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Cyclical Macro Policy and Industry Growth: The Effect of Counter-Cyclical Fiscal Policy

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Very preliminary, comments welcome

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This paper evaluates whether and how the cyclical pattern of macro policy can affect growth. We focus on fiscal policy and study whether the degree of fiscal policy counter-cyclicality has any significant impact on growth. Following the Rajan-Zingales (1998) methodology, we draw a relationship between fiscal policy counter-cyclicality –measured at the macro level– and growth (both value added and productivity) at the industry level. We provide evidence that (i) industries have grown faster in economies where fiscal policy has been more counter-cyclical, both in terms of output and productivity (ii) that the positive growth effects of fiscal policy counter-cyclicality have been larger for industries which rely proportionally more on external finance. We show these two conclusions to be unaffected by a bunch of robustness checks. In particular the effect of fiscal policy counter-cyclicality is robust to the inclusion of a large number of structural macroeconomic variables, including financial development, openness to trade or net current account position. Hence, the cyclical pattern of fiscal policy is probably at least as important as can be structural features in their impact on growth. Second we use a number of different measures of fiscal policy counter-cyclicality. In particular we separate between the different components of fiscal policy (revenues and expenditures, investment and consumption) to determine which item counter-cyclicality is more important for growth. Empirical evidence seems to show that counter-cyclicality stemming from discretionary fiscal policy is more important for growth than counter-cyclicality stemming from automatic stabilizers.

Keywords: growth, financial dependence, fiscal policy, counter-cyclicality
JEL Classification: E32, E62

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I. INTRODUCTION

Standard macroeconomic textbooks generally present macroeconomics in two separate bodies: in the long term an economy's performance is essentially influenced by structural features, such as education, R&D, openness to trade, competition or financial development. Long term growth for instance does essentially depend on these characteristics. In the short term however, the economy is essentially influenced by the shocks it undergoes and the stabilisation policies undertaken (fiscal and monetary policy). These two approaches have been considered for long as separate and distinct bodies of research in the sense that no long term evolution is considered to have any (first order) impact on the short term. Neither is stabilization policy considered to impact significantly the long run performance of an economy[2]. The point of this paper is to investigate (the relevance of) this dichotomy, namely whether the determinants of short run evolutions can be predictors of long term performance. Here we focus on short run stabilization policies and ask whether they can influence long term performance in general and growth in particular.

Before trying to answer this question, it is worth noting that the structural component of short run cyclical stabilisation policies can affect long run growth. For instance average growth is generally thought to be negatively related to average inflation. The structural fiscal deficit is also likely to have an impact on long run growth. Hence monetary and fiscal policy can affect growth through their structural components. The interesting question (we focus on) is therefore whether the cyclical component of monetary or fiscal policy can impact long run growth. Is there however any reason a priori to believe that the cyclical component of short run stabilisation policies can affect long run growth?

To answer this question, the literature on growth and volatility can be useful[3]. This literature basically shows that volatility understood as the standard deviation in output growth can be detrimental to average growth. When shocks are more volatile, the probability that agents are not able to face the negative shocks and hence be compelled to liquidate their investment increases. As a result, agents are more reluctant to invest in risky technologies. Hence when

[2] Easterly (2005), "National Policies and Economic Growth: A Reappraisal," Chapter 15 in Handbook of Economic Growth, P. Aghion and S. Durlauf eds.

[3] cf. Aghion, P, Angeletos, M, Banerjee, A, and K. Manova (2005), "Volatility and Growth: Credit Constraints and Productivity-Enhancing Investment", NBER Working Paper No 11349.

more risky investments are also more productive, macroeconomic volatility can be detrimental to growth. Assuming this statement is correct then within this framework, macroeconomic policy that can help reduce volatility can contribute to increase long run growth. Diversification across industries for instance can help reduce terms of trade volatility. Financial development, by raising refinancing possibilities, easing accommodation of shocks, can also reduce volatility. These are structural long run evolutions on which policy makers have no short run impact. However policy makers can have a short run impact on stabilisation policies: cyclical policies that raise volatility will likely reduce growth while cyclical policies that reduce volatility will likely raise growth. As a consequence procyclical policies are probably detrimental to growth while counter-cyclical policies can possibly be positive for growth, hence the question we ask in this paper: does the cyclical pattern of stabilisation policy affect long run growth?

This paper favours an empirical approach to provide an answer to this question. While there is up to now no simple and clear theoretical framework which formalizes the intuitions described above, we believe that providing a proper empirical assessment of the effect of macro policy on growth is a prerequisite for building the right theoretical model. It is however important to note that going into the empirical study first does not imply that the empirical exercise we carry out fits the traditional critique on non structural econometrics i.e. that regressions do not fit a closed form conclusion of a theoretical model and hence cannot be properly interpreted. Based on the growth volatility literature, we have in mind a simple framework "à la Holmstrom-Tirole (1998)[4]" where the supply of public liquidity can be Pareto improving as long as firms face moral hazard and macroeconomic liquidity or reinvestment shocks. Merging this framework with a Schumpeterian approach to growth, the conclusion that counter-cyclical policy can raise growth becomes straightforward as long as it raises the probability for firms to go through the reinvestment shock[5]. We hence view this paper as a preliminary and early stage in building the stylized facts of the relationship between growth and cyclical macro policy.

A simple approach to assessing the impact of counter-cyclical economic policies on growth could consist in running a regression with a growth indicator (output or labour productivity)

[4] Holmstrom and Tirole (1998), "Private and Public Supply of liquidity" Journal of Political Economy, vol. 106(1), pp. 1-40.

[5] Kiyotaki and Moore (2001) also provides a useful framework for studying the impact of monetary policy on growth based on the existence of both borrowing and liquidity constraints. cf. "Liquidity, Monetary policy and the Business Cycle," Clarendon Lectures (2001).

as a dependent variable and an indicator of counter-cyclicality in economic policies as an explanatory variable. Every thing else equal, this framework can tell whether the cyclical properties of macro policy do affect growth significantly and in case they do, how much growth increase can be expected from a change in macro policy, for instance moving from a procyclical to an acyclical policy. However there are three important issues that preclude this type of straightforward exercise. First cyclicality in economic policies (by now, we will only focus on fiscal policy) is generally captured through a unique time-invariant parameter which only varies in the country dimension[6]. As a result, standard cross-country panel regression cannot be used to assess to the effect of the cyclical pattern of fiscal policy on growth in as much as the former is perfectly collinear to the fixed effect that is traditionally introduced to capture unobserved cross-country heterogeneity[7]. To solve this issue, Aghion and Marinescu (2007)[8] introduce time-varying estimates of fiscal policy cyclicality[9]. While this is a step forward in the effort to capturing the growth effect of fiscal policy cyclicality –while at the same time controlling for unobserved heterogeneity-, this can be at the cost of loosing precision in the estimates of fiscal policy cyclicality. The second important issue that must be dealt with in estimating the effect of fiscal policy cyclicality on growth is the causality issue namely does fiscal policy cyclicality affect growth or does growth modify the cyclical pattern of fiscal policy? This question is fundamental to derive the policy implications of the empirical exercise. In particular estimating the growth gain/cost to a change in the cyclical pattern of fiscal policy highly depends upon whether the causality issue has been properly addressed. However macro level regressions have proved to have difficulties in dealing with this issue. A final concern is the identification issue. The gain in testing the conclusion(s) of a theoretical model is precisely to test the relevance of the underlying mechanism. In the absence of a proper theoretical approach, there is both a problem of control variables –the econometrics must be robust to the inclusion of a number of control variables representing other standard theoretical models- and a problem of identification in the sense that the underlying mechanism is not directly tested. Hence even if the argument -that the cyclical pattern of fiscal policy is important for growth- is empirically verified, the channel through which this conclusion works remains uncovered with a macro level analysis.

