

Do the International Monetary Fund Lending Programs Create Moral Hazard?

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Abstract

Using International Monetary Fund lending data from 2005 through 2015, we find evidence that the IMF General Resources Account credit creates moral hazard that is concentrated in European and EU-member countries. Our results hold for the periods of time just prior to and after the financial crisis. In contrast, we find moral hazard associated with the IMF Poverty Reduction Growth Trust creates moral hazard only prior to the financial crisis and we attribute this change to the 2010 modifications to the trust.

I. Introduction

The issue of moral hazard dates back well before the creation of the International Monetary Fund (IMF) in 1944. Moral hazard is the situation created when costs are borne by another party, causing risky behavior. For example, the federal deposit insurance maintained on bank deposits in the United States can result in banks taking on risky behavior because, in the event of default, the Federal Deposit Insurance Corporation (FDIC) would bailout the banks. Therefore, FDIC insurance can cause moral hazard in the U.S. banking industry. We evaluate moral hazard on a more global scope than the FDIC, specifically the IMF. Utilizing data on the loan accounts of each IMF member country, we evaluate if IMF lending results in countries taking on risky behavior by way of increased debt, because, in the event of distress, they are able to obtain loans through the IMF, thus creating moral hazard.

In recent decades, the IMF has issued billions of dollars in loans to such countries as Greece, Ireland, and Portugal to save them from economic collapse (Buiter & Rahbari, 2010). By doing so, the IMF supported many of these countries in financial crisis by providing them the ability to meet their financial obligations, time to address their government debt and to strengthen their financial position. It is indisputable that the IMF has played a pivotal role in assisting to stabilize the global economy, but there is one implication that continues to be debated: the relationship between the IMF and the members it provides financial assistance to has the potential to create some degree of moral hazard.

Moral hazard is not exclusive to the IMF; however, moral hazard created by the IMF is the focus of our study. Moral hazard exists anywhere one party can take on additional risk at no expense or consequence to themselves. This irresponsibility that creates moral hazard can be entered into by individuals, corporations or governments. Insurance companies continually face moral hazard problems when the insured takes on additional risk that is not accounted for in the insurance contract. The Asian financial crisis in the late 1990s stemmed from moral hazard created in the industrial sector due to the Asian governments' underwriting investments in these industries (Chang, 2000). Since the Asian governments bore the liability of any financial issues, the industry managers were free to take on risky behavior and leave the Asian governments holding the bill. Greece serves as an ideal example of moral hazard at a government level,

continuing to spend money, unable to repay their debt and forcing the European Stability Mechanism and the European Central Bank to bear the cost.

We specifically explore the level of country public debt and whether moral hazard created by IMF lending results in increased debt levels. If a country has the ability to borrow from the IMF, and can possibly have its debt forgiven in times of significant economic turmoil, then the country could be more likely to take on additional debt knowing the IMF will be there to support it in crisis. We utilize the general resources account (GRA) loans and the Poverty Reduction and Growth Trust (PRGT) credit provided to member countries by the IMF as our proxies for moral hazard. These IMF credit mechanisms differ from each other in that GRA loans bear interest and do not have austerity measures attached to them, while PRGT credit bears no interest but requires that the countries receiving the credit follow strong austerity measures dictated by the IMF. By exploring the public debt associated with these IMF credit mechanism, we are able to compare the moral hazard created specific to each of these loans. Our research differs from some past IMF moral hazard research as we specifically measure moral hazard directly at the country level, contrary to other research using sovereign debt yield spreads, driven by investor perception of risk, to evaluate investor moral hazard. We also provide an analysis of IMF lending around the global financial crisis and discuss the impact of low-income country lending reforms (PRGT) and the impact on moral hazard.

Roland Vaubel is the first known to propose the idea that IMF lending may generate moral hazard. He argues that there is no sound case for IMF lending (Vaubel, 1983). While Vaubel does not provide empirical evidence to support his claim, he opens the door to future research. Further research on the generation of moral hazard by the IMF is important because it helps to understand how theories in economics can vary over time. Our analysis specifically evaluates IMF loans just prior to and after the 2008 global financial crisis. We evaluate a country's level of debt and IMF loans over our full period, but we also explore the periods prior to and after the financial crisis to determine if the crisis resulted in any changes to moral hazard on the part of IMF member countries.

Utilizing country debt levels from 2005 to 2015, our results show a statistically significant and positive relationship between GRA credit and a country's debt over our full sample, supporting the theory that IMF lending creates moral hazard. Dividing our sample into various subsets we find this result is driven by European and EU-member countries. Exploring the economic effects of moral hazard, we generally find a small overall impact on countries with a large Debt/GDP; however, the economic impact is much greater for countries with small Debt/GDP ratios. We find that PRGT credit created moral hazard prior to the financial crisis for European and EU-member countries; however, we find no significant impact for EU-member countries after the financial crisis. In fact, for European countries, we find the moral hazard generated by IMF lending reversed after the January 1, 2010 modifications to the PRGT and attribute lower Debt/GDP values on the austerity measures required from PRGT credit.

