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Planned fiscal consolidations and growth forecast errors: New panel evidence on fiscal multipliers

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Planned Fiscal Consolidations and Growth Forecast Errors - New Panel Evidence on Fiscal Multipliers

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Ansgar Belke, Dominik Kronen, and Thomas Osowski¹

Planned Fiscal Consolidations and Growth Forecast Errors - New Panel Evidence on Fiscal Multipliers

Abstract

This paper analyzes the effect of planned fiscal consolidation on GDP growth forecast errors from the years 2010 – 2013 using cross section analyses and fixed effects estimations. Our main findings are that fiscal multipliers have been underestimated in most instances for the year 2011 while we find little to no evidence for the years 2010 and especially the latter years 2012/13. Since the underestimation of fiscal multipliers seems to have decreased over time, it may indicate learning effects of forecasters. However, the implications for fiscal policy should be considered with caution as a false forecast of fiscal multipliers does not confirm that austerity is the wrong fiscal approach but only suggests a too optimistic assessment of fiscal multipliers for the year 2011.

JEL Classification: C23, E61, E62, G01

Keywords: Fiscal multiplier; austerity; growth forecast errors; panel econometrics

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1. Introduction

Before the beginning of the financial crisis in 2008, there was broad agreement among macro-economists that short-run stabilization was nearly exclusively the province of monetary policy. The possibility to hit the lower zero bound on nominal interest rates was considered to be a minor issue and even in this unlikely event that it did bind, monetary authorities would have additional tools in place to mitigate adverse shocks. However, in presence of the large adverse shock generated by the outbreak of the financial crisis in 2008, central banks sharply reduced their policy interest rates and the constraint imposed by the zero lower bound turned out to be large (Romer 2011). Because of the magnitude of adverse effects, fiscal policy was rediscovered as a short-term stabilization tool. Therefore, large fiscal programs were launched as an immediate response to the crisis and triggered a large increase in public debt. Furthermore, public debt accelerated further as bailouts became necessary to rescue large parts of the financial sector and governmental revenue shrank due to a sharp economic decline.¹

As public debt growth accelerated and economic activity decreased, the rise of serious concerns about the ability of several European states² to meet their financial obligations marked the beginning of the European sovereign debt crisis in 2010. While the ECB took large actions in order to prevent a breakup of the Euro Area and to lower sovereign bond yields, fiscal policy in Europe entered the “age of austerity” (Ortiz/Cummins 2013). As the Euro Area is still struggling to recover from the recent crises, fiscal consolidation efforts are subjected to large criticism. As fiscal contraction can have strong negative effects on economic activity in the short-run, it is partly blamed for the weak economic development of the Euro Area. Fears are rising that austerity might be self-defeating in its task to reduce public indebtedness (De Grauwe/Ji 2013). As unemployment is high in large parts of the Euro Area, it might endanger the public support to effectively implement austerity policies and structural reforms. Furthermore, economic development in countries which are undertaking heavy fiscal consolidation has been quite disappointing even compared to original forecasts. In this aspect, it is frequently stated that the effects of austerity have been underestimated, as fiscal multipliers might be larger than normal due to the economic environment.

Regarding the magnitude of fiscal multipliers, economic theory does not provide a clear picture. Even with regard to the sign, there is no consensus among economic theories. While classic

¹ Between 2007 and 2010 the public debt-to-GDP ratio of the Euro Area increased from 66.3 to 85.3 percent.

² Namely, the so-called GIIPS (Greece, Ireland, Italy, Portugal, Spain).

Keynesian and New Keynesian models generally find multipliers to be positive, the effect of fiscal stimulus can be zero or even negative according to several neoclassical models as well as the Ricardian equivalence proposition (Ramey 2011). Furthermore, the question about the size of fiscal multipliers appears to be even more complicated as additional theoretical considerations as well as empirical evidence suggest that the magnitude of fiscal multipliers might depend on the economic environment (Romer 2011). Therefore, there might be no single multiplier measuring the effectiveness of fiscal stimulus as its size varies over time as well as across countries (Hernandez de Cos/Moral-Benito 2013).

With respect to the current economic environment, there are several reasons indicating that fiscal multipliers might be higher than in normal times. As nearly all major central banks have reached the zero lower bound on nominal interest rates, fiscal stimulus might be a powerful tool to boost aggregate demand as it is accommodated through a fixed zero policy rate (Corsetti et al. 2012). As shown theoretically by Christiano et al. (2011) and Woodford (2011), fiscal multipliers can exceed the value of three in presence of the binding zero bound and therefore can be higher than under normal monetary conditions.³ As the overall short-term effects of unconventional monetary policies are still on debate, fiscal impulses might be considered as one of the last tools to generate significant short-term effects.

Moreover, the position in the business cycle might strongly affect the impact of fiscal policy on output. The traditional argument stating that fiscal impulses crowd out private spending appears less applicable when output is below potential and capacities in the economy are available (Baum/Koester 2011). In line with standard Keynesian theory, empirical evidence finds significant differences in sizes of fiscal multipliers between down- and upturns. Baum et al. (2012) find evidence for the G7 countries (except Italy) that fiscal multipliers vary with the business cycle. Auerbach/Gorodnichenko (2012b) generate additional evidence for a large number of OECD countries. Using a regime-switching VAR, Batini et al. (2012) estimate the impact of fiscal adjustment in the United States, Europe and Japan, allowing fiscal multipliers to vary across recessions and booms. The authors find that fiscal multipliers appear to be much larger during recessions than during an expansion.⁴

³ See Wieland (2011) for empirical evidence. The upper bound on multipliers found by Wieland (2011) is about 1,5 and therefore smaller than suggested by Christiano et al. (2011) and Woodford (2011).

⁴ See also: Auerbach/Gorodnichenko (2012a), Hernández de Cos/Moral-Benito (2013), Baum/Koester(2011), Owyang et al. (2013) and Barro and Redlick (2011).

A deep recession might lead to even higher multipliers, if a period of economic slack is connected or even caused by high levels of stress in the banking sector. As a result, banks might reduce lending or increase risk premia on interest rates for loans severely constraining a large share of households as well as firms from credit funding. Since financial and banking stress raises the share of credit-constrained agents in the economy, fiscal multipliers might be higher, as consumption and investment are more dependent on current than future income and profits (Eggertson/ Krugman 2012).⁵

With regard to the current discussion about austerity in the Euro Area, it has to be highlighted that the level of fiscal debt might also influence the magnitude of the fiscal multiplier. The short-term effects on output of a fiscal consolidation in times of high levels of public debt can be lower, as it reduces the likelihood of strong distortion from large tax increases in the future (Corsetti et al. 2012). Perotti (1999) provides a theoretical model as well as empirical evidence for several countries.^{6,7} Furthermore, if additional fiscal stimuli generate or intensify doubts about public debt sustainability, it will lead to higher private-sector borrowing costs as well as higher interest payments of the sovereign (Abbas et al. 2013). High levels of debt can therefore decrease the effectiveness of fiscal expansion and fiscal stimuli might even be counterproductive.