[6] Cf. Kaminski , Reinhart, and Végh, (2004) "When it Rains it Poors: Procyclical Capital Flows and Macroeconomic Policies," NBER working paper 10780

[7] Cf. also Rodrik (2005) "Why We Learn Nothing from Regressing Economic Growth on Policies," mimeo Harvard University.

[8] Aghion and Marinescu (2007), "Cyclical Budgetary Policy and Economic Growth: What Do We Learn from OECD Panel Data," NBER Macro Annual, forthcoming.

[9] Time varying estimates of cyclicality can be obtained with a number of non parametric methods.

The approach we provide in this paper proposes a possible remedy for each of these issues. We build on the methodology provided by Rajan and Zingales (1998) in their seminal paper[10]. Initially this methodology was used to assess the impact of financial development on growth, linking growth at the industry level to financial development at the macro level interacted by external financial dependence at the industry level, the idea being that financial development should be positive for growth and more so for industries which rely more heavily on external finance. Applying this methodology to the issue we are interested in simply consists in linking growth at the industry level to fiscal policy counter-cyclicality at the macro level interacted by the level of external financial dependence at the industry level, the idea being that industries which rely more heavily on external finance should benefit disproportionally more from fiscal policy counter-cyclicality.

Why is this approach useful in solving the practical issues stated above? First, because we use a country – industry panel dataset, we can estimate counter-cyclicality in fiscal policy based on a time-invariant parameter. As previously fiscal policy counter-cyclicality is collinear to country fixed effects. However the conclusion we test that the growth effect of fiscal policy counter-cyclicality is larger for industries that rely more on external finance. Hence the interaction between a country level and a industry level variable solves the collinearity issue. Second the interaction term helps solve the identification issue because it shows that the effect of fiscal policy counter-cyclicality goes through the financial structure of the firm – or the industry- hence validating the theoretical framework described above. Finally and most importantly, we believe this approach can be an important step forward in solving the causality issue. Because macro policy can affect industry level growth while the opposite - industry level growth affecting macro policy- is much less likely, the framework we consider is useful to assess whether the cyclical pattern of fiscal policy has a *causal* impact on growth[11]. There is however a downside to the approach we consider in this paper. Because we use a difference in difference approach, our methodology is not equipped to derive the magnitude of the macroeconomic growth gain/loss to different patterns of cyclicality in fiscal policy. Hence although we provide some empirical estimates of the growth gain at the industry level

[10] Rajan and Zingales (1998), "Financial Dependence and Growth," American Economic Review, vol. 88(3) pp. 559-586.

[11] Fiscal policy cyclicality could be endogenous to the industry level composition of total output if for example industries that benefit more from fiscal policy counter-cyclicality do lobby more for counter-cyclical fiscal policy. However o the extent that there are decreasing returns to scale (which is plausible given that we focus here on manufacturing industries), that should rather imply a downward bais in our estimates of the positive impact of fiscal policy counter-cyclicality on growth. Hence controlling for this possible endogenity relationship would probably, if it is really important, reinforce the results we obtain here by reducing this downward bais.

that can arise from a change in the cyclical pattern of fiscal policy, we believe that the results of this paper are, above all, qualitative evidence of the growth effect of counter-cyclical fiscal policy. As a result, we do not claim that the results which we detail below can be used to derive directly the policy implications of different fiscal policies as to their growth consequences[12].

The results we come up can be divided into three main parts. First we show that fiscal policy counter-cyclicality has a positive impact on industry growth. We show that this property holds for real value added as well as for labour productivity. We also provide evidence that the property that fiscal policy counter-cyclicality is good for growth applies when fiscal policy is measured both as the total fiscal balance to GDP or as the primary fiscal balance to GDP. However we show that it fails to apply to fiscal receipts to GDP counter-cyclicality. Hence the positive growth effect of fiscal policy counter-cyclicality essentially comes from fiscal expenditure to GDP counter-cyclicality, hence suggesting that more than automatic stabilisers, discretionary counter-cyclical fiscal policy is driving the positive effect on growth. Based on these results, we derive the magnitude of the diff-in-diff effect, i.e. how much growth can be gained following a change in counter-cyclicality and a change in financial dependence. We show that the magnitudes we derive are as large as those obtained by Rajan and Zingales (1998), hence suggesting that counter-cyclicality is at least as important as can be financial development. Second we go through a number of robustness checks: we introduce a bunch of control variables to test whether counter-cyclical fiscal policy is indeed important for growth every thing else equal. We show for instance that the Rajan-Zingales result –that financial development raises growth in industries with higher financial dependence- is not robust to the inclusion of counter-cyclical fiscal policy. Third, we explore two different avenues. On the one hand we run a horse between the structural component of fiscal policy and fiscal policy counter-cyclicality to test whether our result is robust to including the structural component of fiscal policy. We find that this is indeed the case. On the other hand we provide an instrumental variable estimation of the effect of fiscal policy counter-cyclicality and show that results are very close to those obtained in the very first regressions, thus confirming both qualitatively and quantitatively the first results of the paper.

[12] A further limit to a direct interpretation of our results relates to our focus on growth for manufacturing industries while the total share of manufacturing industries in total value added in about one third not more. Deriving the global macroeconomic effect of fiscal policy cyclicality would require an assessment of the impact on the service sector.

The rest of the paper is organized as follows. The next section lays down the econometric methodology and presents the data used in estimations. The basic specification is tested in section 3. Section 4 tests which component of fiscal policy (expenditures, revenues, consumption, investment, etc…) does affect growth through its counter-cyclicality. Section 5 tests the relevance of the counter-cyclical pattern of fiscal policy against a number of structural characteristics of the economy including financial development. Instrumental variable estimations are carried out in section 6. Conclusions are eventually drawn in section 7.