The remainder of this paper is organized as follows: Section 2 provides the background and history of the IMF, IMF lending, a background on IMF moral hazard research; and development of our hypothesis; Section 3 presents our data and methodology; Section 4 presents our empirical results; and Section 5 concludes.

I. Background and Hypothesis

2.1 *History of the IMF*

The IMF was officially formed as a result of World War II, when European countries found themselves depleted of gold and lacked the resources necessary to rebuild. Representatives from countries around the world met in Bretton Woods, NH and, in addition to establishing an international monetary system, fixing exchange rates to the U.S. dollar, they created the IMF.

In July 1944, when first created, the IMF had 29 original member countries compared to the 189 member countries today (IMF, n.d.). The IMF's objective is to make loans to countries with balance of payment difficulties with the goal of promoting the growth of world trade (Mishkin & Eakins). A member country can borrow from the IMF when it lacks, or potentially lacks, sufficient funds to meet its debt while still maintaining adequate cash reserves (IMF, 2002). As expected, financial crises throughout history have resulted in large volumes of loans from the IMF. Since the 1980s, the IMF has moved from short-term, smaller loans, to large crisis lending to member countries (IMF, 2017).

The funds at the IMF are held by its General Department, the SDR Department and Administered Accounts. The GRA is held by the General Department while the PRGT funding is held in the Administered Accounts. (IMF, 2002) The GRA is the main IMF account, and each member country's "membership payment" (quota) is deposited into the GRA. These membership payments are based on a country's size and constitute the GRA's basic funding, although the IMF does have power to borrow to assist its GRA balance management. The assistance a country can receive from the IMF is also based on the size of this membership payment. The IMF runs its day-to-day lending operations from this account. GRA loans are non-concessional, which means they bear interest and do not come with an austerity plan prescribed by the IMF, such as seen in other lending arrangements. GRA credit loans are paid back at the Special Drawing Right interest rate which is based on the average short-term interest rates in the economies of the major world powers. It is important to remember that loans provided from the IMF out of this account are not free, and interest rates are not significantly lower than from any other major bank (IMF, 2002).

The second type of account with the IMF is the PRGT. The IMF Executive Board created this type of credit in the 1990's as a means to help developing countries fight poverty, modernize their economy, and defend against financial crises. Overtime, the mechanism of supplying funding to low income countries has been modified to the current PRGT concessional lending structure, implemented on January 7, 2010. (IMF, 2016). The PRGT is setup to provide emergency funding, short-term funding and medium-term funding to low-income countries.⁷ Most recently, in September of 2012 the fund also established long-term lending provisions.

Countries that borrow under the PRGT are provided concessional lending with zero interest on funds. This means that a country receives payment only after it has enacted austerity

⁷ Examples of PRGT-eligible countries include: Afghanistan, Bolivia, Ethiopia, Haiti, Madagascar, Nepal, Sierra Leone, Tanzania, Uganda, Vietnam, Yemen and Zambia, to name a random few. (IMF, 2015)

policies ordered by the IMF. The PRGT is considered self-sustaining and is funded from resources pledged by IMF members, in addition to a windfall profit from the IMF selling gold reserves. When PRGT credit is granted, the receiving country is paid in fixed installments while the IMF monitors the country to ensure its government/central bank is making the required policy changes. The policy changes ordered by the IMF revolve around developing fiscal responsiveness and eliminating excessive spending. The zero interest policy of PRGT lending is currently enacted until 2018, but for the purposes of our study, any PRGT credit loaned out is interest free (IMF, 2016).

We utilize a country's GRA balance and PRGT balance with the IMF as our main independent variables to evaluate if IMF lending creates moral hazard.

2.2 IMF Moral Hazard Literature Review

The first known research on the creation of moral hazard by the IMF was by Roland Vaubel when he was a Senior Research Fellow at the University of Kiel. Vaubel argues there is no economic justification for the operation of the IMF, and further that its actions are counter-productive. In refuting nine arguments in favor of IMF lending he concludes that IMF lending is harmful and can create moral hazard (Vaubel, 1983).

Dell'Ariccia, Schnabel and Zettelmeyer (2002) evaluate investor moral hazard created by the IMF using the Russian crisis of 1998 as the backdrop for their analysis. They extend their analysis to also evaluate the Mexican and Asian financial crises. Utilizing issuance spreads and secondary market spreads of sovereign debt, and by grouping their samples into pre- and post-crisis, they find evidence of moral hazard in the Russian economy. They argue the risk to the Russian economy prior to the crisis should have been priced into the bond yield spreads. After the crisis, they find a significant increase in the yield spreads and argue this shows evidence of moral hazard. Evaluating the Asian and Mexican debt crises, Dell'Ariccia et al. (2002) did not find any evidence of moral hazard. Their results indicate that investor moral hazard, created by the IMF, varies across countries.