According to the growing evidence on the regime-dependency of fiscal multipliers the current economic environment overall hints at larger-than-usual fiscal multipliers. With regard to the discrepancy between growth forecasts and actual growth rates for the Euro Area in recent years, it can be argued that growth forecasts have underestimated the magnitude of fiscal multipliers and therefore the short-term effects of austerity in the Euro Area. In this regard, the study of Blanchard/Leigh (2013) attracted considerable attention. The authors come to the conclusion that austerity has larger effects than previously forecasted as fiscal multipliers have been underestimated in advanced economies. Their results indicate that this has especially been the case for 2011 and to a lesser extent for the following years. However, the European Commission (2012) and Ikonen et al. (2013) come to different conclusions. Both sources find evidence that “it was the eruption of the sovereign debt crisis and the associated tightening of credit conditions that depressed domestic demand and ultimately caused the observed growth shortfall in several euro area countries” (Ikonen et al. 2013). Therefore, the current strand of empirical

⁵ Corsetti et al. (2012) find evidence that the effectiveness of fiscal stimulus is higher at times of a financial crisis.

⁶ Bertola/Drazen (1993) propose a theoretical model with similar predictions.

⁷ Further evidence is provided by Ilzetzki et al. (2010) and Corsetti et al. (2012).

literature suggests two explanations. While Blanchard/Leigh (2013) focus on the effects of austerity and higher-than-usual fiscal multipliers, EC (2012) and Ikonen et al. (2013) explain the discrepancy between forecast and actual growth as a result of fiscal vulnerabilities leading to the sovereign debt crisis.

The paper at hand closely follows the approach presented by Blanchard/Leigh (2013) to estimate whether the effectiveness of fiscal contraction has been underestimated in times of austerity. Focusing mainly on European countries between 2010 and 2013, we conduct cross section as well as fixed effect panel estimation and include several additional variables in order to check for robustness of our estimations.

Our findings can be summarized as follows: We find that large evidence of an underestimation of fiscal multipliers by forecasters can only be found for 2011 in both the IMF and EC data. Therefore, our results indicate that forecasts have underestimated the effects of fiscal contraction on GDP growth at least for 2011. With regard to the year 2010, we find that evidence is pretty scarce as the relevant coefficient is not robust with regard to the inclusion of additional variables which account for sovereign debt developments. For 2012 and 2013, we find no evidence that the effectiveness of fiscal consolidation has been underestimated by IMF forecasts. We do, however, find some evidence that the forecasters of the European Commission have overestimated the effect of fiscal contraction on GDP growth in the year 2012, possibly as a reaction to the underestimation in 2011. Therefore, we conclude that forecasts have not repeatedly underestimated the magnitude of fiscal multipliers.

In section 2 we start by describing the economic framework as well as our dataset. Afterwards, we report the results of our cross section analysis in section 3. The findings of our panel fixed-effects estimations are presented in section 4. Section 5 concludes with a final evaluation of our findings.

2. Estimation Framework and Dataset

As mentioned in the introduction, this paper closely follows the estimation framework of Blanchard/Leigh (2013). The estimation approach comprises a simple regression of forecast growth errors for real GDP in years t and $t + 1$ on fiscal consolidation forecasts for t and $t + 1$ made at the beginning of year t . As fiscal policy can be expected to have lagged effects on output, two-year intervals are used. We obtain the following equation:

$$\text{Forecast Error of } \Delta Y_{i,t:t+1} = \alpha + \beta \text{ Forecast of } \Delta F_{i,t:t+1} + \varepsilon_{i,t:t+1} \quad (1)$$

where $\Delta Y_{i,t:t+1}$ denotes the growth of GDP and the Forecast Error is calculated as $\Delta Y_{i,t:t+1} - f\{\Delta Y_{i,t:t+1} | \Omega_t\}$ where f marks the forecast dependent on the information set Ω_t available at year t (Blanchard/Leigh 2013). $\Delta F_{i,t:t+1}$ denotes the year over year change in the general government structural fiscal balance expressed in percent of potential GDP. Positive values indicate an improvement of the government balance and therefore a restrictive fiscal policy, while negative values indicate an expansionary fiscal policy. α denotes the constant while $\varepsilon_{i,t:t+1}$ is the error term which is assumed to be i.i.d.

With regard to equation (1), β equals the effect of the fiscal consolidation forecast on the growth forecast error. Assuming rational expectations and that the correct model has been used for forecasting, β should be zero. A negative β would indicate that the effects of fiscal consolidation and therefore fiscal multipliers have been underestimated by forecasts. A value of $\beta = -1$ would therefore imply that GDP was 1 percent lower than forecast for every percentage point of fiscal consolidation expressed as percentage of GDP.

The data for our baseline model is taken from the IMF's World Economic Outlook (WEO) and the spring forecasts from the European Economic Forecasts made by the European Commission (EC). The actual data points that are used to calculate the forecast error of GDP growth are taken from the WEO in fall 2014 and the EC's autumn forecasts in 2014. The real time forecasts for GDP growth and general government structural balance⁸ are taken from the spring WEOs and European Economic Forecasts of the respective previous year.

In order to check for robustness of our estimations, we include additional variables. Because the fiscal consolidation forecast is the sole regressor variable in our baseline specification, there is a possibility that a relevant variable is omitted and β is biased. Therefore, we include additional variables in order to account specifically for governmental debt developments as well as stress in the banking sector. Thereby, we especially include variables "that could plausibly have triggered both planned fiscal consolidation and lower-than-expected growth. The omission of such variables could bias the analysis toward finding that fiscal multipliers were larger than assumed" (Blanchard/Leigh 2013). We include the following variables in order to check for robustness: government effectiveness, political stability, unemployment, the external debt to

⁸ We use "cyclically adjusted net lending/ borrowing as percentage of GDP" to model fiscal spending when using the data from the European Commission.

GDP ratio, 10-year sovereign yields, the year-on-year change in 10-year sovereign yields, 5-year-sovereign credit default swap (CDS), government net debt, government gross debt, average 5-year-bank CDS spread, stock market volatility, the Net International Investment Position (NIIP) and the current account. With regard to the current economic environment, we especially include variables which measure the perception of government risk as well as financial market stress.

Regarding the addition of variables as robustness tests, it is important to highlight that these variables are only allowed to include information which were accessible at the time forecasts were made. Therefore, it is not possible to simply use ex-post data in order to perform a robustness tests as these information were not in the information set of the forecaster. In accordance with the framework of Blanchard/Leigh (2013), we use real-time data for variables which are susceptible to revision and only utilize latest information which were available at times forecasts were made.

The two stability indices (political stability and government effectiveness) are taken from the World Banks World Wide Governance Indicators (WGI). The indicators range from -2.5 (weak) to 2.5 (strong) governance performances. Unemployment rates, current account, government gross and net debt⁹ for all countries are taken from the WEO database. The external debt data is mainly taken from the Eurostat database.¹⁰ Values for the USA and Iceland are constructed by own calculations using the data from the US treasury and Statistics Iceland. As we could not find satisfactory data for Norway it is excluded from this particular test for robustness.

