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Senior Honors Thesis

Argentina: A Case for Moral Hazard

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Abstract: An unprecedented number of emerging market countries experienced severe financial failure during the 1990s. These failures coincided with a series of exceptionally large IMF bailouts, where individual loans were administered to failing countries and were in turn used to repay private lenders, who had invested in those failing countries. As a result of the simultaneity of these occasions, concerns emerged that the IMF, as an organization that lends money to countries in crisis, generates incentives for lenders to invest in ways that make a crisis more likely to occur. It was presumed that the IMF bailouts created this phenomenon, known as creditor moral hazard, by encouraging investors to take excessive risks based on the expectation that they would be rescued from financial losses as they had been during past crises. Building on recent research, in this study I test for the presence of creditor moral hazard. To test for this, I apply an event study approach that examines whether various IMF announcements, which could have altered the perception of the likelihood of an IMF bailout, significantly influenced emerging market investor's perception of risk during the 2001 financial crisis in Argentina. This test assumes that if perceptions of risk are altered by IMF announcements then investors are inclined to take excessive investing risk based on the IMF bailouts. Therefore, the IMF would generate investor moral hazard and thereby exacerbate the very financial crisis that they are attempting to thwart.

I. Introduction

The occurrence and degree of moral hazard ensuing from international lending has become the subject of considerable debate in political and intellectual circles. These debates emerged during the last decade in the aftermath of several large and unprecedented bailouts administered by the International Monetary Fund (IMF). Such bailouts began during the 1994-95 crisis in Mexico, and continued most notably with the 1997 crisis in East Asia, 1998 default in Russia, and 2001 default in Argentina. The subsequent debates have centered on one question: "Does the presence of the IMF, as an institution that lends to countries in crisis, create incentives for borrowers and lenders to behave in ways that makes a crisis more likely?" (Lane and Phillips 3). In other words, have the recent IMF rescue packages created or amplified the degree of moral hazard resulting from lending to emerging market economies?

II. Moral Hazard

a. Introduction to Moral Hazard

Moral hazard is recognized as a pervasive phenomenon. Very generally, it refers to the possibility that by diminishing the motivation to avert a particular outcome, the provision of insurance may actually lead to an increase in the occurrence of that outcome. Health insurance is perhaps the most frequently cited example of moral hazard. In this example, the insured are more disposed to over employ healthcare services. For, after receiving health insurance, they will tend to ignore preventative care and will often participate in risky activities, actions that if not taken would likely decrease their need for future healthcare services. The insured are more willing to take these costly actions above, the level that they would otherwise without the provision of insurance, knowing

that an insurer, rather than themselves, will bear the cost of their medical expenses. In effect, insurance coverage distorts their perception of risk, which causes the insured to experience less motivation to avoid risk, unlike their uninsured counterpart. Therefore, by assuming the costs of medical expenses, health insurance reduces an individual's aversion to employing healthcare services and thereby increases the frequency of its use. It in other words creates the moral hazard phenomenon.

The moral hazard phenomenon applies to numerous other insurance examples, such as automobile, fire, or even life insurance. For example, an insured driver will drive further, faster, and overall more recklessly knowing that they will not directly suffer monetarily from any resulting automobile accidents. Again, this insurance distorts the insured's perception of risk, and in this example increases the probability that an auto accident will occur. Overall, these examples depict the nature of moral hazard. Moral hazard is simply the increase in probability of an accident (hazard) that results when people or firms (moral agents), who have taken out insurance or have some form of insurance against a negative outcome, have a reduced motivation to take precautions that they would otherwise without insurance.

b. Moral Hazard in the Financial Markets

International finance is also vulnerable to moral hazard. In fact, the financial markets can experience various forms of moral hazard. However, in the form studied here, moral hazard occurs when an international financial institution attempts to provide financial assistance to a country experiencing economic crisis and as a byproduct of this assistance actually increases the probability that the crisis or a future one will occur. Debates specifically regarding IMF induced moral hazard can actually take two forms,

each differentiated by the type of insured risk-taker included in the debate. There are two possible types of risk-takers potentially influenced by the IMF: (1) the creditors investing in the emerging market countries receiving aid and (2) the policy makers of the emerging market countries receiving aid. In other words, the moral hazard possibly created by the IMF could result from excessive emerging market investing fueled by inadequate creditor scrutiny, or irresponsible policy decisions on the part of emerging market government officials, which is referred to as creditor and debtor moral hazard respectively. Both phenomena are potentially very troublesome. However, the remainder of this paper will focus on the latter, creditor moral hazard.

