0556	0.0265
AR 2	0.125	0.236	0.176	0.284
Hansen	0.196	0.430	0.180	0.339
Time dummies	Yes	Yes	Yes	Yes
Instruments	69	69	82	82

*Significance: * 10%, ** 5% and *** 1% with t-statistic in brackets.*

In fact, *table 7* also shows that the OG coefficients are no longer significant except for the column [1] where the positive sign of the coefficient suggest a countercyclical fiscal policy. Moreover, we see through this table that the coefficients of interactive variables do not match the expected positive sign as in our previous estimations in *table 2 and 3*. These results seem quite intriguing for two main reasons. On the one hand, the countercyclicality suggested here by the robustness is at odds with the literature on fiscal policy. On the other hand, the negative sign and the non-significant coefficients of the interactive variable reject the hypothesis that the stability of fiscal policy increases with the rigidity of the regime.

To sum up, the relationship previously found between the ER regime and the cyclical behavior of the fiscal policy seems weak. According to *table 7*'s results, the stabilizing effect of pegged regime seem very sensitive to the dependent variable used to measure the fiscal policy as well as the classification of the ER regime.

CONCLUSION

The aim of this paper is to test the hypothesis that the stability of fiscal policy increases with the rigidity of the ER regime. The study is conducted through a wide panel of emerging market economies and low income countries over the period 1970-2008. Our baseline estimations show that pegged regimes influence the cyclical behavior of fiscal policy in the sense that such regimes reduce or even reverse the magnitude of the procyclicality of fiscal policy. This conclusion seems consistent with Ghosh et *al.*, 2010.

We take the study steps further and see how constraining the pegged regimes are? We find that the stabilizing effect is not generalizable to all types of pegged regimes. Within the hard pegs, the stabilizing effect is solely observable for countries with a conventional peg arrangement. The rationale of such stabilizing mechanism of ER regime is that countries under pegged regime manage their incentive to overspend during booms in order to avoid rapid growth of money and inflation. This can also be vindicated by the fact that, under pegged regimes, countries should not have adequate or even inexistent room to monetize the debt. Given that, authorities tend to monitor the money growth in order to hold down the inflation pressures that represent a major threat on the peg. As one can say, hard pegs *tie the hand* of policymakers by preventing them from lax fiscal policy. Therefore, pegged ER regimes –*as conventional peg*- increase the stability of fiscal policy. The sensitivity analyses show that the two main components of the fiscal balance are used differently by the incumbent authorities. Government expenditures seem more sensitive to the business cycle than do the total government revenues. In reaction to the output fluctuations, fiscal authorities tend to reduce expenditures in order to stabilize fiscal policy rather than increasing the government revenues.

At the light of these results, we think to the main policy implications that one can draw from this analysis? First, one would be tempted to suggest that countries which aim to stabilize their fiscal policy should peg their exchange rate i.e. adopt a fixed regime, especially in the case where fiscal policy is pro cyclical. However, such policy recommendations should be taken carefully. On the one hand, adopting a pegged regime requires the candidate to deal with the downside effects like the abandonment of the monetary policy to the anchor country. On the other hand, and more fundamentally, we see that the nexus between ER regimes and the cyclical behavior of fiscal policy –*the stabilizing effect*- seems weak. We find through the

robustness analyses that the stabilizing effect does not persist once the regime classification is changed. Moreover, we fail to identify any influential effect of the ER regimes in the case where we modify the fiscal policy indicator. These conclusions cast serious doubts on the hypothesis of Ghosh et *al.,* (2010) that pegged ER regime are stabilizing. However, this paper's conclusion of a weak link between ER regimes and the cyclical behavior of fiscal policy seems close to those of the existing literature. Tornell and Velasco, (2000) find that the stabilizing effect is not automatic but rather conditional upon the intertemporal distribution of the costs of lax fiscal policy among the alternative regimes, while Kaminsky et *al.,* (2004) support that there is no relationship between ER regime and the pro cyclicality. These latter conclusions raise two main interrogations: Does the regime classification really matter in the assessment of the ER regime effects on cyclical behavior fiscal policy? More intriguing, is the stabilizing effect a simple mirage?