Both the data for the bank CDS¹¹ and sovereign CDS spreads are taken from the Bloomberg LP database. The sovereign yields represent long-term (10-years) rates and are taken from Thomson Reuters Datastream. We use data from the first quarter of each year. Furthermore, we measured yearly stock market volatility as standard deviations of log returns. The NIIP is taken directly from the ECFIN's database.

⁹ Real-time data of government net debt is still scarce. No data is available for the following countries: Cyprus, Luxembourg, Malta, Slovak Republic, Slovenia, Czech Republic and Romania.

¹⁰ The values for 2013 are calculated as the mean of quarters 1 to 3 for Italy, Luxembourg and Portugal since the last quarter was missing in the Eurostat database.

¹¹ However, observations are only available for a limited number of countries. There is no data available for the following countries: Cyprus, Finland, Luxembourg, Malta, Slovak Republic, Slovenia, Bulgaria, Czech Republic, Hungary, Iceland, Poland and Romania.

Our data encompasses 27 countries with a focus on European economies.¹² To differentiate our results we estimate our models with 6 different subgroups each of which is defined by their potentially different fiscal multipliers. Our subgroups are:

- Total: Encompassing all economies in our data
- Europe: using the complete dataset exempting the United States
- Europe without IMF programs: exempts countries which received help following the IMF programs which are Cyprus, Greece, Iceland, Ireland, Portugal and Romania
- Euro Area: consists of the members of the Euro Area¹³
- Liquidity Trap: exempts countries who are not considered to be close to the liquidity trap: Hungary, Iceland, Norway, Poland, Romania and Sweden
- Europe without Emerging Economies: exempts countries which are considered emerging economies¹⁴ and the USA to concentrate on core-Europe.

3. Cross Section Analysis

3.1 Main Findings

Table 1 presents the results of the cross section analysis for the years 2010 to 2013 when using the IMF data. It includes results of different groups of countries in order to model the sensitivity to changes in the economies included in the sample. Apart from simple OLS regressions, robust and quantile regressions were used in order to generate (more) outlier-resistant estimates and to check whether potential outliers affect the OLS regressions. The reported coefficients measure the effect of a change in the structural fiscal balance as a percent of potential GDP on the growth forecast error. The estimates of the constant terms are not reported as its economic interpretation is not eminent for the topic at hand.¹⁵

Starting with the results of our country group “Total”, we find a strong and significant negative relation between fiscal consolidation forecast and growth forecast for 2011. Using OLS, the estimated coefficient, β , is -1,155 and is statistically significant at the 1% level. This result

¹² The 27 countries are: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Germany, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Iceland, Italy, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, the United Kingdom and the United States of America.

¹³ Except for Estonia and Latvia due to data availability.

¹⁴ These countries are: Bulgaria, Poland, Romania and Hungary.

¹⁵ The constant term equals the mean of the forecast error. The results are available on request.

implies that the fiscal multiplier has been underestimated by nearly 1,2. Furthermore, this estimate appears to be quite robust to outliers as the additional regressions generate similar results. For the remaining years, the absolute values of β are considerably lower and generally not statistically significant. With respect to the results for 2010, the OLS coefficient has a smaller value of -0,592 indicating a lower effect of fiscal consolidation forecast in comparison to 2011. This result appears to be only partly robust to potential outliers as indicated by the estimations results of the quantile and robust regressions. For 2012 and 2013, we find no robust evidence of a significant relationship.

Table 1: Cross Section – Baseline (IMF)

Year	<i>Total</i>	<i>Europe</i>	<i>Europe w.o. IMF</i>	<i>Euro Area</i>	<i>liquidity trap</i>	<i>Europe w.o.EE</i>
2010	-0,592***	-0,579***	-0,365	-0,621	-0,507	-0,571
	-0,633	-0,517	0,039	0,04	0,04	0,04
	-0,552*	-0,549*	-0,381	-1,256	-0,987	-0,391
2011	-1,155***	-1,156***	-1,022***	-1,152**	-1,046**	-1,062**
	-1,335***	-1,315***	-1,315***	-1,315***	-0,959***	-1,115***
	-0,936***	-0,945***	-1,199***	-1,069***	-0,887***	-0,600***
2012	-0,306	-0,315	0,314	-0,642	-0,538	-0,639
	0,221	0,349	0,498	-0,328	-0,182	-0,328
	0,198	0,19	0,305	0,145	0,18	-0,065
2013	-0,479*	-0,511*	-0,189	-0,588*	-0,497	-0,553*
	-0,414	-0,634**	-0,381	-0,809*	-0,381	-0,414
	-0,385	-0,447*	-0,332	-0,615*	0,421	-0,544*

Note: the three rows represent the Simple, Quantile and Robust regression of the respective year. *, **, and *** represent the corresponding significance levels 10%, 5% and 1%.

With respect to the sensitivity of the results to changes in the economies included in the sample, we start by excluding the USA from our sample in order to focus on European countries. For 2013, we find deviations from the results of the estimation for country group “Total” as the absolute values of β increase and are at least significant to the 10% level. However, the results for the other years are in line with the baseline estimations.

As there are still large differences between European Countries with regard to the economic development, we check whether developments in emerging countries are influencing the baseline results. Therefore, we exclude the following emerging economies from the sample: Bulgaria, Hungary, Poland and Romania. While the results indicate no evidence for 2010 and 2012, the β -coefficients for 2011 remain highly significant and of large magnitude ($\beta_{ols} = -1,062$).

Next, we focus on the Euro Area as austerity has been a major subject in response to the sovereign debt crisis. We find no evidence that fiscal multipliers have been underestimated for the years 2010 and 2012. Compared to the baseline results, the absolute value of the β -coefficient is again slightly above 1 ($\beta = -1,133$) for 2011 and is highly significant. For 2013, the evidence once again becomes weaker as the coefficient is barely significant at the 10% level.

Next, we test whether forecasts of countries with IMF programs cause the results of the baseline estimations. Therefore, we exclude Cyprus, Greece, Iceland, Ireland, Portugal and Romania from the sample. For this sample, we find no significant evidence of an underestimation of the fiscal multiplier for 2010, 2012 and 2013. However, the β -estimations for 2011 once again are significant and large in magnitude ($\beta_{OLS} = -1,022$).

As mentioned in the introduction, there is theoretical evidence that the fiscal multiplier is large if the nominal interest rate hits the zero lower bound. Therefore, the next subgroup includes only countries which can be considered to be near the zero lower bound and are in danger of being in a liquidity trap.¹⁶ With regard to the results presented in Table 1, we find even less evidence of a repeated underestimation of the fiscal multiplier as the estimated coefficient is not significant for 2010, 2012 and 2013. However, the results for 2011 clearly resemble the results of the baseline specification, as β slightly exceeds 1 and is significant at the 5% level.