II. DATA AND ECONOMETRIC METHODOLOGY.

The basic specification we build on our empirical investigation is a regression where the dependent variable (henceforth LHS variable) g_{jk}^{y} is the average annual growth rate of real value added in industry j in country k. On the right hand side, we first introduce country and industry fixed effects $\{\alpha_j ; \beta_k\}$ to control for unobserved heterogeneity between countries and industries. Second we include the interest variable $(fd_j)\times(fpc_k)$, i.e. the interaction term between fiscal policy cyclicality and external financial dependence. Finally, we introduce (y_{jk}) the initial share in total manufacturing of industry j in country k as an explanatory variable.

$$g_{jk}^{y} = \alpha_j + \beta_k + \lambda(fd_j)\times(fpc_k) + \delta\log(y_{jk}) + \varepsilon_{jk} \qquad (1.a)$$

ε being an error term. In an alternative specification we use as a dependent variable g_{jk}^{yl} the average annual growth rate of real value added per worker in industry j in country k. In this case we introduce (yl_{jk}) the initial level of real value added per worker in industry j in country k as an explanatory variable in place of the initial share in total manufacturing.

$$g_{jk}^{yl} = \alpha_j + \beta_k + \lambda(fd)_j \times(fpc_k) + \delta\log(yl_{jk}) + \varepsilon_{jk} \qquad (1.b)$$

Following Rajan and Zingales (1998) we measure external financial dependence at the industry on the basis of firm level data for the US computed as the ratio of capital expenditures minus cash flow from operations divided by capital expenditures. Proceeding this way is valid as long as (i) differences in financing across industries are largely driven by differences in technology and (ii) technological differences persist across countries. Under these two assumptions, the US based measure of external finance is likely to be a valid measure of external financial dependence for countries other than the US[13]. In reality these two conditions are likely to be verified. For instance if pharmaceuticals require proportionally more external finance than textiles in the US, this is likely to be the case in other countries. Finally because the US is one of the most developed capital market in the world, US based

[13] Note however that this measure is unlikely to be valid for the US as it likely reflects the equilibrium of supply and demand for capital in the US and is hence endogenous.

measures of external financial dependence are likely to give the least noisy measures of industry level demand for external finance.

Estimating equation (1.a) and (1.b) can be carried out with a simple OLS procedure which if need be can be corrected for heteroscedasticity bias. The reason why we can do so is that the right hand side variable i.e. the interaction term between industry financial dependence and fiscal policy counter-cyclicality is in theory exogenous to the LHS variable, industry value added or labour productivity growth. First financial dependence is measured in the US while industry growth is considered for other countries than the US. Hence reverse causality in the sense that industry growth outside the US could affect the industry financing structure in the US seems quite implausible. Second the LHS variable is measured on a post 1990 period while the financial dependence indicator is measured on a pre 1990 period, hence further reducing the possibility of reverse causality. Finally fiscal policy counter-cyclicality is measured at the macro level while the LHS variable is measured at the industry level which in theory precludes any case for reverse causality.

The last thing we need to estimate our specification is the degree of fiscal policy counter-cyclicality. A simple benchmark to begin with consists in estimating fiscal policy cyclicality as the marginal change in fiscal policy following a change in the output gap. Hence fiscal policy cyclicality can be estimated with the following equation

$$def_{kt} = \alpha_k + (fpc_k).z_{kt} + u_{kt} \qquad (2.a)$$

where *def* is a measure of fiscal policy (fiscal balance, primary balance, expenditures, revenues, etc…) and *z* is a measure of the output gap of the economy. Equation (2) is hence estimated for each country so that we end up with an estimator for fiscal policy cyclicality for each country of the sample.

While this benchmark equation is extremely simplistic, it must be regarded as a first step. More elaborated fiscal policy regression can be considered. In particular, following Gali and Perrotti (2003)[14] fiscal policy cyclicality can be measured in a specification including a debt stabilization motive and controlling for fiscal policy persistence. Noting b_{kt} the ratio of public

[14] Gali and Perotti (2003), "Fiscal Policy and Monetary Integration in Europe," Economic Policy, 533-572.

debt to GDP in country k in year t, a more elaborate estimation of fiscal policy counter-cyclicality is given by $(fpc_{2,k})$ where $(fpc_{2,k})$ is estimated following the equation[15]

$$def_{kt} = \alpha_k + (fpc_{2,k}).z_{kt} + \beta_k b_{kt-1} + \gamma_k def_{kt-1} + \varepsilon_t \qquad (2.b)$$

To check the validity of these arguments, we also carry out instrumental variable regressions where we instrument macro policy counter-cyclicality and verify that equations passing the over-identification tests confirm our results[16].

We focus our study on the industrialized OECD countries, i.e. we abstract from Central and Eastern European countries (Hungary, Poland, Slovakia, and the Check Republic), and emerging markets (Mexico, Turkey and South Korea). We end up with a panel of sixteen countries. We consider two time spans: 1990-2000 and 1990-2004, the main reasons why we focus on post 1990 periods, being that we want to include Germany to our sample[17].
Data used come from three different sources. Data on industry level real value added growth and labour productivity growth come from EU KLEMS dataset which provides annual industry level data for a large number of indicators. The primary source of data on industry financial dependence is Compustat which gathers balance sheets and income statements for US listed firms. We draw on Rajan and Zingales dataset to gather these indicators[18] and also on data from Raddatz (2006)[19] which has the advantage of being more industry disaggregated and covering other financial indicators. Finally macro policy cyclicality is estimated based on macroeconomic data from the OECD Economic Outlook dataset.

III. THE BASIC SPECIFICATION.

We first estimate the benchmark equations (1.a) and (1.b) which relate real value added growth and labour productivity growth to the interaction of external financial dependence and fiscal policy counter-cyclicality. Fiscal policy counter-cyclicality is measured using equation

[15] Results presented in this paper are based on the simple fiscal policy counter-cyclicality specification (2.a). Using specification (2.b) does not modify the qualitative conclusion that fiscal policy counter-cyclicality has a significant positive impact on growth.

[16] Next tables will show a large degree of similarity between OLS and IV estimations, thus confirming that our empirical strategy properly addresses the reverse causality issue, even in the case of OLS estimation.

[17] See appendix for country sample and other details on data.

[18] Data is accessible at the following address: http://faculty.chicagogsb.edu/luigi.zingales/research/financing.htm

(2.a) where the LHS variable is either total fiscal balance to GDP or alternatively primary fiscal balance to GDP. Hence a larger regression coefficient in equation (2) reflects a more counter-cyclical fiscal policy. Table 1 and table 2 provide the results of this estimation.

The two first columns of each table present results for the period 1990-2000, the two last columns present results for the period 1990-2004, fiscal policy counter-cyclicality being measured in each case on the relevant time span. The results of these estimations show that both real value added growth and labour productivity growth are significantly affected by the interaction of financial dependence and fiscal policy counter-cyclicality. In other words industries tend to grow faster when fiscal policy is more counter-cyclical and the more so for industries with higher external financial dependence.

Table 1: Real Value Added Growth and Fiscal Policy Counter-cyclicality

Estimation Period	(i) 1990-2000	(ii) 1990-2000	(iii) 1990-2004	(iv) 1990-2004
Log of initial share in manufacturing Value Added	**-0.0136** (0.0053)**	**-0.0138*** (0.0053)**	**-0.00940** (0.0040)**	**-0.0104*** (0.0040)**
(External Financial dependence) × (Net Fiscal Balance to GDP counter-Cyclicality)	**0.0535*** (0.019)**		**0.0390** (0.017)**	
(External Financial dependence) × (Net Primary Fiscal Balance to GDP counter-Cyclicality)		**0.0507*** (0.017)**		**0.0422*** (0.015)**
Observations	534	534	533	533
R-squared	0.45	0.45	0.44	0.45

Note: The dependent variable is the annual growth rate in real value added for the period indicated in each column for each ISIC industry in eahc country. External financial dependence is the fraction of capital expenditures not financed with internal funds for US firms in the same indsutry between 1980-1990 computed on the basis of Raddatz (2007). Counter-cyclicality in fiscal policy is the regression coefficient of the output gap when regressing the fiscal policy indicator indicated in each row on a constant and the output gap. The interaction variable is the product of external financial dependence and counter-cyclicality in fiscal policy. Robust standard errors in parentheses. All estimations include country and sector dummies. *** (resp. **; *) indicate a singificance level of 1% (resp. 5%; 10%)

[19] Raddatz (2006), "Liquidity needs and vulnerability to financial underdevelopment," Journal of Financial Economics vol. 80 pp. 677-722.