Lee and Shin (2008) further evaluate investor moral hazard, similar to Dell'Ariccia et al. (2002) by evaluating sovereign bond spreads. They attempt to explain why the relationship Dell'Ariccia et al. (2002) hypothesize was present following the Russian crises, but not following the Asian crises. Lee and Shin (2008) argue that moral hazard differs across countries based on three factors: the individual country's probability of receiving future bailout money; the individual country's relationship to the IMF; and the country's economic profile. By varying the probability of bailout across countries, they find evidence of investor moral hazard.

While Dell'Ariccia et al. (2002) and Lee and Shin (2008) are concerned with investor moral hazard, our analysis focuses on country moral hazard. Specific to country moral hazard, Dreher & Vaubel (2004) propose that the higher a member countries quota⁸ in the IMF, the more likely it is to run a higher government budget deficit. Utilizing panel data from 106 countries

⁸ Quota represents the "membership payment" and is directly related to the amount a country can borrow from the IMF.

from the period 1971 to 1997, they regress a country's debt relative to GDP on the exhaustion of a country's IMF quota and a country's eligibility for SAF/ESAF credit (low income financial assistance prior to current PRGT credit). They find that, as a country diminishes its available IMF credit, its debt values decline. In other words, the more money the country can borrow from the IMF, the higher its debt, which the authors claim as evidence of moral hazard. They also find that IMF lending is related to political business cycles. Specifically, during election periods, countries tend to borrow more from the IMF to possibly "window dress" their economies to help win elections. Similar to Dreher & Vaubel, we utilize a country's level of debt as our dependent variable; however, we specifically evaluate GRA credit and PRGT borrowings as proxies for moral hazard. In addition, due to significant changes to the low income financial assistance credit program in 2010, we are the first known to evaluate the PRGT as a source of moral hazard.

2.3 Hypothesis

Based on the theory of moral hazard, we seek to evaluate country debt and IMF credit to determine if the amount of IMF loans is related to higher debt, indicating moral hazard. We utilize both GRA credit and PRGT credit as our proxies for moral hazard. We utilize both IMF credits to determine the creation of moral hazard by the IMF. GRA credit is issued to countries without austerity measures and at the Special Drawing Right interest rate (IMF, 2002). PRGT credit is interest free but requires countries to comply with specific requirements aimed to cut government spending and reign in debt. These differences could also indicate differences in moral hazard created by the two loan programs.

If the IMF creates country moral hazard we would expect the public debt amount to be positively associated with IMF lending. Therefore we state our null hypothesis as:

H_0 : IMF lending does not create moral hazard.

If there is no moral hazard, we would expect to find no statistical significance between IMF lending and public debt, or that this relationship is negative. We test this hypothesis to determine if country moral hazard is evident and also to evaluate the economic impact of the moral hazard. In addition, we test our hypothesis during the periods of time before and after the most recent global financial crisis to determine if the crisis had any impact on moral hazard and IMF lending.

II. Data and Methodology

3.1 Summary Statistics

We utilize unbalanced panel data consisting of IMF member countries' loan balances, debt levels, and economic indicators over the period January 2005 to December 2015. We begin with IMF member country PRGT and GRA credit balances for each month and year in our sample period, and then match relevant annual economic data from both the IMF and the World Bank. Appendix A lists variables, their description and source. We convert all values to U.S.

dollars for consistency and drop countries with missing data only for the years the data is missing.

Our sample comprises the 189 base IMF member countries; however, due to missing variable data, our main regressions cover 157 of the original 189 countries. Table I provides summary statistics for the 157 country sample. Our unbalanced panel is evident when evaluating the number of country-years in our sample. For the 157 countries over the 11 years of the sample, the *GRA* and *PRGT* credit variables have the most observations at 1,772, while trade, consumption and inflation are lower, which leads to the lower number of observations in our analysis. Our dependent variable, *Debt/GDP* varies widely across our sample from 0.5848 to 2.61 e+08. Evaluating end-of-year *GRA* and *PRGT* values (4.33 e+08 and 4.40 e+07), we find they are very close to their annual averages, *Ave GRA* and *Ave PRGT* (4.2 e+08 and 4.30 e+07). These values indicate it is irrelevant whether we use year-end IMF balances or average annual IMF balances in our analyses; however, we perform our analyses with both end-of-year and average credit values to verify. Overall, the maximum *Ave GRA* credit is almost 25 times larger than *Ave PRGT* credit, revealing that *GRA* lending is much greater than *PRGT* lending in the time period studied.