Table 2: Cross Section – Baseline (EC)

Year	<i>Europe</i>	<i>Europe w.o. IMF</i>	<i>Euro Area</i>	<i>liquidity trap</i>	<i>Europe w.o.EE</i>
2010	-0,421	-0,005	-0,535	-0,422	-0,374
	-0,114	-0,101	0,064	-0,101	0,008
	-0,356	-0,014	-0,194	-0,352	-0,197
2011	-1,080**	-0,404	-1,498***	-1,061*	-1,169**
	-0,855***	-0,715***	-1,139***	-0,855***	-0,932***
	-0,647**	-0,448	-0,786**	-0,460*	-0,719**
2012	0,502*	0,413*	0,576**	0,453**	0,456**
	0,558**	0,630	0,584	0,556	0,556
	0,439*	0,416	0,484	0,392	0,395
2013	-0,161	-0,270	-0,336	-0,221	-0,211
	-0,032	0,006	-0,132	0,020	0,020
	0,059	0,057	-0,065	0,050	0,080

Note: the three rows represent the Simple, Quantile and Robust regression of the respective year. **,*, and *** represent the corresponding significance levels 10%, 5% and 1%.

¹⁶ We follow Blanchard/Leigh (2013) and define the set of economies in a liquidity trap as those for which the central bank's main nominal policy interest rate reached 1 percent or less during 2010-2013. This definition excludes the following countries from the sample: Iceland, Hungary, Norway, Poland, Romania and Sweden.

Table 2 shows the results of the cross section analysis using the data from the European Commission's European Economic Forecasts. We again analyze the different country groups and apply simple, robust and quantile regressions.

We find no significant relation between fiscal consolidation forecasts and GDP growth forecasts for the years 2010 and 2013. However, as was the case for the IMF data, we find significant negative values for the year 2011. The coefficients are significant for the three regression type except for the country group "Europe without IMF programs" where only quantile regression yields a significant value.

It is interesting to note that using the database from the EC results in significant positive values of approximately 0,5 for the year 2012 when applying simple regression. These results are however only robust to the quantile and robust regression when estimating the "Europe" country group. These results imply that the forecasters overestimated the effect of fiscal contraction on GDP growth in the year 2012, possibly as a reaction to the underestimation in year 2011.

Overall, we find strong evidence of a negative relationship between fiscal consolidation forecasts and the growth forecast errors for 2011. In this regard, we can confirm the cross section findings of Blanchard/Leigh (2013). However, we find no evidence that the effects of fiscal consolidation and therefore the fiscal multiplier has been repeatedly underestimated. While we find no evidence for 2012 in the IMF data, the results indicate only weak evidence for 2010 and 2013 which do not appear to be robust to potential outliers and are quite sensitive to the country selection. However, using the data from the EC results in significant positive values in the year 2012 which might have resulted from a "too rigid" learning or adjustment effect in the forecasts by the EC leading to an overestimation of the effects of fiscal contraction on GDP growth.

3.2 Robustness Tests

As a next step, we investigate whether our results are robust to controlling for additional variables. With regard to the omitted variable bias, omission of relevant variables which are positively correlated with fiscal consolidation forecasts and cause lower-than-expected growth might cause a negative bias of our β estimations. Therefore, the omitted variable bias can be

considered as an explanation for our findings for 2011. As mentioned in section 2, robustness variables include only information which were available at times forecasts were made.^{17,18}

Table 3: Cross Section Robustness Check – Country Group „Total“ (IMF)

Year	2010		2011		2012		2013	
	Simple	Robust	Simple	Robust	Simple	Robust	Simple	Robust
<i>Bank CDS</i>	-1.655**	-0,688	-0,528	-0,614	-1,221	-0,339	0,150	-0,075
<i>Efficiency</i>	-0,294	-0,287	-1,023**	-1,318***	0,132	0,291	-0,528	-0,403
<i>External Debt</i>	-0,571***	-0,511*	-1,153***	-0,942***	-0,222	0,278	-0,434	-0,226
<i>Gov. Gross Debt</i>	-	-	-1,170***	-0,915***	-0,283	0,241	-0,541	-0,491
<i>Gov. Net Debt</i>	-	-	-	-	-0,308	0,151	-0,201	-0,103
<i>Sovereign CDS</i>	-0,489**	-0,420	-1,001**	-1,171**	0,073	0,200	-0,265	0,288
<i>Sovereign Yield</i>	-0,353	-0,246	-0,965**	-1,280***	-0,014	0,177	-0,264	0,124
<i>Delta Sov. Yield</i>	-0,364	-0,342	-1,163***	-1,337***	0,006	0,235	-0,251	0,020
<i>Stability</i>	-0,570***	-0,542	-0,993***	-1,174***	0,004	0,354	-0,686*	-0,606*
<i>Unemployment</i>	-0,639	-0,478	-1,273***	-0,728**	-0,181	0,291	-0,466	-0,056
<i>Stock Volatility</i>	-0,592***	-0,614*	-1,173***	-1,468***	-0,100	0,200	-0,146	-0,180
<i>Current Account</i>	-0,522**	-0,483	-1,102***	-1,289***	-0,203	0,135	-0,385	-0,396
<i>NIIP</i>	-0,494**	-0,413	-1,084**	-1,285***	-0,051	0,479	-0,393	-0,279

Note: *, **, and *** represent the corresponding significance levels 10%, 5% and 1%.

We first check the results of the country group “Total” of the IMF dataset for robustness. Estimates are reported in Table 3. There are no significant changes in our simple regression results for 2010 when adding either political stability, external debt or stock market volatility. Controlling for sovereign yields as well as the year-on-year change in sovereign yields, we obtain insignificant estimates for β which are also of smaller magnitude. When including sovereign CDS β is not significant after controlling for potential outliers. The estimated coefficient becomes also insignificant when adding government efficiency as well as unemployment. Adding bank CDS spreads into the framework increases the β -coefficient to a significant value at the 5% percent level of -1,655. The high value may be explained by extreme outliers such as Greece as the robust regression yields a far lower value of -0,688.

The results for 2011 are robust to all additional variables included in our estimation approach, except for including bank CDS spreads. However, estimations including bank CDS spreads have to be interpreted with caution as data is only available for a small amount of countries (see

¹⁷ As an example for 2011: The forecasts for 2011 were released in April 2010, therefore the additional variables are only allowed to include information which was available at that time. With regard to bank CDS, sovereign CDS and sovereign yield, we use data from 2010:Q1. External debt, unemployment, current account, NIIP, government gross and net debt represent magnitudes for 2009 released in early 2010. Stock volatility indicates the stock market volatility in 2009. The political indicators represent magnitudes for 2008 released in late 2009.

¹⁸ Because of data limitations we can use government gross debt and net debt only as robustness tests for later years.

section 2). All coefficients range around the value of our baseline estimation ($\beta = -1,115$). Performing the robust regression also yields significant coefficients for all checks for robustness (excluding bank CDS spreads) with a bigger effect of fiscal consolidation forecasts when adding government efficiency ($\beta = -1,318$) and stock market volatility ($\beta = -1,468$).

According to our baseline estimations all checks for robustness result in insignificant coefficients in 2012. The results for 2013 are only robust to including the stability indices from the World Governance stability indicator resulting in insignificant β -coefficients for all other variables contrary to the baseline result which was significant on the 10% level. Adding the stability indicators into the robust regression yields β -coefficients which are significant on the 10% level while the robust regression was insignificant in the baseline regression. As in the simple regression framework, all other variables yield insignificant β -coefficients.