The debate regarding the IMF's ability to create creditor moral hazard is concerned with the effect that large and routine monetary disbursements made by the IMF to emerging market countries have on a creditor's investing behavior. Ultimately, economists and policy makers are concerned that by acquiring a reputation for repeatedly providing assistance to countries on the verge of default and thereby preventing their default, the IMF is gradually perceived by creditors as an insurer against default. Thereby, in line with creditor moral hazard, a creditor's willingness to take investment risk is increased. This phenomenon is especially concerning when the perception of the IMF as an investor is combined with creditors, already attracted to invest in specific emerging market countries, by very profitable interest rates[1]. Under these conditions, the IMF bailouts in essence negate the necessity for these high interest rates. For creditors could perceive that there is in fact, with IMF insurance, no risk of default. Therefore, the

[1]*As due to weak economic fundamentals, the emerging market countries are less stable and therefore more likely to default on their loans. Therefore, to overcome this risk, countries attract investors with high interest rates.*

creditors would presume that they are being paid for a risk that they will in fact never suffer monetarily from. Therefore, there is concern that the combination of what is perceived to be insurance provided by the IMF with extremely profitable interest rates offered by emerging market countries, creditors will be willing to invest in much greater quantities to less stable countries. Furthermore, economists and policy makers are concerned that this increased investing will overtime result in a run on credit in the relevant emerging market countries, and thereby exacerbate the very financial crisis trying to be averted by the initial IMF disbursements. If this concern is valid, then the IMF creates creditor moral hazard, and this phenomenon may explain many unprecedented economic events in the emerging markets during the 1990s and early part of the twenty-first century.

III. Experiences with Moral Hazard

Concern with the IMF's ability to create creditor moral hazard has evolved overtime. Therefore, a historical perspective helps clarify the nature and current status of the moral hazard debate. Consequently, after a general discussion, this section reviews four key financial events which may have influenced or been influenced by creditor moral hazard. Each of these events has also prompted much of the concern and subsequent debates regarding moral hazard. The events discussed are the recent financial crises that occurred in: Mexico, East Asia, Russia, and Argentina.

a. General Evolution of Moral Hazard

Unease with the actions of the IMF resulting from creditor moral hazard is relatively recent. It emerged as the role of IMF evolved to its present state. This evolution was initially prompted by, and continues to occur today in concert with, changes in the global economy. The IMF of today emerged out of the institution originally established in 1944 at Bretton Woods. In its early stages, propelled by the experience of the 1920s and 1930s, the institution's primary objectives were to manage the current account balances and exchange rates of its approximately forty member countries. However, today's economy is much evolved from 1944. For instance, an unprecedented number of financial markets have been created and integrated across the globe. Meanwhile, private investments, especially in the emerging markets, have boomed. Though, the emerging markets of today have also experienced an unprecedented number of financial crises that threatened the prosperity of the global economy. Given these changes, the IMF has also evolved. Today, the institution's primary objective is to prevent instability in the global economy. In addition, it has become a 182 member "surveillance" institution which lends reserves in the form of rescue packages to developing countries while advising them on macroeconomic policies. These simultaneous structural changes, to the economy and the IMF, have prompted the concern with the IMF's possible creation of creditor moral hazard. Gradually, concern emerged that the goal and recurring nature of IMF disbursements will stimulate volatile short-term capital flow and result in further financial crisis, as has possibly played a critical role in recent crises, such as those experienced in East Asia, Russia, and Argentina.