Table 2: Labor Productivity Growth and Fiscal Policy Counter-cyclicality				
Estimation Period	(i) 1990-2000	(ii) 1990-2000	(iii) 1990-2004	(iv) 1990-2004
Log of initial Labor Productivity	**-0.113*** (0.011)**	**-0.112*** (0.011)**	**-0.0789*** (0.011)**	**-0.0785*** (0.011)**
(External Financial dependence) × (Net Fiscal Balance counter-Cyclicality)	**0.0225** (0.0097)**		**0.0186* (0.011)**	
(External Financial dependence) × (Net Primary Fiscal Balance counter-Cyclicality)		**0.0220*** (0.0081)**		**0.0217** (0.0097)**
Observations	528	528	527	527
R-squared	0.73	0.73	0.64	0.64

Note: The dependent variable is the annual growth rate in labor productivity for the period indicated in each column for each ISIC industry in each country. External financial dependence is the fraction of capital expenditures not financed with internal funds for US firms in the same indsutry between 1980-1990 computed on the basis of Raddatz (2007). Counter-cyclicality in fiscal policy is the regression coefficient of the output gap when regressing the fiscal policy indicator indicated in each row on a constant and the output gap. The interaction variable is the product of external financial dependence and counter-cyclicality in fiscal policy. Robust standard errors in parentheses. All estimations include country and sector dummies. *** (resp. **; *) indicate a singificance level of 1% (resp. 5%; 10%)

The natural question is then how big are the numbers estimated? To give a sense of the magnitudes involved here, we compute the growth gain for an industry moving from the 25% to the 75% percentile in external financial dependence in a country where fiscal policy counter-cyclicality would also move from the 25% to the 75% percentile. The approximate growth gain in terms of real value added is between one and a half and two and a half percentage points per year while the growth gain in terms of productivity growth is around one percentage point per year.

Estimation	(i)	(ii)	(iii)	(iv)
Table 1. Differential in Real Value Added growth	2,55%	2,18%	1,54%	2,04%
Table 2. Differential in Labour Productivity growth	1,06%	0,89%	0,73%	0,82%

These numbers are fairly large especially if compared with the original results of Rajan and Zingales. According to their results the real value added growth gain to moving from the 25% to the 75% percentile in terms of financial development and external financial dependence is roughly about 1% per year. Hence our estimates for real value added growth are twice larger than theirs while our estimates for labour productivity growth are as large as their estimates for real value added growth. Differences in counter-cyclicality can hence be considered as an important driver of differences in value added and productivity growth at the industry level.

Before going into further investigation, we provide two tables (table 3 and table 4) which are exactly similar to respectively table 1 and table 2 apart from the external financial dependence indicator. In the two previous tables, external financial dependence was computed on the basis of a four digit level industry desegregation coming from Raddatz (2006). In table 3 and table 4, external financial dependence indicators are computed thanks to data provided by Rajan and Zingales based on industry desegregation at the three digit level. Hence we investigate whether the underlying desegregation level of explanatory variables is important, to assess the robustness of our results.

Table 3 and table 4 essentially show that the interaction term between external financial dependence and fiscal policy counter-cyclicality is still significant when external financial dependence is computed on the basis of three digit desegregated data. However significance is lower. Hence we stick in next regressions to the four digit level data to compute our indicator of external financial dependence.

Table 3: Real Value Added Growth and Fiscal Policy Counter-cyclicality

Estimation Period	(i) 1990-2000	(ii) 1990-2000	(iii) 1990-2004	(iv) 1990-2004
Log of initial share in manufacturing Value Added	**-0.00962** **(0.0040)**	**-0.00970** **(0.0040)**	**-0.00676** **(0.0032)**	**-0.00697** **(0.0032)**
(External Financial dependence) × (Net Fiscal Balance counter-Cyclicality)	**0.0328*** **(0.019)**		**0.0214*** **(0.014)**	
(External Financial dependence) × (Net Primary Fiscal Balance counter-Cyclicality)		**0.0339**** **(0.017)**		**0.0250*** **(0.013)**
Observations R-squared	534 0.45	534 0.45	533 0.44	533 0.45

Note: The dependent variable is the annual growth rate in real value added for the period indicated in each column for each ISIC industry in eahc country. External financial dependence is the fraction of capital expenditures not financed with internal funds for US firms in the same indsutry between 1980-1990 computed on the basis of Rajan and Zingales (1998). Counter-cyclicality in fiscal policy is the regression coefficient of the output gap when regressing the fiscal policy indicator indicated in each row on a constant and the output gap. The interaction variable is the product of external financial dependence and counter-cyclicality in fiscal policy. Robust standard errors in parentheses. All estimations include country and sector dummies. *** (resp. **; *) indicate a singificance level of 1% (resp. 5%; 10%)

Table 4: Labor Productivity Growth and Fiscal Policy Counter-cyclicality				
Estimation Period	(i) 1990-2000	(ii) 1990-2000	(iii) 1990-2004	(iv) 1990-2004
Log of initial Labor Productivity	**-0.113*** **(0.011)**	**-0.113*** **(0.011)**	**-0.0793*** **(0.011)**	**-0.0791*** **(0.011)**
(External Financial dependence) × (Net Fiscal Balance counter-Cyclicality)	**0.0263**** **(0.012)**		**0.0169*** **(0.009)**	
(External Financial dependence) × (Net Primary Fiscal Balance counter-Cyclicality)		**0.0254**** **(0.011)**		**0.0191*** **(0.010)**
Observations	528	528	527	527
R-squared	0.73	0.73	0.64	0.64

Note: The dependent variable is the annual growth rate in labor productivity for the period indicated in each column for each ISIC industry in each country. External financial dependence is the fraction of capital expenditures not financed with internal funds for US firms in the same indsutry between 1980-1990 computed on the basis of Rajan and Zingales (1998). Counter-cyclicality in fiscal policy is the regression coefficient of the output gap when regressing the fiscal policy indicator indicated in each row on a constant and the output gap. The interaction variable is the product of external financial dependence and counter-cyclicality in fiscal policy. Robust standard errors in parentheses. All estimations include country and sector dummies. *** (resp. **; *) indicate a singificance level of 1% (resp. 5%; 10%)

IV. OPENING THE FISCAL POLICY BOX.

If fiscal policy, understood as fiscal balance, counter-cyclicality promotes growth in terms of value added and labour productivity, one is inclined to ask which component of fiscal policy is doing the job and which part of fiscal policy has no effect on growth. To provide a possible answer to this question, we examine two different decompositions. First we split fiscal policy into receipts and expenditures and ask which counter-cyclicality is (more) important for growth. Second, we divide fiscal expenditures between government consumption and government investment and ask a similar question.