Table 4: Cross Section Robustness Check – Country Group „Europe without Emerging Economies“ (IMF)

Year Variable	2010		2011		2012		2013	
	Simple	Robust	Simple	Robust	Simple	Robust	Simple	Robust
<i>Bank CDS</i>	-1,795*	-0,799	-0,52	-0,669	-1,253	-0,368	-0,092	0,014
<i>Efficiency</i>	-0,139	-0,117	-0,901**	-0,586**	-0,415	0,008	-0,554	0,019
<i>External Debt</i>	-0,526	-0,035	-1,064***	-0,660***	-0,527	-0,005	-0,500	-0,490
<i>Gov. Gross Debt</i>	-	-	-1,035***	-0,737***	-0,601	-0,035	-0,748*	-0,465
<i>Gov. Net Debt</i>	-	-	-	-	-0,777	-0,197	-0,144	-0,028
<i>Sovereign CDS</i>	-0,533	-0,594	-0,912*	-0,534	-0,253	-0,186	-0,336	0,442
<i>Sovereign Yield</i>	-0,365	0,299	-0,831*	-0,591	-0,346	-0,174	-0,366	-0,100
<i>Delta Sov. Yield</i>	-0,556	-0,502	-1,102***	-0,656*	-0,361	-0,074	-0,345	-0,166
<i>Stability</i>	-0,485	-0,232	-0,954**	-0,561*	-0,176	0,124	-0,666	-0,638
<i>Unemployment</i>	-0,617	-0,424	-1,248***	-0,889**	-0,616	-0,016	-0,586	-0,093
<i>Stock Volatility</i>	-0,575	-0,687	-1,114**	-1,302***	-0,341	0,021	-0,224	-0,285
<i>Current Account</i>	-0,446	-0,035	-0,935**	-0,609*	-0,491	-0,071	-0,467	-0,493
<i>NIIP</i>	-0,509	-0,057	-0,882**	-0,640**	-0,435	0,075	-0,367	-0,316

Note: *, **, and *** represent the corresponding significance levels 10%, 5% and 1%.

We further check the results for European countries without emerging markets for robustness. As focusing our analysis on the Euro Area results in few observations we consider concentrating on developed European countries to be a well suited substitution. Table 4 illustrates the results.

The baseline results showed no significant effect of the fiscal consolidation forecast in 2010. Our checks for robustness confirm this result except for the simple OLS regression including

bank CDS spreads. This may be explained by extreme outliers in the bank CDS spreads mentioned above. As was the case in our baseline estimations, all coefficients remain insignificant when checking for robustness.

While all three regressions in our baseline estimations result in significant coefficients for the year 2011 adding bank CDS spreads into the framework produces insignificant values for both the simple and the robust regression. Furthermore, including sovereign CDS spreads and yields into the estimation produces insignificant β -coefficients for the robust estimation in 2011.

In accordance with our baseline estimations presented in Table 1, all checks for robustness result in insignificant coefficients in 2012. However, the significant β -coefficients for the OLS regression and the robust regression in 2013 cannot be confirmed in our checks for robustness since all values, except for the simple OLS regression including gross government debt yielding a value significant at the 10% level, turn out to be insignificant.

Table 5: Cross Section Robustness Check – Country Group „Europe“ (EC)

Year	2010		2011		2012		2013	
	Simple	Robust	Simple	Robust	Simple	Robust	Simple	Robust
<i>Bank CDS</i>	-0,586	0,182	-0,698	-1,223***	0,403	0,749	0,234	0,262
<i>Efficiency</i>	-0,037	0,122	-1,015*	-0,311	0,646***	0,513*	-0,314	0,024
<i>External Debt</i>	-0,408	-0,304	-1,089**	-0,418	0,511**	0,512**	-0,140	0,151
<i>Gov. Gross Debt</i>	-	-	-1,022**	-0,632**	0,524**	0,372	-0,070	0,248
<i>Gov. Net Debt</i>	-	-	-	-	0,481	0,270	0,277	0,048
<i>Sovereign CDS</i>	-0,288	-0,171	-0,426	-0,416	0,651***	0,421	-0,119	0,235
<i>Sovereign Yield</i>	-0,368	-0,230	-0,830*	-0,465	0,704***	0,430	-0,023	0,031
<i>Delta Sov. Yield</i>	-0,246	-0,164	-1,084**	-0,612**	0,652**	0,459	-0,003	0,256
<i>Stability</i>	-0,400*	-0,336	-0,870*	-0,358	0,682***	0,534*	-0,074	0,062
<i>Unemployment</i>	-0,421	-0,209	-1,404***	-0,791**	0,684***	0,530*	-0,152	0,064
<i>Stock Volatility</i>	-0,381	-0,324	-0,960**	-0,767***	0,434**	0,387	0,249	0,201
<i>Current Account</i>	0,364	-0,264	-1,047*	-0,379	0,692**	0,495*	-0,066	0,121
<i>NIIP</i>	-0,357	-0,271	-1,169***	-0,782**	0,775**	0,456	0,088	0,240

Note: *, **, and *** represent the corresponding significance levels 10%, 5% and 1%.

We also apply the same checks for robustness on our results for the EC dataset. Table 5 shows the results when checking the country group “Europe” for robustness. As was the case in the baseline estimation, the coefficients in the years 2010 and 2013 remain insignificant for all variables except for the inclusion of political stability in the simple regression for the year 2010. The simple regression remains significant for all checks for robustness in year 2012, again except for including Bank CDS spreads. The robust regression yields insignificant values for a number of variables those being; Bank CDS, Government gross and net debt, Sovereign CDS,

Yield and Delta Yield, Stock Volatility and NIIP. The results for the simple regression in the year 2011 are robust to all variables except for Bank and Sovereign CDS. Again, the robust regression does not seem to be as robust to the inclusion of additional variables resulting in insignificant values for adding government efficiency, external debt, sovereign CDS, political stability or current account into the regression framework.

Table 6: Cross Section Robustness Check – Country Group „Europe without Emerging Economies“ (EC)

Year Variable	2010		2011		2012		2013	
	Simple	Robust	Simple	Robust	Simple	Robust	Simple	Robust
<i>Bank CDS</i>	-0,586	0,182	-0,698	-1,223***	-0,403	0,749	0,234	0,262
<i>Efficiency</i>	-0,056	0,191	-1,071*	-0,632*	0,663*	0,537	-0,327	0,279
<i>External Debt</i>	-0,382	-0,119	-1,188*	-0,484	0,463*	0,472	-0,180	0,212
<i>Gov. Gross Debt</i>	-	-	-1,073**	-0,720**	0,521*	0,211	-0,145	0,316
<i>Gov. Net Debt</i>	-	-	-	-	0,434	0,306	0,286	0,101
<i>Sovereign CDS</i>	-0,376	-0,080	-0,272	-0,650**	0,695**	0,266	-0,153	0,534
<i>Sovereign Yield</i>	-0,188	0,553	-0,528	-0,871***	0,713**	0,562	-0,053	0,267
<i>Delta Sov. Yield</i>	-0,234	0,546*	-1,142**	-0,768***	0,695**	0,491	-0,030	0,316
<i>Stability</i>	-0,386	-0,139	-1,055*	-0,533	0,718**	0,659*	-0,120	0,149
<i>Unemployment</i>	-0,421	-0,209	-1,404***	0,791**	0,751**	0,603	-0,193	0,150
<i>Stock Volatility</i>	-0,393	-0,083	-1,043**	-0,890***	0,383*	0,343	0,292	0,250
<i>Current Account</i>	-0,312	-0,138	-1,058**	-0,720**	0,695**	0,399	0,031	0,154
<i>NIIP</i>	-0,339	0,026	-1,066*	-0,768**	0,761*	0,590	0,005	0,258

Note: *, **, and *** represent the corresponding significance levels 10%, 5% and 1%.