Table I: Summary Statistics

Variable	N	Mean	Minimum	Maximum
Debt to GDP	1626	1,179,245	.5848	2.61 e+08
GRA	1772	4.33 e+08	0	3.59 e+10
PRGT	1772	4.40 e+07	0	1.41 e+09
Ave GRA	1772	4.20 e+08	0	3.50 e+10
Ave PRGT	1772	4.30 e+07	0	1.42 e+09
Price Level	1672	0.5908	0.1971	1.7658
Trade	1586	91.5977	18.9816	439.6567
Tax Rate	1667	45.7359	7.4000	339.1000
Consumption	1511	81.8239	13.7311	252.5373
GDP Cap	1700	12593.5	154.9245	116612.9
Political Stability	1730	-.1123	-3.3239	1.5355
Quality	1721	-0.0777	-2.6646	2.2629
Goods Balance	1627	-6.6991	-171.9918	50.6846
Inflation	1579	21.7572	-35.8367	21,411.03

Table II reports our pairwise correlations for our variables of interest and shows most correlations are only moderate at best, limiting concerns of multicollinearity. *Ave GRA* and *Ave PRGT* are not significantly correlated with our dependent variable *Debt/GDP*. *Ave GRA* and *IMF Net* are positively and significantly correlated, as expected. Also as expected, we have statistically significant correlations among our economic independent variables.

3.2 Methodology

We employ a country fixed-effects regression analysis to enable us to control for unobservable omitted variables and include year fixed effects, utilizing the model below:

$$Debt_{i,j} = \beta_0 + \beta_1 Loan_{i,j} + \beta_2 Econ_{i,j} + \varepsilon$$

Where *Debt* is the level of country *i* debt, scaled by GDP, in year *j*. To ensure we do not have simultaneity bias in our results, we use both current year and a lagged dependent variable in our analysis. *Loan* is the PRGT and GRA credit amounts for country *i* in year *j*. We analyze both PRGT and GRA credit independent variables jointly in our analysis and in regressions independent of one another. We also employ an additional IMF loan variable, *Net IMF*, to ensure robustness of our analysis.

Econ represents various economic variables that impact a country's debt. Specific to our analysis, we utilize national *Price level* to indicate the strength of a country's currency, similar to

Table II: Pairwise Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Debt/GDP	1											
Ave GRA	-0.0123	1										
Ave PRGT	-0.0248	-0.0185	1									
IMF Net	0.0124	0.6356*	-0.0164	1								
Price level	0.0531	0.0504	-0.2388*	0.0119	1							
Trade	0.0680*	0.0158	-0.1376*	-0.0365	0.1248*	1						
Tax rate	0.0649*	-0.0141	0.1330*	-0.0158	-0.1046*	-0.1795*	1					
Consumption	0.3425*	0.0041	0.1856*	-0.0159	-0.2028*	-0.1456*	0.1679*	1				
GDP/Capita	-0.0099	0.0512	-0.2131*	0.1394*	0.7927*	0.2903*	-0.1621*	-0.4117*	1			
Political Stability	0.0959*	0.0129	-0.3207*	-0.0461	0.5978*	0.3584*	-0.1932*	-0.2760*	0.5170*	1		
Quality	-0.0645*	0.0904*	-0.1972*	0.0964*	0.6600*	0.2219*	-0.2601*	-0.2527*	0.7147*	0.5998*	1	
Goods balance	-0.065	0.05	-0.1545*	0.0339	0.2237*	0.1109*	-0.1292*	-0.9007*	0.4520*	0.1804*	0.3014*	1
Inflation	-0.0008	-0.0046	0.0151	-0.005	-0.0328	-0.0047	0.0029	0.0292	-0.0201	-0.0312	-0.0663*	-0.0051

* denotes statistical significance at 1%.

Dreher & Vaubel, 2002, as countries with stronger currencies tend to need lower amounts of debt. Neck & Sturm (2008) find that countries with higher levels of imports are more likely to require IMF credit and/or other forms of debt, therefore we control for a country's *Trade* (Neck & Sturm 2008). Logically, countries with higher values of exports and are more heavily reliant on trade tend to have a greater tendency to borrow money. For this reason, we also control for a country's *Goods balance*.⁹ Dreher and Vaubel (2004) similarly control for a country's trade. *Tax rate* is included in our analysis as taxes are the main source of a government's revenue. Governments with lower taxes may be more prone to borrowing and have higher debt levels. *Consumption* could indicate higher levels of sovereign debt as it measures both public and private consumption; therefore, we control for it in our analysis. Neck & Sturm (2008) find a weak growth in GDP results in an increased reliance on IMF credit, so we control for a country's GDP/capita, similar to the work of Lee and Shin (2008) and Dreher and Vaubel (2004). *Political stability* and *Quality* are two measures we utilize to control for the overall governance of a country. Countries with good governance have higher accountability, more transparency and can support sustained economic growth (IMF, 1997). Countries with good governance may have a lower debt level and we control for this in our analysis. To control for the possibility of inflation causing a higher debt value, we included *Inflation* as a control variable. As inflation increases, the cost of goods increases and can impact a country's debt level.

First, we analyze the entire population of countries, then we divide our sample into various sub-samples and time periods for investigation. Specifically, we group our samples based on developed, emerging and frontier economies, geographical regions and pre- and post-financial crisis. We utilized the period of 2008 through 2009 as our financial crisis period (i.e., NBER specifies Jan 1, 2008 to June 30, 2009 for the crisis time period) and analyze our pre-crisis subsample prior to January 2008 and our post-crisis subsample after December 2009.