Table 5.a: Real Value Added Growth and Fiscal Policy Counter-cyclicality				
Estimation Period	(i) 1990-2000	(ii) 1990-2000	(iii) 1990-2004	(iv) 1990-2004
Log of initial share in manufacturing Value Added	**-0.0102** **(0.0040)**	**-0.0137*** **(0.0052)**	**-0.00688** **(0.0032)**	**-0.0109*** **(0.0036)**
(External Financial dependence) × (Governement Receipts counter-Cyclicality)	**0.0435*** **(0.025)**		**0.0289** **(0.021)**	
(External Financial dependence) × (Governement Expenditures counter-Cyclicality)		**0.0907*** **(0.031)**		**0.0451**** **(0.018)**
Observations R-squared	534 0.44	534 0.45	533 0.44	493 0.40

Note: The dependent variable is the annual growth rate in real value added for the period indicated in each column for each ISIC industry in eahc country. External financial dependence is the fraction of capital expenditures not financed with internal funds for US firms in the same indsutry between 1980-1990 computed on the basis of Raddatz (2007). Govenrment receipts (resp. expenditures) counter-cyclicality is the regression coefficient (resp. the opposite of the regression coefficient) of the output gap when regressing government receipts (resp. expenditures) to GDP on a constant and the output gap. The interaction variable is the product of external financial dependence and counter-cyclicality in the relevant fiscal policy indicator. Robust standard errors in parentheses. All estimations include country and sector dummies. *** (resp. **; *) indicate a singificance level of 1% (resp. 5%; 10%)

Counter-cyclicality in government receipts does not seem to play a significant role neither for real value added growth nor for labour productivity growth. As far as the first question is concerned (table 5.a and table 5.b), results show that the positive effect on growth of fiscal balance counter-cyclicality is mainly coming from counter-cyclicality in expenditures. This suggests that the simple effect of automatic stabilizers which presumably is a more important driver of government receipts than government expenditures counter-cyclicality is not the phenomenon we capture through the positive impact of fiscal policy counter-cyclicality. It rather seems that discretionary counter-cyclical fiscal policy which probably applies more directly to government expenditures than government receipts does have a positive growth effect.

Table 5.b: Labor Productivity Growth and Fiscal Policy Counter-cyclicality				
Estimation Period	(i) 1990-2000	(ii) 1990-2000	(iii) 1990-2004	(iv) 1990-2004
Log of initial Labor Productivity	**-0.113*** **(0.0045)**	**-0.113*** **(0.0044)**	**-0.0788*** **(0.0044)**	**-0.0797*** **(0.0044)**
(External Financial dependence) × (Governement Receipts counter-Cyclicality)	**0.0199** **(0.013)**		**0.0212** **(0.013)**	
(External Financial dependence) × (Governement Expenditures counter-Cyclicality)		**0.0381*** **(0.011)**		**0.0219**** **(0.010)**
Observations R-squared	528 0.73	528 0.73	527 0.64	487 0.65

Note: The dependent variable is the annual growth rate in real value added for the period indicated in each column for each ISIC industry in eahc country. External financial dependence is the fraction of capital expenditures not financed with internal funds for US firms in the same indsutry between 1980-1990 computed on the basis of Raddatz (2007). Govenrment receipts (resp. expenditures) counter-cyclicality is the regression coefficient (resp. the opposite of the regression coefficient) of the output gap when regressing government receipts (resp. expenditures) to GDP on a constant and the output gap. The interaction variable is the product of external financial dependence and counter-cyclicality in the relevant fiscal policy indicator. Robust standard errors in parentheses. All estimations include country and sector dummies. *** (resp. **; *) indicate a singificance level of 1% (resp. 5%; 10%)

Next we focus on government expenditures and ask which type of expenditure can have a positive impact on growth through higher counter-cyclicality? To do so we adopt a simple decomposition of expenditures between consumption and investment. Table 6.a and table 6.b basically show that both government consumption counter-cyclicality and government investment counter-cyclicality correlate positively and significantly with industry growth.

Table 6.a: Real Value Added Growth and Fiscal Policy Counter-cyclicality				
Estimation Period	(i) 1990-2000	(ii) 1990-2000	(iii) 1990-2004	(iv) 1990-2004
Log of initial share in manufacturing Value Added	**-0.0163*** **(0.0045)**	**-0.0171*** **(0.0048)**	**-0.0122*** **(0.0037)**	**-0.0117*** **(0.0040)**
(External Financial dependence) × (Governement Consumption counter-Cyclicality)	**0.230*** **(0.063)**		**0.153*** **(0.045)**	
(External Financial dependence) × (Governement Investment counter-Cyclicality)		**0.191**** **(0.081)**		**0.0488*** **(0.012)**
Observations R-squared	476 0.46	436 0.39	475 0.46	435 0.40

Note: The dependent variable is the annual growth rate in real value added for the period indicated in each column for each ISIC industry in eahc country. External financial dependence is the fraction of capital expenditures not financed with internal funds for US firms in the same indsutry between 1980-1990 computed on the basis of Raddatz (2007). Govenrment consumption (resp. investment) counter-cyclicality is the opposite of the regression coefficient of the output gap when regressing government consumption (resp. investment) to GDP on a constant and the output gap. The interaction variable is the product of external financial dependence and counter-cyclicality in the relevant fiscal policy indicator. Robust standard errors in parentheses. All estimations include country and sector dummies. *** (resp. **; *) indicate a singificance level of 1% (resp. 5%; 10%)

Table 6.b: Labor Productivity Growth and Fiscal Policy Counter-cyclicality				
Estimation Period	(i) 1990-2000	(ii) 1990-2000	(iii) 1990-2004	(iv) 1990-2004
Log of initial Labor Productivity	**-0.115*** **(0.0049)**	**-0.118*** **(0.0048)**	**-0.0796*** **(0.0048)**	**-0.0813*** **(0.0049)**
(External Financial dependence) × (Governement Consumption counter-Cyclicality)	**0.0886*** **(0.032)**		**0.0708**** **(0.028)**	
(External Financial dependence) × (Governement Investment counter-Cyclicality)		**0.130*** **(0.041)**		**0.0301**** **(0.014)**
Observations R-squared	474 0.75	434 0.75	473 0.64	433 0.64

Note: The dependent variable is the annual growth rate in real value added for the period indicated in each column for each ISIC industry in eahc country. External financial dependence is the fraction of capital expenditures not financed with internal funds for US firms in the same indsutry between 1980-1990 computed on the basis of Raddatz (2007). Govenrment consumption (resp. investment) counter-cyclicality is the opposite of the regression coefficient of the output gap when regressing government consumption (resp. investment) to GDP on a constant and the output gap. The interaction variable is the product of external financial dependence and counter-cyclicality in the relevant fiscal policy indicator. Robust standard errors in parentheses. All estimations include country and sector dummies. *** (resp. **; *) indicate a singificance level of 1% (resp. 5%; 10%)

Hence there is no distinction that can be drawn between government consumption which could be regarded as unproductive and government investment which could be regarded as (more) productive. One reason for this result is possibly that countries where government consumption is more counter-cyclical are also countries where government consumption is more productive in the sense that it is more used as a substitute to private demand to firms, especially in downturns.