b. 1995 Crisis in Mexico

The initial concern with creditor moral hazard surfaced following the financial crisis in Mexico during late 1994 and early 1995. During the crisis, Mexico's economy suffered from a protracted period of overvalued exchange rates and government overspending. These ills gradually resulted in broad economic instability and eventually stimulated concern across the international financial community. Especially in the United States, concern emerged that Mexico's depressed economy would progressively thwart growth in the global economy, and thereby threaten the IMF's primary goal. Therefore, on fears that Mexico would default as their debt accumulated to over $55 billion[2], the IMF and United States government administered a rescue package worth over $48 billion. However, this action prompted a new concern. Now mainly among academics and policy makers, worries surfaced that the IMF's rescue would induce moral hazard, as it was by far the largest rescue package ever administered by the IMF. In fact, Mexico's rescue package amounted to over three times any single amount ever before administered.

Perhaps, more important than the size of the rescue package in cultivating creditor moral hazard though was the subsequent use of the IMF funds. After being disbursed to the Central Bank, the funds were used in part to make payment in full to the holders of Tesobonos[3]. Further still, another portion of the funds was used to rescue many commercial banks that held other Mexican loans. These creditors were yielding very

[2] *http://www.shcp.gob.mx/english/docs/mben/mben0600.pdf_ Ministry of Finance and Public credit of Mexico- Bi monthly economic news- January 24, 2000*

[3] *A Mexican treasury bill denominated in pesos but indexed to the US dollar.*

high interest rates, over 20% per annum in many cases, to compensate for the financial risk associated with investing in Mexico's unstable economy. Therefore, these creditor payments resulting from IMF loans essentially prevented investors, who accepted the risk of financial losses as a condition for receiving such high interest rates, from experiencing losses. In essence, the IMF rescue package functioned for creditors as an insurance against financial losses for taking investment risks. Therefore, this use of funds further fueled concern that the IMF's assistance in Mexico might distort creditors' willingness to take risk. According to those concerned, this distortion would prompt investors to take greater investing risks under the assumption that the IMF would always intercede at a certain level of country instability to prevent weakness from transferring to the global economy. As a result, investors are sheltered from investing losses which would prompt a willingness to invest in greater amounts. Inevitably, this increase would result in an in investing boom, fueling a run on credit, and thereby encouraging default.

c. 1997 Crisis in East Asia

This concern appeared to be substantiated by a subsequent run on emerging market investments that culminated in the 1997 East Asian financial crisis. To those who presumed the Mexican rescue package resulted in moral hazard, this latest crisis was fueled by excessive investing on the part of creditors who expected that the IMF would insure them against monetary losses in the event of a financial crisis. In other words, they presumed that IMF insurance encouraged creditors to lend to developing countries (most especially the Asian countries) above the level justified by their economic fundamentals which resulted in an unsupportable run on credit. These assertions were

substantiated by a one year 38% climb in the number of mutual funds specializing in the emerging markets, taking place in the spring of 1995, shortly after the Mexican crisis[4]. Moreover, the net private capital, which amounted to slightly over $42 billion in 1990, leaped to $329 billion by 1996[5].

Investors' foremost lure though was in Asia, where between 1995 and 1997 "the lending to the East Asian region skyrocketed"[6]. This increase, combined with the subsequent lack of liquidity, suggested that investor exuberance exacerbated the financial crisis in Asia. Therefore, like Mexico, concerns emerged across the broader economic community. The economic community, and especially the IMF, were now concerned that East Asia's financial instability would adversely affect the global economy. This therefore prompted the international community, lead by the IMF, to administer $55 billion to South Korea, $40 billion to Indonesia, and $17 billion to Thailand[7]. Like Mexico, these rescue packages were deposited in the central bank which subsequently paid off the emerging market investors, in these cases the exuberant creditors. Therefore, like the Mexican bailout, it was not the size as much as the nature of the subsequent use of the IMF disbursement that generated the concern with IMF induced creditor moral hazard. That is, the concern that by ensuring debt obligations were met, the IMF rescue packages encouraged more careless lending, debt runs, and eventually financial crises. Therefore, the actions in East Asia set the stage for another financial crisis teeming with exuberant investors.