Checking the country group “Europe without Emerging Economies” for robustness leads to robust results as depicted in Table 6. The coefficients for the year 2010 and 2013 correspond to the baseline results. Including additional variables also results in the same significant values as in the baseline for 2012 excluding bank CDS and government net debt. Results for the year 2011 are robust to the inclusion of all variables except for bank CDS, sovereign CDS and sovereign yield in the simple and external debt and political stability for the robust regression.

After controlling for additional variables, we find rather weak evidence that fiscal multipliers have been underestimated for 2010. Especially after the addition of variables which measure sovereign risk, estimates lose their significance compared to our baseline estimations. For 2011, there is still strong evidence that the effects of fiscal contraction have been underestimated. With regard to our country group “Total”, β -estimates remain large and significant even after controlling for additional variables. However, this result appears to be sensitive to the choice

of countries in the sample as indicated by the results for country group “Europe without Emerging Economies”. Focusing on Core Europe, β coefficients for 2011 become slightly smaller and less significant after controlling for sovereign risk. This generates some support for the thesis that sovereign risk perception can at least partly explain the findings of Blanchard/Leigh (2013). Once again, we find no evidence that forecasters have systematically underestimated the effects of fiscal contractions for 2012 and 2013 when using the IMF dataset. We again find evidence for a possible overestimation of the fiscal multiplier in the year 2012 by the EC forecasts.

4. Panel Estimations

4.1 Main findings

As cross section analysis only allows to examine the effects of fiscal consolidation forecasts for a specific year, panel data analysis appears to be a natural extension of our research. One advantage of using panel data estimations is the large increase in the number of observations. With respect to the key aspect of this paper, using fixed-effects estimations allows to control for time-invariant heterogeneity between countries (α_i) which might affect the estimation of β . Concerning our panel baseline estimations, we start by jointly investigating the effect of fiscal consolidation forecasts for 2010 to 2013. Based on the results of our cross section analysis, we subsequently divide the sample and conduct estimations for 2010-2011 and for 2012-2013. Each estimation includes a vector of time-fixed effects λ_t . Once again, we use different country groups in order to check whether results are sensitive to the choice of economies in the sample. In this regard, we use the same country groups as in the cross section analysis. In accordance with equation (1), the new equation estimated follows as:

$$\text{Forecast Error of } \Delta Y_{i,t:t+1} = \beta \text{ Forecast of } \Delta F_{i,t:t+1} + \alpha_i + \lambda_t + \varepsilon_{i,t:t+1} \quad (2)$$

Table 7 presents the results of our baseline panel estimations using forecasts made by the IMF. Using the total amount of countries available in our data set, we find that the effect of fiscal consolidation forecast on the growth forecast error is -0,380 and is highly significant for the period of 2010-2013. However, if we divide the sample and reestimate for the sub-periods of 2010-2011 and 2012-2013, we find only significant evidence for the period of 2010-2011. The estimated β is -0,360 and highly significant. For the sub-period of 2012-2013, there is once again no evidence that fiscal multipliers have been underestimated by forecasts.

With regard to estimations using different country groups, we find only weak evidence that the results are sensitive to the choice of economies in the sample. Mainly, there are only small differences regarding the magnitude and significance of the estimations. However, estimates for the subgroup of European Countries which did not have an IMF Program show surprisingly weak evidence of an underestimation of fiscal multipliers. For the entire sample (2010-2013), the estimated coefficient is rather low ($\beta = -0,163$). Furthermore, β is not significant for the subsample of 2010-2011. These results might indicate that countries with IMF programs are somehow driving our results.

Table 7: Fixed Effects – Baseline (IMF)

Country Group	2010 – 2013	2010-2011	2012-2013
<i>Total</i>	-0,380*** (-4,02)	-0,360*** (-2,90)	-0,085 (-0,34)
<i>Europe</i>	-0,387*** (-4,06)	-0,300** (-2,56)	-0,091 (-0,37)
<i>Europe w.o. IMF</i>	-0,163* (-1,74)	-0,256 (-1,54)	0,331 -1,45
<i>Euro Area</i>	-0,392*** (-3,44)	-0,407*** (-3,70)	-0,188 (-0,61)
<i>liquidity trap</i>	-0,352*** (-2,83)	-0,478*** (-3,69)	-0,281 (-1,15)
<i>Europe w.o. EE</i>	-0,412*** (-3,94)	-0,416*** (-3,78)	-0,239 (-1,12)

Note: All regressions have been estimated with included time-dummies.

*, **, and *** represent the corresponding significance levels 10%, 5% and 1%.

The results of our estimation approach using forecasts made by the EC are presented in Table 8. Compared to our previous findings utilizing IMF data, we find that the effect of fiscal consolidation forecast on the growth forecast error is of smaller magnitude and less significant for the period of 2010-2013. Only the estimation results of our country groups “Europe” and “liquidity trap” are barely significant to the 10% level. With regard to our subsample of 2010-2011, we once again find evidence that fiscal multipliers have been underestimated. Compared to our results using IMF forecasts, we detect further evidence that our results are driven by European Countries under IMF programs. Regarding the subsample of 2012-2013, the estimated coefficients turn out to be positive but do not reach statistical significance.

Table 8: Fixed Effects – Baseline (EC)

Country Group	2010 – 2013	2010-2011	2012-2013
<i>Europe</i>	-0,280*	-0,298**	0,302
	(-1,91)	(-2,20)	(0,87)
<i>Europe</i>	-0,173	-0,169	0,117
<i>w.o. IMF</i>	(-1,12)	(-1,52)	(0,35)
<i>Euro Area</i>	-0,283	-0,497**	0,220
	(-1,57)	(-2,28)	(0,52)
<i>liquidity trap</i>	-0,264*	-0,432**	0,137
	(-1,78)	(-2,74)	(0,35)
<i>Europe</i>	-0,239	-0,394**	0,147
<i>w.o. EE</i>	(-1,50)	(-2,71)	(0,38)

Note: All regressions have been estimated with included time-dummies.

*, **, and *** represent the corresponding significance levels 10%, 5% and 1%.