V. CYCLE VS. TREND.

Up to now, we have provided evidence that the cyclical component of fiscal policy can indeed play a significant role in differences in value added and labour productivity growth. However there are two simple competing stories which can also embed a priori some explanatory power of growth differences. First if the cyclical component of macroeconomic policy does play a significant role in growth, it is also possible that the structural component of macroeconomic policy play a similar role. Indeed traditional growth theories rather focus on that component of macro policy, stressing the role of research and development or education in labour productivity growth. Hence we need to confront the preliminary evidence presented up to now to the alternative view that growth is driven by the structural component of macro policy. Second a large part of the growth literature stresses the impact of financial constraints. Hence, it seems natural to confront our results to the possibility that fiscal policy counter-

cyclicality is simply a proxy for financial development, which could be a very natural outcome[20].

In the two next tables, we test how the effect of fiscal policy counter-cyclicality on growth compares with the effect of financial development. As previously, we focus on two different indicators for fiscal policy: total and primary fiscal balance counter-cyclicality. As to financial development, we also use two different indicators: private credit to GDP and stock market capitalization to GDP. For value added growth as for labour productivity growth, we do not find any case where the effect of counter-cyclical fiscal policy is not robust to introducing financial development.

Table 7: Real Value Added Growth Fiscal Policy Counter-cyclicality and Stock Market Development

Estimation Period	(i) 1990-2000	(ii) 1990-2004	(iii) 1990-2000	(iv) 1990-2004
Log of initial share in manufacturing Value Added	**-0.0182*** (0.0061)**	**-0.0118*** (0.0037)**	**-0.00954** (0.0040)**	**-0.0108*** (0.0041)**
(Financial dependence) × (Fiscal Balance counter-Cyclicality)	**0.0796*** (0.027)**	**0.0506*** (0.018)**		
(Financial dependence) × (Primary Balance counter-Cyclicality)			**0.0806*** (0.025)**	**0.0618** (0.025)**
(Financial Dependence) × (Stock Market Cap. to GDP)	**-0.0547 (0.051)**	**-0.0279 (0.032)**	**-0.0723 (0.053)**	**-0.0500 (0.047)**
Observations	494	534	494	493
R-squared	0.40	0.45	0.40	0.41

Note: The dependent variable is the annual growth rate in real value added growth for the period indicated in each column for each ISIC industry in each country. External financial dependence is the fraction of capital expenditures not financed with internal funds for US firms in the same indsutry between 1980-1990 computed on the basis of Raddatz (2007). Counter-cyclicality in fiscal policy is the regression coefficient of the output gap when regressing the fiscal policy indicator indicated in each row on a constant and the output gap. The interaction variable is the product of external financial dependence and counter-cyclicality in fiscal policy. Stock Market Cap. to GDP is the stock market capitalization to GDP in 1990. Robust standard errors in parentheses. All estimations include country and sector dummies. *** (resp. **; *) indicate a singificance level of 1% (resp. 5%; 10%)

Hence we can conclude that the growth effect of cyclical macro policy is at least as important as can be the growth effect of structural reforms in the sense of fostering financial development or reducing barriers to access finance. While this sounds like an incredibly challenging result, it worth noting that the effect of financial development itself as highlighted by Rajan and Zingales in their paper is not robust to the sample we use here. Put differently the result that financial development raises growth at the industry level and more so for high financial dependence industry does not hold when focusing on developed OECD countries as we do here. Hence it is not surprising that we also end up with a similar result although with

[20] Aghion and Marisnecu (2007) provide evidence that there exists a positive relationship between fiscal policy counter-cyclicality and financial development.

different data for a different period. While this general result clearly deserves more scrutiny to be taken for granted[21], an important policy implications is that structural reforms should go hand in hand with a reform in the design of cyclical macro policy.

Table 8: Labour Productivity Growth, Fiscal Policy Counter-cyclicality and Private Credit

Estimation Period	(i) 1990-2000	(ii) 1990-2004	(iii) 1990-2000	(iv) 1990-2004
Log of initial share in manufacturing Value Added	**-0.114*** (0.0048)**	**-0.0799*** (0.0048)**	**-0.113*** (0.0048)**	**-0.0794*** (0.0048)**
(Financial dependence) × (Fiscal Balance counter-Cyclicality)	**0.0178* (0.0096)**	**0.0090** (0.0031)**		
(Financial dependence) × (Primary Balance counter-Cyclicality)			**0.0192** (0.0086)**	**0.0618** (0.025)**
(Financial Dependence) × (Private Credit to GDP)	**0.0115 (0.017)**	**0.0219 (0.016)**	**0.00737 (0.017)**	**0.0105 (0.017)**
Observations	501	500	501	500
R-squared	0.73	0.63	0.73	0.63

Note: The dependent variable is the annual growth rate in real value added growth for the period indicated in each column for each ISIC industry in each country. External financial dependence is the fraction of capital expenditures not financed with internal funds for US firms in the same indsutry between 1980-1990 computed on the basis of Raddatz (2007). Counter-cyclicality in fiscal policy is the regression coefficient of the output gap when regressing the fiscal policy indicator indicated in each row on a constant and the output gap. The interaction variable is the product of external financial dependence and counter-cyclicality in fiscal policy. Private Credit to GDP is the ratio of private credit to GDP in 1990. Robust standard errors in parentheses. All estimations include country and sector dummies. *** (resp. **; *) indicate a singificance level of 1% (resp. 5%; 10%)

In drawing a difference between the cyclical component of macro policy and the structural factors that shape the economic environment, it also important to determine if counter-cyclical fiscal policy is good for growth because counter-cyclicality is valuable on its own or because the positive growth impact of counter-cyclicality simply reflects the positive growth effect of the structural component of fiscal policy. For instance if differences in fiscal balance counter-cyclicality systematically vary with differences in average fiscal balance across countries, then what we consider as the effect of counter-cyclical fiscal policy could simply be the effect different average fiscal policies. It could be the case that more counter-cyclical countries are also countries where fiscal discipline is larger and we could be mistakenly attribute to fiscal counter-cyclicality what in reality is a result of fiscal discipline. To study this question, we run a horse race regression with counter-cyclicality in total fiscal balance (resp. primary fiscal

[21] Although we simply present regressions with real value added growth as a dependent variable, the same result applies to labour productivity growth and also to a number of other financial variables, including liquid liabilities to GDP, private credit by banks and stock market turnover ratio. The result also holds when fiscal policy counter-cyclicality is introduced with average inflation, average openness to trade or average current account balance to GDP.

balance) to GDP on the one hand and the average fiscal balance (resp. average primary balance) to GDP on the other hand.