[4] *This figure is taken from Paul Blustein.*
[5] *This figure is taken from Paul Blustein.*
[6] *Quote taken from Carmen Reinhart- an economist for the IMF Capital Division (located in Blustein).*
[7] *This figure is taken from Paul Blustein.*

d. 1998 Crisis in Russia:

By the middle of 1998, the enormous rescue packages administered in Mexico and East Asia that prompted concern with IMF induced moral hazard were about to come to a halt. Shortly after the 1997 Asian financial crisis, in 1998, Russia entered a period of extreme financial turmoil. Before this, in the early 1990s, Russia began to transition from a communist command and control system to a market economy. Favoring this transition, as it would obviously benefit the broader global economy, the IMF came to provide extensive support to Russia as it converted to a market economy. For instance, in 1995 the IMF approved a $6.8 billion dollar loan to thwart inflation and in 1996 the IMF allocated another $10 billion dollars, one of the largest credits administered in its history to that date.

At the same time, Russian authorities welcomed an influx of exuberant investing by foreign financers. These financers inundated Russia's market with credit for two primary reasons: (1) Russia's bonds had very high returns yielding over 20-30% quarterly and (2) Several private lending institutions memos show that the high returns were expected to be in essence insured by the IMF. Taken together, these motivations suggest that investors were trying to take advantage of a unique financial opportunity, the guarantee of profits without the risk of losses. In other words, in the event of economic failure, investors expected the IMF to rescue Russia and to be subsequently paid as had been experienced in East Asia and Mexico. As one mass produced Merrill Lynch memo stated: "there is little risk of devaluation with new IMF loans" and in a subsequent memo "remember also that the IMF loan virtually assures a stable exchange rate". These

sentiments resulted in an overextended credit market and allowed Russia to overextend its debt obligations. For instance, foreign investing reached a level greater than 10% of Russia's GDP, though this seemed to concern very few investors. Furthermore, it appears that investors and Russian officials failed to consider that factors affecting the financial assistance between Russia and the IMF might differ from those between East Asia and Mexico with the IMF.

By 1998, after repeated disbursements, Russia had a reputation with the IMF for failing to make the commitments necessary to stabilize their economy. As this reputation worsened, so too did the concern that an undeterred Russia would continue to rely on the IMF rescue packages long into the future. Therefore, it was eventually decided by IMF officials that "another IMF loan to Russia would be akin to handing a shot of vodka to an alcoholic"[8]. After one final disbursement, and to the surprise of foreign investors as well as Russian officials, the IMF refused to provide further assistance. Soon after, following failed rescue attempts by the World Bank and other financial institutions, Russia began to experience margin calls. This, coupled with other pressures, forced Russian officials to devalue the ruble and default on their short term debt. Shortly thereafter, international lending, especially in the emerging markets, experienced a notable decline.

Many in the moral hazard debate perceived this reversal in investing to have been prompted by investors readjusting their behavior in response to actual fundamental economic risk. In other words, it appeared that when investors unexpectedly experienced

[8]*This quote from IMF officials is taken from Blustein.*

loss in Russia they were prompted to be more cautious in all of their emerging market investments. Hence, international lending declined. Furthermore, many concluded that this unexpected abandonment forced investors to realign the expectations they placed on the IMF. In other words, the withheld disbursement, as the first of its kind amongst an amazing run of bailouts in the 1990s, meant that the IMF could no longer be viewed as a stable insurer against emerging market losses. As such, the assumptions made by Merrill Lynch and countless others appeared to be incorrect and creditors were behaving as though they were. Overall, these alterations implied that the moral hazard encouraged by IMF rescues was reduced if not demolished.

e. 2001 Crisis in Argentina:

The creditors revised perception of the IMF did not seem to last. Impressive bailouts, like those disbursed in Brazil and Turkey, appear to have mitigated the losses experienced during the 1998 crisis in Russia. Therefore, by 2001, the investor's expectation for the IMF to disburse large rescue packages appeared to gradually be restored. As a result, the exuberant behavior that characterized creditors in much of the 1990s appeared to be reemerging in the emerging markets, especially Argentina in 2001. In fact, despite debt amounting to over $129 billion, an overvalued exchange rate, and unstable budget and fiscal policies, investors continued to invest in Argentina.