With respect to the estimations using both sources of forecasts, we once again find strong evidence that forecasts did underestimate fiscal multipliers in 2010-2011. However, based on the results for our subsample 2012-2013, we find less evidence that forecasters of the IMF and the EC have under- or overestimated fiscal multipliers systematically between the years of 2010-2013. The fact that our estimation results turn out to be not significant, if we exclude countries under IMF programs from the sample, hints at the possibility that these countries are driving our findings.

4.2 Robustness Tests

Corresponding to our Cross Section analysis, we check our findings for robustness by including nearly the same additional variable as before. In this regard, the entire set of countries is first used for both sources of forecasts.¹⁹ Since our panel analysis for the year 2012 – 2013 produced no significant results we exclude the time frame from our checks for robustness.²⁰ Our results using IMF forecasts are illustrated on the left-hand side of Table 9, whereas our findings using forecasts made by the EC are presented on the right-hand side of Table 9

With regard to our baseline panel estimations using IMF forecasts, both time periods 2010 – 2013 and 2010 – 2011 yielded significant coefficients at the 1% level in our fixed effects baseline estimations. Checking for robustness confirms our findings for 2010 – 2013 for all variables resulting in coefficients close to the baseline panel significant at the 1% level, except for Bank

¹⁹ Due to data limitations government gross and net debt cannot be used as robustness variables.

²⁰ Our robustness checks for our subsample 2012-2013 reveal no significant evidence of an under- or overestimation of fiscal multipliers. These results are available on request.

CDS spreads which suggests a strong effect of financial market risks on GDP forecasts. However, if we include stock market volatility into our regression framework the coefficient remains significant. With regard to estimates including bank CDS as additional variable, results have to be interpreted with caution as the data availability is pretty low. Our results for the time period 2010 – 2011 are robust to all variables included and yield significant β -coefficients at the 10% level for all controls for robustness.

Table 9: Fixed Effects Robustness Check

Robustness	Country Group "Total" (IMF)		Country Group "Europe" (EC)	
	2010 - 2013	2010-2011	2010 - 2013	2010-2011
<i>Efficiency</i>	-0,431*** (-3,93)	-0,360*** (-2,85)	-0,278* (-1,90)	-0,335** (-2,30)
<i>Stability</i>	-0,439*** (-4,21)	-0,399** (-3,02)	-0,278* (-1,90)	-0,335** (-2,30)
<i>External Debt</i>	-0,396*** (-3,69)	-0,345** (-2,43)	-0,284** (-1,93)	-0,329** (-2,15)
<i>Sovereign Yield</i>	-0,427*** (-4,61)	-0,300* (-1,92)	-0,299** (-2,27)	-0,408** (-2,51)
<i>Delta Sov. Yield</i>	-0,427*** (-4,61)	-0,299* (-2,05)	-0,327** (-2,50)	-0,423** (-2,68)
<i>Unemployment</i>	-0,389*** (-3,27)	-0,487*** (-3,52)	-0,214* (-1,75)	-0,279** (-2,26)
<i>Sovereign CDS</i>	-0,384*** (-3,91)	-0,355*** (-2,82)	-0,247* (-1,75)	-0,313* (-1,82)
<i>Bank CDS</i>	-0,247 (-1,52)	-0,517** (-2,30)	-0,206 (-1,47)	-0,372* (-1,83)
<i>Stock Volatility</i>	-0,453*** (-4,07)	-0,348** (-2,83)	-0,233 (-1,42)	-0,175 (-0,98)
<i>Current Account</i>	-0,373*** (-3,69)	-0,297** (-2,51)	-0,250* (-1,81)	-0,289** (-2,11)
<i>NIIP</i>	-0,345*** (-3,14)	-0,294** (-2,23)	-0,250* (-1,77)	-0,314*** (-2,94)

Note: All regressions have been estimated with included time-dummies.

*, **, and *** represent the corresponding significance levels 10%, 5% and 1%.

Examining the robustness of our estimations using forecasts of the EC, the inclusion of additional variables does not change our baseline results in general for the time period of 2010-2013 as well as the results for our subsample 2010-2011. However, the inclusion of the financial variables "Bank CDS" and "Stock Volatility" render our estimation insignificant. In this regard, after the inclusion of variables measuring financial stress as well as stress in stock markets, we do not find signs of an underestimation of fiscal effectiveness for the EC forecasts anymore.

However, as mentioned before, the results regarding the inclusion of the variable “Bank CDS” has to be interpreted with caution due to low data availability.

Table 10: Fixed Effects Robustness Check – Country Groups “Euro Area” and “Europe without Emerging Economies” (IMF)

	Euro Area		Europe w.o. Emerging Economies	
	2010 - 2013	2010-2011	2010 - 2013	2010-2011
Robustness				
<i>Efficiency</i>	-0,357*** (-3,25)	-0,403*** (-3,92)	-0,361*** (-3,72)	-0,419*** (-3,83)
<i>Stability</i>	-0,413*** (-3,35)	-0,441** (-2,56)	-0,435*** (-4,03)	-0,441*** (-3,06)
<i>External Debt</i>	-0,434*** (-3,26)	-0,374** (-2,66)	-0,445*** (-3,75)	-0,397*** (-3,04)
<i>Sovereign Yield</i>	-0,404*** (-3,79)	-0,468*** (-3,10)	-0,452*** (-4,11)	-0,422*** (-3,89)
<i>Delta Sov. Yield</i>	-0,382*** (-3,02)	-0,696*** (-2,89)	-0,550*** (-4,70)	-0,513** (-2,71)
<i>Unemployment</i>	-0,457*** (-4,21)	-0,439*** (-3,24)	-0,461*** (-4,52)	-0,451*** (-4,11)
<i>Sovereign CDS</i>	-0,363*** (-3,37)	-0,446** (-2,59)	-0,423*** (-3,56)	-0,493*** (-3,93)
<i>Bank CDS</i>	-0,217 (-1,45)	-0,398 (-0,62)	-0,298 (-1,71)	-0,441** (-2,42)
<i>Stock Volatility</i>	-0,396*** (-2,91)	-0,386*** (-3,29)	-0,413*** (-3,90)	-0,400*** (-3,83)
<i>Current Account</i>	-0,435*** (-4,14)	-0,412*** (-3,66)	-0,409*** (-3,94)	-0,419*** (-3,79)
<i>NIIP</i>	-0,424** (-2,43)	-0,457* (-1,94)	-0,368** (-2,32)	-0,465** (-2,51)

Note: All regressions have been estimated with included time-dummies.

*, **, and *** represent the corresponding significance levels 10%, 5% and 1%.

We further concentrate our analysis on countries in the Euro Area as well as economic advanced countries in Europe (country group: “Europe w.o. Emerging Economies”) and depict our results in Table 10 and Table 11.