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Appendix A: List of countries

Emerging markets	***Low income countries***		
Albania	Angola	Eritrea	Panama
Algeria	Antigua and Barbuda	Ethiopia	Papua New Guinea
Argentina	Bahamas, The	Fiji	Paraguay
Bolivia	Bahrain	Gabon	Peru
Brazil	Bangladesh	Gambia, The	Romania
Bulgaria	Barbados	Ghana	Rwanda
Chili	Belize	Grenada	Senegal
China	Benin	Guatemala	Seychelles
Egypt	Bhutan	Guinea	Sierra Leone
Hungary	Botswana	Guinea Bissau	Sri Lanka
India	Brunei Darussalam	Guyana	St. Kitts and Nevis
Indonesia	Burkina Faso	Haiti	St. Lucia
Iran, I.R. of	Burundi	Honduras	St. Vincent
Kenya	Cambodia	Jamaica	Sudan
Kuwait	Cameroon	Jordan	Suriname
Malaysia	Cap Verde	Lesotho	Swaziland
Mexico	Central African R.	Liban	Syria
Morocco	Chad	Liberia	Tanzania
Nigeria	Columbia	Madagascar	Togo
Pakistan	Comoros	Malawi	Tonga
Philippines	Congo D.R. of	Mali	Trinidad and Tobago
Poland	Congo R.	Malta	Uganda
Russia	Costa Rica	Mauritania	Uruguay
Saudi Arabia	Côte d'Ivoire	Mongolia	Vanuatu
South Africa	Djibouti	Mozambique	Venezuela, R.B. of
Thailande	Dominica	Namibia	Yemen
Tunisia	Dominican R.	Nepal	Zambia
Turkey	Ecuador	Nicaragua	Zimbabwe
United Arab Emirates	El Salvador	Niger	
Vietnam	Equatorial Guinea	Oman	

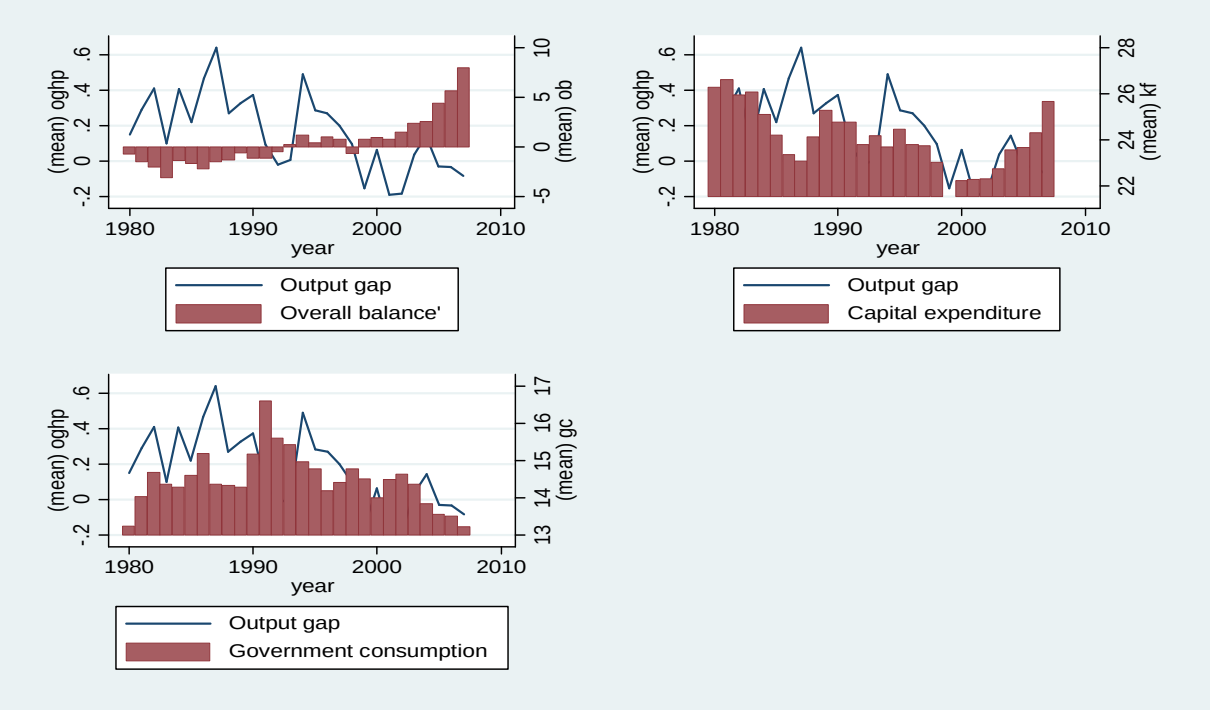
Appendix B: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Growth	3304	3.427157	6.208755	-51.0306	106.28
Democ	3272	.3976161	.4894801	0	1
Og	3304	4.14e-10	4.371469	-46.73032	79.03793
og1	3304	4.08e-09	5.130073	-51.27595	93.94242
d_ob	2677	.4784893	40.52242	-811.3778	717.5147
log_gdpc	3304	7.251068	1.348457	3.495704	10.9401
lg_debt	2862	4.013325	.8072184	-1.145188	7.646317
log_aid	3063	.8895065	2.054541	-7.564185	5.122044
log_openness	3273	4.165654	.5840872	2.167499	5.897642
log_rem	2409	.1112815	2.05334	-10.45195	4.574141
log_rn	2976	1.360334	1.651789	-6.777708	4.447863
Infla	2775	.878725	3.024131	-26.01941	146.3126
d_rev	1652	.1619943	4.839018	-43.13579	42.46383
l_gc	1581	1.567406	1.080645	-4.475599	4.421508
d_gc	2959	-.0644358	3.161011	-63.00659	63.40611
d_kf	2956	.000016	5.140322	-47.89767	63.71555