At the time of the crisis, Argentina's relationship with the IMF was quite similar to Mexico's in 1995 and East Asia's in 1997. For instance, as Argentina's financial troubles emerged the IMF immediately granted them a $7.2 billion loan, in March 2000. This action was then followed on December 12, 2000 by an IMF announcement stating

the institution's commitment to assisting Argentina through their financial trouble. This position was reaffirmed by a May 4 announcement that paved the way for further debt exchange. As such, the IMF actions appeared to mimic the commitments in Mexico and Asia among others. Therefore, it appeared that investors would be, as in earlier experiences, rescued by the IMF in the event of a potential default.

The announcements triggering creditors to perceive the IMF as an insurance against default did not continue unabated, however. During a shift reminiscent of Russia's abandonment by the IMF, reports were published that the IMF would deny Argentina's financial assistance based on noncompliance. Eventually though, the credit disbursements were restored, such as a rushed disbursement of $1.2 billion in early August of 2001. However, this restoration was only temporary as the IMF again withheld a disbursement and subsequently allowed Argentina to default on December 21, 2001. Therefore, like Russia in 1998, the actions of the IMF in regard to Argentina depict their willingness to allow presumably "important" countries to "fail" or default at the risk of negative global impact. Again, as in Russia, moral hazard proponents expected this withholding to prompt creditors to revise their perception of the role of the IMF. This would then lead to a readjustment in the perception of risk by investors in the emerging market and as a result lead to decreased investing by more cautious creditors.

These examples suggest that there are two general outcomes for financially distressed emerging market countries: (1) the country avoids default by accepting international lending which allows them to repay bankers and other privileged investors. As a result, the investors escape the risks that they willingly accepted and for which they

received a premium, as in Mexico and East Asia and whereupon the debt shifted to the IMF at a lower interest rate or (2) the country buckles under financial pressure after the IMF decides to withhold future disbursements. This typically results in losses for investors, as experienced in Russia and Argentina. If the IMF induces moral hazard, we should expect the first outcome to promote investing, which could overtime create runs on credit and thereby exacerbate financial crises. Meanwhile, the second outcome should have the opposite effect, as creditors will be forced to evaluate the true fundamental economic risk in each country, knowing that the IMF may not bail out the country, no matter its level of importance to the global economy. However, before we proceed with further analysis on the effects of moral hazard, it should be determined whether concerns with moral hazard are in fact valid.

V. Literature Review

There have been several studies attempting to validate or debunk the creditor moral hazard theory. These studies occurred in response to the financial crises that were experienced through the 1990s and into the early part of the 21st century. The researchers, for the most part, attempted to detect the presence of moral hazard during the events of the 1990s using empirical data. Three of the most important studies will be discussed here. Those are: Zhang (1999), Lane and Phillips (2000), and Dell' Ariccia, Godde, and Zettelmeyer (2000). As will be seen, each researcher studies a different set of events, applies different methods, and arrives at different conclusions. This spectrum illustrates the range of methods and conclusions dominating the creditor moral hazard debate.

a. Zhang (1999)

In the first study, Zhang attempts to measure the presence of moral hazard in the international financial markets resulting from IMF bailouts. Moreover, he tests the long term impact of the Mexican bailout in 1995 on the occurrence of moral hazard. In his test, Zhang regresses quarterly emerging market bond spreads on four macroeconomic variables and measures whether a dummy variable changes significantly before and after the Mexico crisis. He uses the following regression model:

$$S_{e,t} = \alpha + \beta_1 (D/X)_{t-1} + \beta_2 (R/M)_{t-1} + \beta_3 p_{t-1} + \beta_4 S_{h,t} + \beta_5 D_1 + \beta_6 D_2 + e_t$$