III. Empirical Results

Table III provides the baseline analysis using country fixed effects regressions with firm clustered, heteroskedasticity-robust standard errors. We vary our analysis utilizing the lagged and current dependent variable, *Debt/GDP*, the year end *GRA* and *PRGT* and *Ave GRA* and *Ave PRGT* proxies for moral hazard. Overall, we find a positive and statistically significant relationship between GRA credit and a country's level of debt. Specifically, regressions (1) and (2) find the year-end GRA positive and statistically significant at 1%. Our coefficients for year-end GRA and the average GRA are comparable at 1.54e-09 and 1.54e-09. We compare our results using the lagged dependent variable to using the current year Debt/GDP values in regression (3) and again find a positive and statistically significant coefficient of 1.35e-09 on the year-end GRA credit. Lastly, we evaluate the World Bank reported *Net IMF* value and find the coefficients on both *GRA* and *Net IMF* are positive and statistically significant at 1%. We see a slight increase to the coefficient on GRA for this regression; therefore, in unreported results, we analyze regression (3) with only *Net IMF*, dropping *GRA*, and our results are consistent for *Net IMF*. Regression (3) finds our proxy for moral hazard robust and our overall results are

⁹ Trade and Goods balance show a high correlation, therefore, in unreported results we omit each of the variables and run our analysis with only one of the two variables, running two regressions, one for each variable. Our results are not impacted by these variables.

consistent with Dreher and Vaubel (2004); however, we also evaluate the economic significance of the GRA credit.

Table III: GRA and PRGT

	(1)	(2)	(3)	(4)
VARIABLES	Lag Debt/GDP	Lag Debt/GDP	Debt/GDP	Lag Debt/GDP
GRA	1.54e-09*** (1.92e-10)		1.35e-09*** (1.40e-10)	2.06e-09*** (5.87e-10)
PRGT	-3.12e-10 (7.13e-09)		-1.53e-09 (9.74e-09)	4.52e-09 (8.50e-09)
Ave GRA		1.59e-09*** (1.70e-10)		
Ave PRGT		1.74e-09 (7.20e-09)		
Net IMF				2.49e-09*** (9.31e-10)
Price level	-31.72 (22.76)	-30.90 (22.69)	-28.98 (18.98)	-71.44* (37.26)
Trade	0.856** (0.374)	0.849** (0.375)	0.656** (0.330)	1.109** (0.433)
Tax rate	0.239*** (0.0371)	0.239*** (0.0369)	0.157*** (0.0306)	0.223*** (0.0528)
Consumption	1.913*** (0.567)	1.918*** (0.566)	1.539*** (0.379)	1.835*** (0.437)
GDP/Capita	0.00118** (0.000529)	0.00118** (0.000527)	0.000743* (0.000414)	0.0115*** (0.00416)
Political stability	-6.761	-6.759	-9.75847**	-7.340

	(5.381)	(5.383)	(4.699)	(4.914)
Quality	-13.94*	-14.09*	-11.70	-11.31
	(7.989)	(8.022)	(7.641)	(11.26)
Goods balance	0.336**	0.332**	0.3254**	0.331
	(0.169)	(0.168)	(0.135)	(0.220)
Inflation	-0.000358	-0.000353	-8.96e-05	-0.000807**
	(0.000379)	(0.000377)	(0.000279)	(0.000399)
Firm Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Observations	1,357	1,357	1,356	885
R-squared	0.465	0.466	0.382	0.540
Number of Countries	157	157	157	101

Note: Lagged debt/gdp and debt/gdp are regressed, controlling for firm fixed effects, on GRA and PRGT credits and country debt controls. Variables are as described in Table A-1. Our data consists of GRA and PRGT balances for IMF member countries from January 2005 to December 2015. Clustered robust standard errors are included and significance at the 10%, 5% and 1% levels are marked (*, **, ***).

To evaluate the economic impact of GRA credit on Debt/GDP we focus on our GRA coefficient which is to the magnitude of E-09. Using the mean values of our sample, an average Debt/GDP value of 1,179,245 would only increase, on average, 1.59 e-09 for every dollar of GRA credit. The average GRA credit across our sample is \$420,000,000 which would indicate an increase to Debt/GDP of 0.67. This does not seem to be a significant impact to Debt/GDP based on the mean value, so we further evaluate our Debt/GDP variable. We calculate the median Debt/GDP to be 40.57 which indicates we have outlying observations impacting our averages.¹⁰ Based on the median Debt/GDP value, a \$420,000,000 GRA loan would increase the Debt/GDP by 2%. For our minimum Debt/GDP country, this would more than double the Debt/GDP. In other words, our coefficient appears economically insignificant when comparing the overall sample; however, for countries with lower Debt/GDP values, GRA borrowing could cause a significant moral hazard problem. In general, our results in Table III support rejecting our hypothesis, finding GRA credit creates country moral hazard.