Table 9: Real Value Added Growth, Fiscal Policy Counter-cyclicality and Average Fiscal Balance

Estimation Period	(i) 1990-2000	(ii) 1990-2004	(iii) 1990-2000	(iv) 1990-2004
Log of initial share in manufacturing Value Added	**-0.0144*** (0.0054)**	**-0.00982** (0.0040)**	**-0.0138*** (0.0053)**	**-0.0105*** (0.0034)**
(Financial dependence) × (Fiscal Balance counter-Cyclicality)	**0.0455** (0.020)**	**0.0365** (0.017)**		
(Financial dependence) × (Primary Balance counter-Cyclicality)			**0.0543*** (0.018)**	**0.0315** (0.013)**
(Financial Dependence) × (Average Fiscal Balance to GDP)	**0.00912 (0.0066)**	**0.00508 (0.0060)**		
(Financial Dependence) × (Average Primary Balance to GDP)			**0.00294 (0.0065)**	**0.00854* (0.0047)**
Observations	534	533	534	533
R-squared	0.45	0.44	0.45	0.45

Note: The dependent variable is the annual growth rate in real value added for the period indicated in each column for each ISIC industry in each country. Financial dependence is the fraction of capital expenditures not financed with internal funds for US firms in the same indsutry between 1980-1990 computed on the basis of Raddatz (2007). Counter-cyclicality in fiscal policy is the regression coefficient of the output gap when regressing the fiscal policy indicator indicated in each row on a constant and the output gap. The interaction variable is the product of financial dependence and counter-cyclicality in fiscal policy. Average fiscal balance to GDP (resp. primary balance to GDP) is the mean fiscal balance to GDP (resp. primary balance to GDP) over the estimation period. Robust standard errors in parentheses. All estimations include country and sector dummies. *** (resp. **; *) indicate a singificance level of 1% (resp. 5%; 10%)

Table 9 and table 10 show that both the average level of the total fiscal balance to GDP and the average level for the primary fiscal balance to GDP ratio do not in general embed any significant explanatory power to account for value added growth and labour productivity growth. Moreover the effect of counter-cyclical fiscal balance (total as well as primary) is still significant, this implying that the effect of counter-cyclical fiscal policy on growth does no go through the structural component of fiscal policy. Note however that the last column of both table 9 and table 10 shows that the interaction between industry external financial dependence and average fiscal balance to GDP is significant at the 10% level thus suggesting that over the recent period, the average fiscal balance has become more important for growth.

Table 10: Labour Productivity Growth Fiscal Policy Counter-cyclicality and Average Fiscal Balance				
Estimation Period	(i) 1990-2000	(ii) 1990-2004	(iii) 1990-2000	(iv) 1990-2004
Log of initial share in manufacturing Value Added	**-0.113*** (0.011)**	**-0.0789*** (0.0044)**	**-0.112*** (0.011)**	**-0.0780*** (0.011)**
(Financial dependence) × (Fiscal Balance counter-Cyclicality)	**0.0206** (0.0097)**	**0.0184** (0.0084)**		
(Financial dependence) × (Primary Balance counter-Cyclicality)			**0.0221** (0.010)**	**0.0113** (0.005)**
(Financial Dependence) × (Average Fiscal Balance to GDP)	**0.00190 (0.0035)**	**0.000289 (0.0027)**		
(Financial Dependence) × (Average Primary Balance to GDP)			**0.000118 (0.0045)**	**0.00826* (0.0045)**
Observations R-squared	528 0.73	527 0.64	528 0.73	527 0.65

Note: The dependent variable is the annual growth rate in labour productivity for the period indicated in each column for each ISIC industry in each country. Financial dependence is the fraction of capital expenditures not financed with internal funds for US firms in the same indsutry between 1980-1990 computed on the basis of Raddatz (2007). Counter-cyclicality in fiscal policy is the regression coefficient of the output gap when regressing the fiscal policy indicator indicated in each row on a constant and the output gap. The interaction variable is the product of financial dependence and counter-cyclicality in fiscal policy. Average fiscal balance to GDP (resp. primary balance to GDP) is the mean fiscal balance to GDP (resp. primary balance to GDP) over the estimation period. Robust standard errors in parentheses. All estimations include country and sector dummies. *** (resp. **; *) indicate a singificance level of 1% (resp. 5%; 10%)

VI. INSTRUMENTAL VARIABLE ESTIMATION.

An important limit to the empirical investigation we carry out in this paper is the fact that counter-cyclicality of macro policy cannot be observed. It can only be inferred through a regression. This can pose a number of problems. Among these problems lies the fact that counter-cyclicality is measured with a standard error. Hence OLS estimation is not consistent as long as we do not observe the "true" value of counter-cyclicality but a "noisy" one. Reducing the impact of this problem on the significance of our results can be done through instrumental variable estimations. Hence we instrument fiscal policy counter-cyclicality with a number of variables which have two characteristics. First, these variables are directly observed, none is inferred from another model. Second they are all predetermined with respect to the counter-cyclicality index we instrument. This means that the period the instruments are observed on is anterior to the period on which counter-cyclicality has been computed. We use as instruments the log of GDP per capita in 1989, the average trade to GDP ratio for 1980-1989, the average share of labour force with secondary education for 1980-1989 and the average gross private capital flows to GDP for 1980-1989.

The instrumental variable estimations are hence an attempt to determine whether the interaction between financial dependence and fiscal policy counter-cyclicality is a significant determinant of industry level growth because the standard errors around the estimates of counter-cyclicality have not been properly taken into account in the estimations.

Table 11: Industry Real Value Growth and Fiscal Deficit Counter-cyclicality. Instrumental variables estimation

Estimation Period	(i) 1990-2000	(ii) 1990-2000	(iii) 1990-2004	(iv) 1990-2004
Log of initial share in manufacturing Value Added	**-0.0117** (0.0053)**	**-0.0126*** (0.0045)**	**-0.0122** (0.0053)**	**-0.0102** (0.0044)**
(External Financial dependence) × (Net Fiscal Balance to GDP counter-Cyclicality)	**0.0334** (0.016)**		**0.0348** (0.015)**	
(External Financial dependence) × (Net Primary Fiscal Balance to GDP counter-Cyclicality)		**0.0776*** (0.025)**		**0.0457*** (0.016)**
Hansen J Test (p. value)	0.1962	0.1485	0.1891	0.2886
Observations	513	533	513	512
R-squared	0.48	0.43	0.48	0.47

Note: The dependent variable is the annual growth rate in real value added for the period indicated in each column for each ISIC industry in eahc country. External financial dependence is the fraction of capital expenditures not financed with internal funds for US firms in the same indsutry between 1980-1990. Counter-cyclicality in fiscal policy is the regression coefficient of the output gap when regressing the fiscal policy indicator indicated in each row on a constant and the output gap. The interaction variable is the product of external financial dependence and counter-cyclicality in fiscal policy. Instrumental variables are the interaction of external financial dependence on the one hand and log of GDP per capita in 1990, average trade to GDP ratio for 1980-1989, averge share of labor force with secondary education for 1980-1989 and average gross private capital flows to GDP for 1980-1989 on the other hand. Robust standard errors in parentheses. All estimations include country and sector dummies. *** p<0.01, ** p<0.05, * p<0.1.