With regard to the IMF forecasts, both timeframes included in the check for robustness were significant in the baseline panel estimation. For both the years 2010 – 2013 all variables yield significant β -coefficients at the 1% level, again with the exception of bank CDS spreads. Again, including stock volatility into the fixed effects framework does however result in a significant value for the β -coefficient. Similar to the timeframe from 2010 – 2013 the results for the years

2010 – 2011 are robust at the 10% to all variables included apart from the inclusion of bank CDS spreads.” The results of our subgroup “Europe without emerging economies” correspond to the findings for the “Euro Area” subgroup confirming the significance of fiscal consolidation forecast for the error in GDP forecasts for all variables for the years 2010 – 2013 and 2010 – 2011 aside from adding bank CDS spreads into the fixed effects panel estimation framework.

Table 12: Fixed Effects Robustness Check – Country Groups “Euro Area” and “Europe without Emerging Economies” (EC)

Robustness	Euro Area		Europe w.o. Emerging Economies	
	2010 - 2013	2010-2011	2010 - 2013	2010-2011
<i>Efficiency</i>	-0,266 (-1,47)	-0,504** (-2,24)	-0,236 (-1,52)	-0,403** (-2,64)
<i>Stability</i>	-0,291 (-1,56)	-0,500* (-1,91)	-0,234 (-1,50)	-0,412** (-2,26)
<i>External Debt</i>	-0,294 (-1,67)	-0,620** (-2,45)	-0,251 (-1,61)	-0,471** (-2,76)
<i>Sovereign Yield</i>	-0,230 (-1,60)	-0,497** (-2,31)	-0,196 (-1,52)	-0,414** (-2,59)
<i>Delta Sov. Yield</i>	-0,235 (-1,54)	-0,380*** (-3,13)	-0,205 (-1,56)	-0,410*** (-4,16)
<i>Unemployment</i>	-0,323* (-1,85)	-0,326 (-1,32)	-0,265 (-1,67)	-0,279** (-2,26)
<i>Sovereign CDS</i>	-0,197 (-1,26)	-0,586** (-2,20)	-0,175 (-1,30)	-0,434** (-2,47)
<i>Bank CDS</i>	0,262* (-2,22)	-0,519 (-1,49)	-0,206 (-1,47)	-0,372* (-1,83)
<i>Stock Volatility</i>	-0,286 (-1,48)	-0,316 (-0,89)	-0,231 (-1,33)	-0,274 (-1,42)
<i>Current Account</i>	-0,275 (-1,34)	-0,493* (-2,06)	-0,238 (-1,37)	-0,338** (-2,42)
<i>NIIP</i>	-0,218 (-1,13)	-0,385* (-1,77)	-0,199 (-1,24)	-0,365*** (-3,00)

Note: All regressions have been estimated with included time-dummies.

*, **, and *** represent the corresponding significance levels 10%, 5% and 1%.

The estimation results of our robustness checks presented in table 12 are once again broadly in line with the panel baseline results. With regard to the Euro Area as well as our measure for Core-Europe, the inclusion of stock volatility yields non-significant results for beta. Therefore, we find further evidence that EC forecasts did not underestimate the effectiveness of austerity if stock market stress is accounted for. Furthermore, some evidence is generated that one has to

account for unemployment. However, evidence is limited to our results for the Euro Area in 2010-2011.

Our panel estimations indicate that IMF forecasts have underestimated fiscal multipliers at the beginning of the decade (2010 and 2011). These results broadly appear to be robust to changes in the economies included in the sample. Even the inclusion of additional variables which account for potential sources of biased estimations such as sovereign risk perception does not affect the results. However, we find small evidence that financial stress measured as Bank CDS spreads explains the significance of our estimations. As data availability of Bank CDS spreads is quite low, we used stock market volatility in order to generate additional evidence that stress in financial markets is driving our baseline results. With regard to our robustness tests, estimates remain negative as well as significant even after including stock market volatility. While our panel estimations which include the entire time period from 2010 to 2013 entirely generate negative coefficients, we believe that these results are driven by dynamics from the 2010 and especially 2011 as indicated by our baseline panel results presented in Table 7. With regard to forecasts of the EC the picture is less clear. We find some evidence that forecasts of the EC did underestimate fiscal multipliers for the years of 2010-2011. However, these results do not appear to be robust after accounting for stress in the stock markets. Interestingly, we find evidence for both IMF as well as EC forecasts that these results may also be sensitive to the set of countries. In this regard, countries under IMF programs which largely correspond to countries being heavily affected by the European sovereign debt crisis appear to be driving our results.

5. Conclusion

Summing up our results, we find strong evidence that IMF forecasts have underestimated fiscal multipliers for 2011. This interpretation is based on the cross section as well as panel analysis. Furthermore, the estimated β -coefficients for 2011 appear to be largely robust with regard to potential outliers as well as the inclusion of additional variables. However, our cross section estimations reveal some evidence for Core Europe that the underestimation of fiscal multipliers decreases when we account for developments in the perception of sovereign risk. With regard to the remaining years, proof becomes weaker that forecasts have underestimated the effects of fiscal consolidation. While our cross section baseline results imply that fiscal multipliers may have been underestimated for the year 2010, the significant baseline results are not robust to the inclusion of additional variables. With regard to 2012 and 2013, we find no robust evidence that forecasts underestimated fiscal multipliers.

With regard to forecasts released by the EC, evidence that forecasts have underestimated the effects of austerity on GDP growth is not as strong. While our baseline estimation results hint at an underestimation of fiscal multipliers in 2011, accounting for sovereign risk partially yields non-significant estimates – at least with regard to our cross section analysis. Checking for robustness of our panel results, we find no evidence that fiscal multipliers have been underestimated for 2010-2011 after including a measure of stock market stress into our estimations. Based on our cross section analysis, we find one striking difference between EC forecasts and forecasts made by the IMF, as EC forecasts might have actually overestimated the effect of austerity on GDP growth for 2012. However, one interesting finding between both sources of forecasts is the tendency that results appear to be driven by countries under IMF programs – Greece, Ireland, Portugal and Cyprus (amongst others). In this regard, one may interpret these results as evidence that the effects of austerity have been especially underestimated for countries which have been heavily affected by the Financial Crisis in 2008 and are at the heart of the European sovereign debt crisis.

Overall, we find evidence that the effects of fiscal contraction have been underestimated for 2011, our results do not indicate that the effectiveness of fiscal policy has been repeatedly and systematically underestimated. Our findings are partly in line with the results of Blanchard/Leigh (2013) who find large evidence of an underestimation for 2011. In contrast to our results, they also find evidence for 2010 and 2013. However, the results of Blanchard/Leigh (2013) also indicate that underestimation has been lower in 2010 and 2013 compared to 2011.

What do our results imply for forecasts and fiscal policy? As we find evidence that the underestimation of fiscal multipliers has decreased over time, this might indicate learning effects of forecasters with regard to the effectiveness of fiscal policy for this specific period of time. In contrast to interpreting the results as learning effects of forecasters, fiscal multipliers may have simply decreased after 2011. As our results do not comprise estimations of the actual fiscal multipliers, this question cannot be answered for good. With regard to the question about the “correct” stance of fiscal policy, our results have to be interpreted with caution. A larger than assumed fiscal multiplier does not necessarily present evidence that austerity is the wrong fiscal approach with respect to the current economic environment. It only suggests that growth forecasts were at least too optimistic for 2011.

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