In addition to analyzing GRA credit as a proxy for moral hazard, Table III also evaluates the impact of PRGT credit on Debt/GDP. Our results find that *PRGT* is not statistically significant, indicating that PRGT credit does not create moral hazard. This is not surprising considering the concessional lending of PRGT credit requires receiving countries to enact

¹⁰ In unreported results we Winsorize our sample to remove outliers with no impact to our regression results.

austerity policies and be monitored by the IMF. Our results indicate that these austerity measures and monitoring prevent moral hazard in comparison to the lack of austerity measures associated with GRA credit, which creates moral hazard. These results show that IMF involvement in governments that receive credit prevents moral hazard.

We perform robustness checks by first dividing our sample into developed, frontier and emerging market countries¹¹ to examine any impact country subsets and market development have on our regression results. Table IV provides the results of these analyses. In all of our subsets, the coefficient on *PRGT* remains insignificant. Specific to the coefficient on *Ave GRA*, frontier markets show no statistical significance between *Ave GRA* and *Debt/GDP*. These results indicate that our initial results from Table III have a degree of country dependence. We further break our sample into developed/non-developed and emerging/non-emerging markets and find the coefficient on *Ave GRA* is positive and statistically significant for all subsamples and the coefficients are within the same degree of magnitude.

Based on the results of our market development subsample we further separate our sample into subsets to evaluate moral hazard geographically. Table V provides the results of our analysis. The first two regressions evaluate European and non-European samples, the third and fourth regressions evaluate European Union (EU) and non-EU countries, the fifth and sixth subsamples evaluate Asia and non-Asian countries and regressions seven and eight evaluate countries in the geographical Americas and outside of the geographical Americas. We find consistent results across European, non-European, EU-countries and non-EU countries. Specifically the coefficient on *Ave GRA* is positive and statistically significant at 1% for European, EU-countries and non-EU countries, and are the same degree of magnitude. However, our Non-European coefficient is significant only at 10%. When evaluating Asian countries, we have no statistical significance between *Ave GRA* and *Debt/GDP* and this result holds for countries located within the Americas. These results show that our main results are driven by European countries, extending to countries in the European Union, and that moral hazard, generated by the IMF is contained within these countries.

¹¹ Based on the MSCI Emerging Markets Indices

Table IV: Market Development Subsets

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Frontier	Non-Frontier	Developed	Non-Developed	Emerging	Non-Emerging
Ave GRA	7.03e-10 (5.00e-10)	1.51e-09*** (1.95e-10)	1.37e-09*** (4.30e-10)	1.65e-09*** (2.25e-10)	1.32e-09*** (1.55e-10)	1.69e-09*** (2.46e-10)
Ave PRGT	2.44e-09 (3.52e-09)	1.17e-08 (1.61e-08)	-	1.81e-09 (7.48e-09)	-	1.92e-09 (7.20e-09)
Firm Fixed Effects	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	230	1,127	196	1,161	187	1,170
R-squared	0.475	0.503	0.778	0.470	0.703	0.476
Number of Countries	26	131	22	135	21	136

Note: Lagged debt/gdp is regressed, controlling for firm fixed effects, on the yearly average GRA and PRGT credits and country debt controls. Country debt controls are as listed in Table 3, and described in App. A, but excluded here for brevity. Data is divided into three subcategories based on market development: frontier, developed and emerging. Our data consists of GRA and PRGT balances for IMF member countries from January 2005 to December 2015. Clustered robust standard errors are included and significance at the 10%, 5% and 1% levels are marked (*, **, ***).

Table V: Regional Subsets

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Europe	Non-Europe	EU	Non-EU	Asia	Non-Asia	Americas	Non-Americas
Ave GRA	1.18e-09*** (2.57e-10)	3.01e-09* (1.77e-09)	1.17e-09*** (2.90e-10)	2.45e-09*** (7.13e-10)	2.37e-09 (2.25e-09)	1.56e-09*** (1.70e-10)	8.99e-09 (6.76e-09)	1.60e-09*** (1.73e-10)
Ave PRGTt	-1.12e-08 (5.98e-08)	5.36e-09 (8.17e-09)	-1.46e-07 (4.33e-07)	3.33e-09 (7.51e-09)	-1.63e-08 (1.76e-08)	5.98e-09 (8.24e-09)	1.53e-08 (8.50e-08)	2.52e-09 (8.01e-09)
Firm Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y
Observations	325	1,032	269	1,088	148	1,204	298	1,059
R-squared	0.786	0.478	0.801	0.471	0.466	0.489	0.389	0.503
Number of Countries	37	120	31	126	17	139	34	123

Note: Lagged debt/gdp is regressed, controlling for firm fixed effects, on the yearly average GRA and PRGT credits and country debt controls. Country debt controls are as listed in Table 3, and described in App. A, but excluded here for brevity. Data is divided into four geographical subcategories: Europe, EU-member countries, Asia, and Americas. Our data consists of GRA and PRGT balances for IMF member countries from January 2005 to December 2015. Clustered robust standard errors are included and significance at the 10%, 5% and 1% levels are marked (*, **, ***).