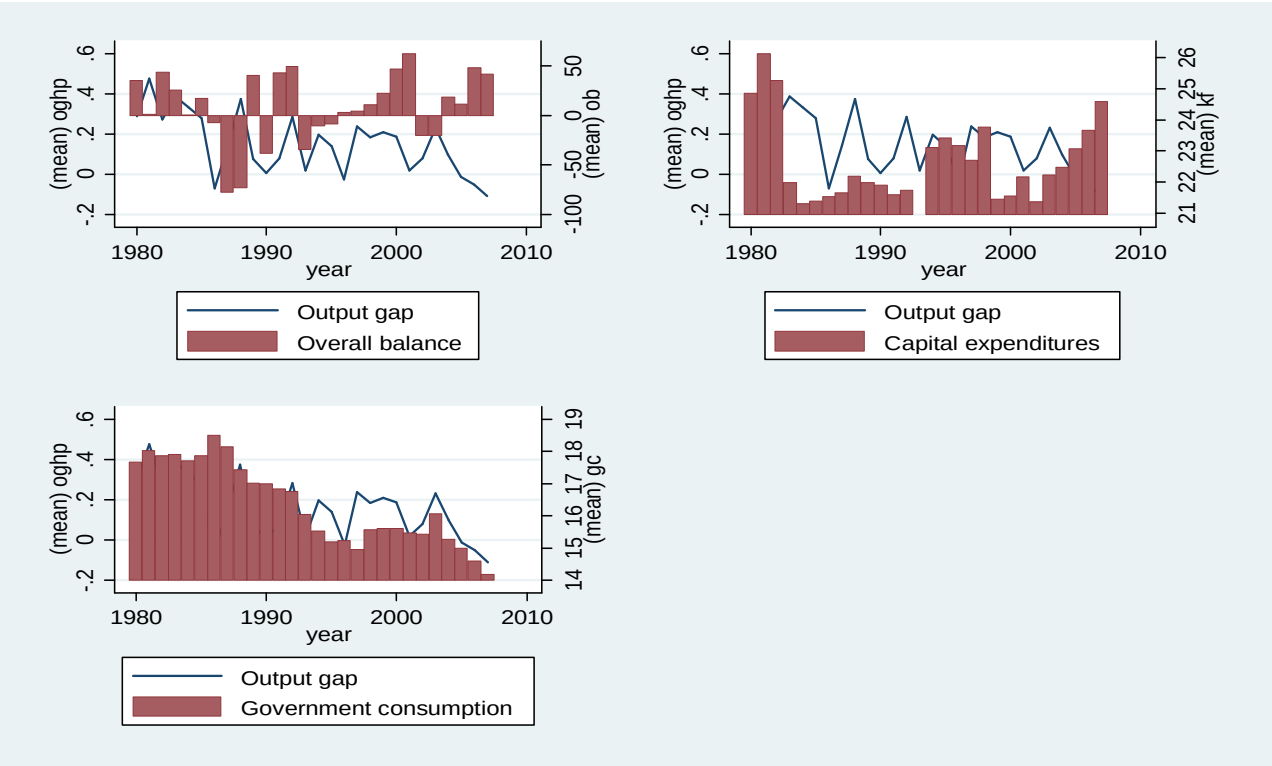
Appendix C: Graphics

Evolution of output gap and fiscal policy variables

Emerging market economies

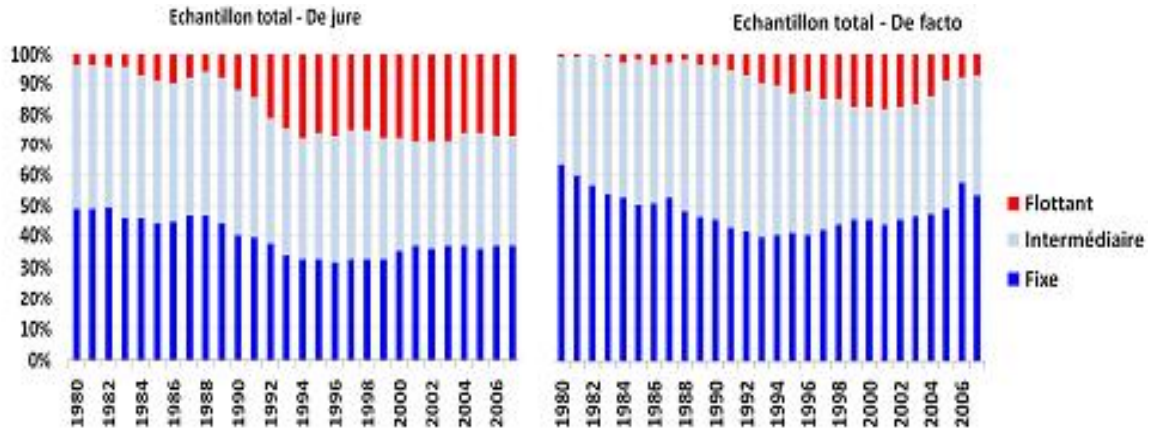


Low income countries

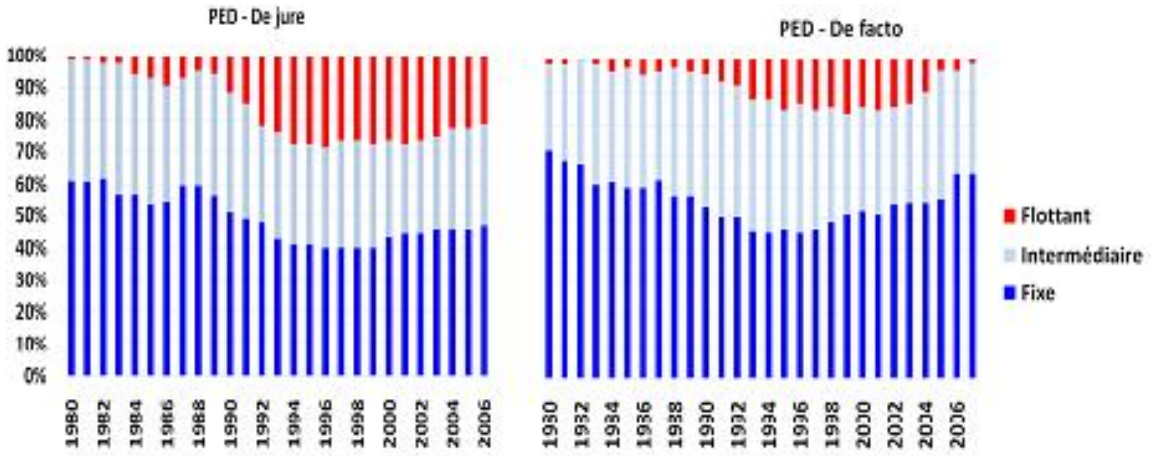


Evolution of the exchange rate regimes

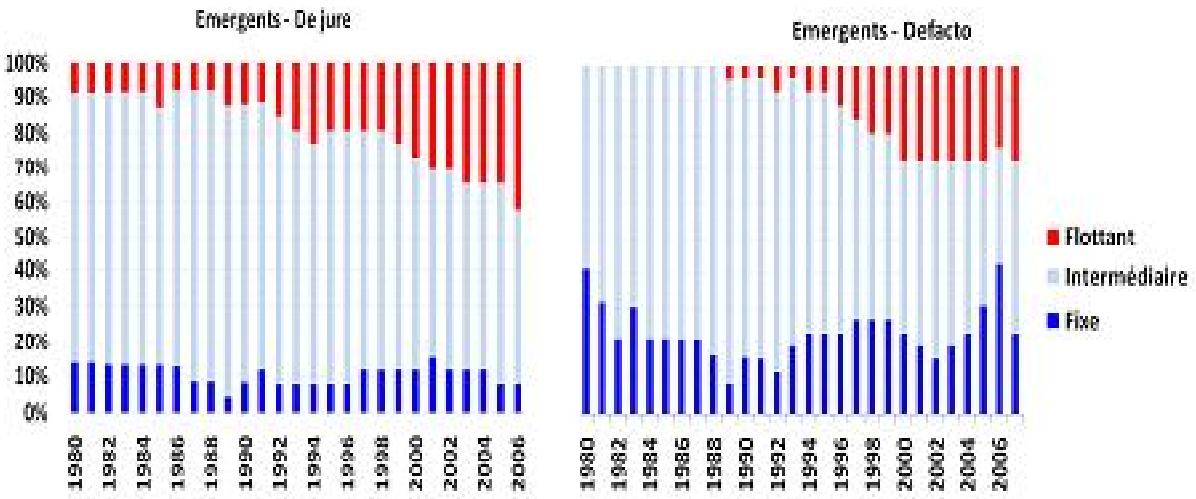
Whole sample



Low income countries



Emerging market economies



Appendix D: Further robustness checks

***Appendix D**: Effect of ERR on the procyclicality*

Dependent Variable: Overall fiscal balance						
	System GMM					
	LIC[¥]		Without BRIC[§]		Without ECA[π]	
OFB $_{(-1)}$	-0.297***	-0.336***	-0.292***	-0.331***	-0.297***	-0.333***
	[6.53]	[6.82]	[6.45]	[6.74]	[7.04]	[6.81]