Table 11 and table 12 provide estimations where fiscal policy counter-cyclicality is instrumented as described above. Two main conclusions emerge from these estimations. First the positive effect of counter-cyclical fiscal policy on growth is robust to the instrumental variable estimation. For both value added growth and labour productivity growth, the results show that higher counter-cyclicality in fiscal policy significantly improves the growth performance of the economy. The second conclusions that bears attention is that the magnitudes estimated in the IV estimations are roughly similar to those we first estimated especially in table 1 and table 2. Using instruments to estimate the effect of fiscal policy counter-cyclicality does not appear to modify at the first order the estimated differential in real value added and labour productivity growth rates. While we do acknowledge that this deserves further confirmation, these last results seem to show that the effect of counter-cyclical fiscal policy on growth is significant and can be sizeable.

Table 12: Industry Labor Productivity Growth and Fiscal Deficit Counter-cyclicality. Instrumental variables estimation

Estimation Period	(i) 1990-2000	(ii) 1990-2000	(iii) 1990-2004	(iv) 1990-2004
Log of initial share in manufacturing Value Added	**-0.112*** (0.011)**	**-0.0783*** (0.010)**	**-0.112*** (0.011)**	**-0.0780*** (0.011)**
(External Financial dependence) × (Net Fiscal Balance to GDP counter-Cyclicality)	**0.0179* (0.0093)**		**0.0176** (0.0087)**	
(External Financial dependence) × (Net Primary Fiscal Balance to GDP counter-Cyclicality)		**0.0473*** (0.015)**		**0.0277*** (0.010)**
Hansen J Test (p. value)	0.5361	0.9571	0.4024	0.1186
Observations	507	527	507	506
R-squared	0.74	0.63	0.74	0.64

Note: The dependent variable is the annual growth rate in labour productivity for the period indicated in each column for each ISIC industry in eahc country. External financial dependence is the fraction of capital expenditures not financed with internal funds for US firms in the same indsutry between 1980-1990. Counter-cyclicality in fiscal policy is the regression coefficient of the output gap when regressing the fiscal policy indicator indicated in each row on a constant and the output gap. The interaction variable is the product of external financial dependence and counter-cyclicality in fiscal policy. Instrumental variables are the interaction of external financial dependence on the one hand and log of GDP per capita in 1990, average trade to GDP ratio for 1980-1989, average share of labor force with secondary education for 1980-1989 and average gross private capital flows to GDP for 1980-1989 on the other hand. Robust standard errors in parentheses. All estimations include country and sector dummies. *** p<0.01, ** p<0.05, * p<0.1.

VII. CONCLUSIONS.

In this paper we have tried to evaluate whether and how the cyclical pattern of macro policy can affect growth, focusing on fiscal policy. Following the Rajan-Zingales (1998) methodology, we have drawn a relationship between fiscal policy counter-cyclicality – measured at the macro level– and growth (both value added and productivity) at the industry level. This simple methodology has the advantage to properly handle the reverse causality issue: namely that within our setup, fiscal policy can affect growth while the opposite is not possible because the former is measured at the macro level while the latter is measured at the industry level. Based on this framework, we have provided evidence that (i) industries have grown faster in economies where fiscal policy has been more counter-cyclical, both in terms of output and productivity (ii) that the positive growth effects of fiscal policy counter-cyclicality have been larger for industries which rely proportionally more on external finance. These two conclusions have been shown to be robust to the inclusion of a large number of structural macroeconomic variables, including financial development, openness to trade or net current account position. Hence, the cyclical pattern of fiscal policy is probably at least as important as can be structural features in their impact on growth.

The results have three different consequences for future research. First they call for a wide renewal of theoretical research on the business cycle and growth to build a proper assessment of the interactions that exist between them especially through the financial channel. Second, a natural question that emerges from this paper is whether and how the results on fiscal policy counter-cyclicality extend to monetary policy counter-cyclicality. This is an important question as monetary policy can move more easily than fiscal policy, although transmission lags can be larger for the former than the latter. Finally if the conclusion that counter-cyclicality in macro policy contributes to raise growth proves to be relevant, them comes the question of the determinants of counter-cyclicality and especially the institutional arrangements that can foster or prevent counter-cyclicality. This final theme could be of great importance to revisit the debate on growth and institutions.

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APPENDIX.

List of countries in the sample

Austria, Belgium, Germany, Denmark, Spain, Finland, France, Great-Britain, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, Portugal, Sweden.

List of industries

Description	ISIC rev.3 code
FOOD , BEVERAGES AND TOBACCO	15t16
Food and beverages	15
Tobacco	16
TEXTILES, TEXTILE , LEATHER AND FOOTWEAR	17t19
Textiles and textile	17t18
Textiles	17
Wearing apparel, dressing and dying of fur	18
Leather, leather and footwear	19
WOOD AND OF WOOD AND CORK	20
PULP, PAPER, PAPER , PRINTING AND PUBLISHING	21t22
Pulp, paper and paper	21
Printing, publishing and reproduction	22
Publishing	221
Printing and reproduction	22x
CHEMICAL, RUBBER, PLASTICS AND FUEL	23t25
Coke, refined petroleum and nuclear fuel	23
Chemicals and chemical	24
Pharmaceuticals	244
Chemicals excluding pharmaceuticals	24x
Rubber and plastics	25
OTHER NON-METALLIC MINERAL	26
BASIC METALS AND FABRICATED METAL	27t28
Basic metals	27
Fabricated metal	28
MACHINERY, NEC	29
ELECTRICAL AND OPTICAL EQUIPMENT	30t33
Office, accounting and computing machinery	30
Electrical engineering	31t32
Electrical machinery and apparatus, nec	31
Insulated wire	313
Other electrical machinery and apparatus nec	31x
Radio, television and communication equipment	32
Electronic valves and tubes	321
Telecommunication equipment	322
Radio and television receivers	323
Medical, precision and optical instruments	33
Scientific instruments	331t3
Other instruments	334t5
TRANSPORT EQUIPMENT	34t35
Motor vehicles, trailers and semi-trailers	34
Other transport equipment	35
Building and repairing of ships and boats	351
Aircraft and spacecraft	353
Railroad equipment and transport equipment nec	35x

MANUFACTURING NEC; RECYCLING	36t37
Manufacturing nec	36
Recycling	37

Data Sources

Variable	**Source**
Real Value Added Growth	EU KLEMS
Labour Productivity Growth	EU KLEMS
External financial Dependence	Compustat
Output Gap	OECD Economic Outlook
Fiscal Balance to GDP	OECD Economic Outlook
Primary Balance to GDP	OECD Economic Outlook
Fiscal expenditures to GDP	OECD Economic Outlook
Fiscal receipts to GDP	OECD Economic Outlook
Government consumption to GDP	OECD Economic Outlook
Government investment to GDP	OECD Economic Outlook
Private Credit to GDP	World Development Indicators
Stock market capitalisation to GDP	World Development Indicators
GDP per capita	World Development Indicators
trade to GDP	World Development Indicators
share of labour force with secondary education	World Development Indicators
gross private capital flows to GDP	World Development Indicators