In line with the research by Dell’Ariccia et al. (2002) and Lee and Shin (2008) who evaluate investor moral hazard surrounding financial crises, we evaluate moral hazard surrounding the most recent global financial crisis. We separate our sample into various pre- and post-financial crisis subsamples. To ensure our results are robust, we utilize both the lagged *Debt/GDP* dependent variable and the current year *Debt/GDP* variable, due to losing observations with lagged variables. Our results are quite telling regarding the pre- and post-financial crisis and are provided in Table VI. Specifically, we find our GRA credit results are confined to the subsample post-financial crisis. This is when countries are more vulnerable and willing to risk higher debt levels knowing that the IMF is available for bailouts.

Further evaluating our pre- and post-financial crisis subsamples, we find that PRGT is statistically significant pre-crisis for the current year *Debt/GDP* regression analysis. This differs from post-regression and our full sample analysis. Reasonably, regarding the full sample analysis, this could be attributed to year fixed effects; however, the pre-financial crisis period is prior to the revision to the concessional lending structure for low-income countries implemented on January 7, 2010. We suggest that the revisions to the low-income concessional lending structure, including the austerity measures and oversight by the IMF, naturally precludes moral hazard with PRGT credit. The order of magnitude is E-07 which has an economic impact to *Debt/GDP*. Utilizing the Average PRGT of 4.4 E+07 reported in Table I, a coefficient of 1.09E-07 would result in a 5.28 increase to *Debt/GDP*. For the median *Debt/GDP* of 40.57, this would equate to a 13% increase.

Lastly, we evaluate our regional subsets prior to and after the subprime crisis to determine if there are any regional impact on the results we find in Table VI. Based on the results of Table V, we focus on the European and EU subsamples. These results are provided in Table VII. For our pre- and post-European subsample, regressions (1) and (2), we find the coefficient on *Ave GRA* is positive and statistically significant at 1% for both time periods (2.65e-08 and 5.12e-10). The European Union subset, regressions (3) and (4), have very similar results (1.14e-08 and 6.02e-10). Both the Non-European and Non-EU subsamples show no statistical significance for *Ave GRA* in either period. Our results continue to support refuting our hypothesis and we find that GRA credit creates country moral hazard.

Focusing on *Ave PRGT* we find pre-crisis results similar to Table VI, specifically all four pre-crisis analyses have a positive and statistically significant coefficient on *Ave PRGT*. We find that post-crisis, only the European subsamples has a statistically significant coefficient at 5% on *Ave PRGT*; however, the sign of the coefficient changed to negative. These results are interesting and indicate that the austerity measures and IMF oversight actually serve to lower debt levels for European countries after the financial crisis. This results indicates that PRGT credit, after the revisions to the program on January 1, 2010, actually prevents moral hazard for European countries.

Table VI: Financial Crisis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	<u>Pre-Financial Crisis</u>				<u>Post-Financial Crisis</u>			
	Lag Debt/GDP	Debt/GDP	Lag Debt/GDP	Debt/GDP	Lag Debt/GDP	Debt/GDP	Lag Debt/GDP	Debt/GDP
Ave GRA	-4.22e-09 (2.82e-09)	7.42e-10 (7.93e-10)			1.11e-09*** (2.26e-10)	5.98e-10*** (1.40e-10)		
Ave PRGT	7.67e-08 (9.19e-08)	1.09e-07*** (3.03e-08)			5.51e-09 (1.28e-08)	5.41e-10 (8.22e-09)		
GRA			-1.81e-09 (2.53e-09)	9.51e-10 (9.79e-10)			9.90e-10*** (2.63e-10)	6.41e-10*** (1.93e-10)
PRGT			-9.32e-08 (1.26e-07)	1.20e-07*** (3.10e-08)			-9.72e-09 (8.39e-09)	-3.06e-09 (6.82e-09)
Firm Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y
Year Fixed Effects	N	N	N	N	N	N	N	N
Observations	210	276	210	276	850	850	850	850
R-squared	0.360	0.359	0.353	0.359	0.211	0.191	0.197	0.191
Number of Countries	150	151	150	151	155	155	155	155

Note: Lagged debt/gdp and debt/gdp are regressed, controlling for firm fixed effects, on the yearly average GRA and PRGT credits and the year-end GRA and PRGT credits. Country debt controls are as listed in Table 3, and described in App. A, but excluded here for brevity. Data is divided into pre-financial crisis including the period prior to 2008 and post-financial crisis including the period from

2010 on. Our data consists of GRA and PRGT balances for IMF member countries from January 2015 to December 2015. Clustered robust standard errors are included and significance at the 10%, 5% and 1% levels are marked (*, **, ***).