Where, $S_{e,t}$ is the quarterly average spread on a emerging market bond for either a Eurobond or a stripped Brady bond against a U.S. Treasury, (D/X) is the fraction of external debt to exports of goods and services, (R/M) is the fraction of foreign reserves to imports of goods and services, p represents the consumer price inflation, S_h represents the spread on high yielding U.S. corporate bonds, D_1 represents a dummy variable where one is the value for observations during the Mexican crisis and zero is the value for any remaining time, D_2 represents a second dummy variable where a value of one is used for observations in the post Mexican rescue period and zero is used for the remaining time.

The results of this model generate an insignificant post Mexican crisis dummy. Furthermore, a positive coefficient is generated which is in fact counter to the moral hazard hypothesis. Therefore, Zhang concludes that little if any moral hazard resulted from the Mexican rescue package. Instead, he concludes that the declines in emerging

market bond spreads[9] are in response to economic fundamentals[10].

Zhang's test has minor problems. Therefore, the validity of his conclusions are questionable. For instance, as Zettlemeyer notes, Zhang's "result is based on an event which arguably is not well suited to test for the existence of moral hazard. Widely viewed as the first of a new type of crisis, the Mexican crisis probably led to a general reassessment of risks related to emerging market lending, as investors learned that even a country with a recent track record of reform and relatively sound fundamentals was vulnerable to a sudden capital flow reversal. Consequently, any reduction in spreads due to moral hazard may have been offset by an increase in the perceived riskiness of emerging market debt" (Zettlemeyer 2000).

Overall, Zhang's conclusion that the IMF rescue packages in Mexico did not generate any moral hazard could in principle be correct. However, as a precursor to several subsequent emerging market failures, it could have also affected future relationships between the IMF, emerging market countries, and creditors. Therefore, the IMF's actions could have indirectly prompted moral hazard or, as Zhang suggests, had no effect at all. However, this does not preclude future manifestations of moral hazard from occurring in the emerging markets, as is suggested to have occurred by the second and third studies in Russia.

[9] *Bond spreads measure the interest rate differential between two bonds. Therefore, a bond spread is simply the subtraction of one bond yield from another. Such spreads indicate the relative risk of the two bonds being compared. In this case, a spread measures the difference between an emerging market bond over US treasuries. This spread is intended to reflect the probability of default in the country being compared, as the US Treasury is considered a basis for comparison- being a default risk free bond.*

[10] *Economic fundamentals are items that play a vital role in the economic stability of a country. These include items such as: price stability, monetary policy, labor, and balance of payments.*

b. Lane and Phillips (2000)

In the second study, Lane and Phillips also test whether the recent financial support administered by the IMF induced moral hazard in the international financial markets. They assume that a degree of moral hazard is the consequence of any insurance provision, which the IMF rescue packages are a form of. Therefore, unlike Zhang, Lane and Philips attempt to detect an increase rather than simply the presence of moral hazard. This focus enables them to address their overall concern: whether the negative aspects of moral hazard generated by IMF assistance outweigh the overall benefits to the receiving countries and global financial community. They begin their analysis with Mexico's crisis in late 1994 and end with the conclusion of Russia's crisis in 1998.

In an attempt to address their overall concern, Lane and Phillips apply an event study or "news based" approach. With this method, they test whether market spreads respond predictably and in significant magnitudes to a series of events. These events are expected to be events that might have influenced the markets perception of the accessibility of the IMF's support in the future. For later analysis, they classify them according to three general categories. These three are:

1) Public announcement to provide financial support to financially ailing countries (as in the 1995 crisis in Mexico and the 1997 crisis in East Asia).

2) Public announcements regarding changes in the size of the IMF's financial resources (such as an increase in quotas or access limits).

3) Public announcements regarding the IMF's assistance to Russia during their financial crisis in 1998.