Output gap (OG)	**-20.63***	**5.780***	**-13.81***	**4.869***	**-12.83***	**5.138***
	[1.79]	[1.75]	[1.81]	[1.68]	[1.79]	[1.74]
OG_Pegged	**28.24***		**22.14***		**20.31***	
	[1.77]		[1.85]		[1.84]	
OG_Intermediate		-29.06**		**-20.60***		**-20.83***
		[2.00]		[1.86]		[1.91]
GDP pc	-7.002	-31.25	12.22	-93.03	13.97	-64.16
	[0.12]	[0.49]	[1.05]	[1.13]	[0.95]	[0.93]
Aid	15.45	18.94	10.19	15.34	9.533	15.40
	[1.33]	[1.39]	[1.33]	[1.54]	[1.32]	[1.55]
Openness	44.50	30.33	10.13	36.71	14.69	36.88
	[1.22]	[0.98]	[0.80]	[1.35]	[1.15]	[1.44]
Remittances	-9.040	-2.234	-3.951	-7.383	-3.550	-6.114
	[1.19]	[0.40]	[1.24]	[1.28]	[1.18]	[1.18]
Natural ress.	-5.167	-15.83	-5.351	-8.323	-5.139	-9.076
	[0.49]	[1.25]	[1.02]	[0.91]	[1.13]	[0.98]
P. debt	37.31	7.278	10.36	10.23	10.73	10.80
	[1.52]	[0.45]	[0.93]	[0.91]	[1.06]	[0.99]
Inflation	1.019	0.744*	1.094	0.557	0.980	0.612
	[1.58]	[1.68]	[1.57]	[1.57]	[1.56]	[1.64]
Democracy	-5.466	12.86	-20.95	-13.80	-16.87	-4.745
	[0.17]	[0.47]	[1.52]	[0.66]	[1.48]	[0.25]
N. obs (countries)	1071 (68)	1071 (68)	1555 (93)	1462 (91)	1528 (90)	1518 (95)
AR 1 p-value	0.0933	0.0738	0.0350	0.0888	0.0285	0.0837
AR 2	0.183	0.240	0.300	0.177	0.270	0.177
Hansen	0.412	0.536	0.396	0.234	0.440	0.206
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Instruments	69	69	82	69	82	69

*Significance: * 10%, ** 5% and *** 1% with t-statistic in brackets.*

[¥] *Low Income Countries*

[§] *Brazil, Russia India and China*

[π] *East and Central Asia*