Table VII: Financial Crisis and Regional Subsets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<u>Europe</u>		<u>European Union</u>		<u>Non-Europe</u>		<u>Non-EU</u>	
VARIABLES	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Ave GRA	2.65e-08*** (9.42e-09)	5.12e-10*** (1.43e-10)	1.14e-08*** (0)	6.02e-10*** (1.33e-10)	-2.68e-10 (1.16e-09)	8.75e-10 (1.07e-09)	3.09e-10 (9.92e-10)	-6.60e-10 (1.16e-09)
Ave PRGT	8.75e-07** (3.42e-07)	-1.20e-07** (4.73e-08)	8.77e-07*** (0)	- (0)	1.04e-07*** (3.03e-08)	1.57e-09 (9.17e-09)	1.08e-07*** (3.02e-08)	3.92e-09 (7.87e-09)
Firm Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y
Year Fixed Effects	N	N	N	N	N	N	N	N
Observations	49	211	36	176	227	639	240	674
R-squared	0.966	0.513	1.000	0.545	0.377	0.147	0.363	0.165
Number of Countries	35	37	30	31	116	118	121	124

Note: Debt/gdp is regressed, controlling for firm fixed effects, on the yearly average GRA and PRGT credits and the year-end GRA and PRGT credits. Country debt controls are as listed in Table 3, and described in App. A, but excluded here for brevity. Data is divided into pre-financial crisis including the period prior to 2008 and post-financial crisis including the period from 2010 on. The data is further subdivide regionally into Europe and EU-member countries. Our data consists of GRA and PRGT balances for IMF member countries from January 2015 to December 2015. Clustered robust standard errors are included and significance at the 10%, 5% and 1% levels are marked (*, **, ***).

IV. Conclusion

We provide empirical analysis of the creation of country moral hazard by the IMF. Our results specifically confirm that GRA credit creates moral hazard but that this is isolated primarily to European countries and EU-member countries. These results are consistent pre- and post-financial crisis. Specific to PRGT credit we find that prior to the financial crisis and the latest revision to the program, PRGT created moral hazard and this too is isolated to European and EU-member countries. However, after revision to the PRGT, we find that PRGT credit actually prevents moral hazard for European countries.

Our results are consistent with Dreher and Vaubel's (2004) finding that IMF loans create moral hazard, but we find this effect focuses on European and EU-member countries. Specific to European countries, we find that the reforms to the PRGT that went into effect on January 1, 2010 actually prevent moral hazard. We attribute this to the austerity measures and oversight implemented by the IMF.

Our findings add to the continued strand of literature that evaluates moral hazard created by the IMF. In general, our research adds to the literature on public-choice theory. We feel that research still remains to help explain moral hazard and suggest future research can be conducted, specific to other credit mechanisms similar to those of the IMF, to further strengthen the findings on moral hazard.

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Appendix A

Table A-1: Variable Descriptions

Variable	Description	Source
Debt/GDP	Total debt as a fraction of GDP.	
GRA	Total GRA loans less repayment. Recorded monthly by IMF in SDR and converted to US \$. Value used for GRA is for December for the given year.	IMF
PRGT	Poverty Reduction and Growth Trust (PRGT) resources disbursed, including outstanding Trust Fund and Structural Adjustment Facility (SAF). Recorded monthly by the IMF in SDR and converted to US \$. Value used for PRGT is for December for the given year.	IMF
Ave GRA	Total GRA loans less repayment. Recorded monthly by IMF in SDR and converted to US \$. Value used is the average of all monthly values for the given year.	IMF
Ave PRGT	Poverty Reduction and Growth Trust (PRGT) resources disbursed, including outstanding Trust Fund and Structural Adjustment Facility (SAF). Recorded monthly by the IMF in SDR and converted to US \$. Value used is the average of all monthly values for the given year.	IMF
Net IMF	IMF repurchases and charges from which includes total repayments of outstanding drawings from the GRA and interest charges with respect to all uses of IMF resources, measured in U.S. \$.	World Bank WDI
Price level	The national price level found by dividing the PPP conversion factor by the market exchange rate.	World Bank WDI
Trade	The sum of exports and imports of goods and services measured as a share of GDP.	World Bank WDI
Tax rate	Measured as a % of commercial profits defined as the amount of taxes and mandatory contributions payable by businesses after accounting for allowable deductions.	World Bank WDI
Consumption	The sum private consumption and general government consumption as a fraction of GDP.	World Bank WDI

GDP/capita	Gross domestic product per capita, current prices in U.S. dollars	IMF WEO
Political Stability	Measures perceptions that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism (Kaufmann, Kraay & Mastruzzi, 2010).	World Bank Governance Index
Quality	Reflects perceptions of the ability of the government to formulate and implement sound policies/regulations that allow private sector development (Kaufmann, Kraay & Mastruzzi, 2010).	World Bank Governance Index
Goods balance	External balance on goods and services (exports of goods and services minus imports of goods and services) measured as a fraction of GDP.	World Bank WDI
Inflation	Annual percentage change in the cost to the average consumer of acquiring a basket of goods and services.	World Bank WDI