According to Lane and Philips' assumptions, given the presence of moral hazard, bond prices should fluctuate in response to particular events classified in one of the three categories above. In other words, given that the "investors consider that the availability of IMF financing significantly affects the riskiness of their investments then they will be willing to pay more or less for their investments depending on the particular IMF announcement". However, the overall question remains: Is the change in investor behavior, created by IMF actions, so significant that it outweighs the benefits of IMF actions?

Therefore, to address this question, after selecting and grouping twenty-two discrete and very significant episodes into the three possible categories, Lane and Philips measure the size of the movement in the bond spreads of daily EMBI data in response to these dates. Their test applies simple statistical analysis, rather than regressions. More specifically, they test whether their predetermined events result in a significantly larger (greater than one standard deviation) change in bond spreads for the EMBI than an average change in EMBI spreads for a two-hundred day sample during the same event period.

[11] *The Emerging Market Bond Index Plus (EMBI+) is an index generated by JP Morgan that tracks the traded external currency dominated debt instruments in the emerging markets. Included in the index are US dollar denominated and other non-local currency- denominated issues: Brady bonds, benchmark Eurobonds, and loans for various emerging market countries. The spreads measure the difference between the emerging market bonds over US treasuries. This spread is intended to reflect the probability of default in the country being compared. In this case the US is considered perfectly stable- therefore the spreads represent the complete degree of risk in the individual emerging market countries- which are the countries I expect to find moral hazard related to the IMF rather than stable countries such as the US, Britain, or France.*

Their results were mixed. In many cases, their test failed to yield significant results supporting a large presence of moral hazard. The changes in bonds spreads were within what they defined as a typical range of fluctuation[12]. For example, they didn't measure any significant change in bond spreads during the Asian crisis in 1997. Like Zhang, though less extreme, they suggest that the events in Mexico did not have a significant impact on the moral hazard present in Asia. However, Lane and Philips did also detect a significant change in moral hazard for some of their episodes. Two of these were quite significant: (1) during the August 1998 crisis in Russia and (2) when the US Congress voted to increase funding to the IMF. These occurrences are consistent with the two general outcomes possible given the presence of moral hazard, as discussed earlier. During the first, as it became clear that Russia was going to default, interest rate spreads in the emerging markets increased sharply. This is consistent with the theory that investors assumed that Russia was too important to the global economy to fail and when allowed to fail were astonished and responded accordingly. Therefore, moral hazard significantly decreased in the emerging markets. Whereas in the second, interest rate spreads decreased significantly when the US increased its funding to the IMF, the results suggest that investors viewed this action as increasing their insurance against default losses. Therefore, the presence of moral hazard significantly increased.

Despite the two significant examples, Lane and Philips conclude that the effect of IMF assistance on moral hazard is not pervasive. Furthermore, they conclude that with the exception of a select few, the effect of IMF announcements in fact had an effect in the direction opposite of that predicted by the moral hazard hypothesis. They suggest that

[12] *Less than one standard deviation change from the 200 day sub-sample.*

"the role of moral hazard in recent crises may have been seriously overstated". Their overall conclusions align with a more moderate view that recognizes that investor's decisions are at times influenced by the IMF. However, given that rescues rarely result in a complete bailout of private investors, the IMF does not generate significant investor moral hazard. Therefore, they conclude that this influence is currently not great enough to outweigh the IMF's potential benefits.

c. Dell' Ariccia, Godde, and Zettelmeyer (2000)

In the third and final study, Dell' Ariccia, Godde, and Zettelmeyer (2000) also test whether the recent financial support administered by the IMF has an effect on moral hazard in the international financial markets. Returning to Zhang's general approach, Dell' Ariccia, Godde, and Zettelmeyer test for moral hazard using a regression model of spread determination. However, their study focuses on events "surrounding" the Russian crisis. Which they argue is a better event to test for the presence of moral hazard than Mexico, the subject in Zhang's study. Furthermore, unlike previous studies, they test whether the Russian crisis resulted in three major reactions (1) spread changes in a vast array of individual countries (2) changes in how spreads react to fundamentals overtime (3) "changes in the cross country variance of spreads (controlling for fundamentals)". The natures of these changes are used as measures of the presence of moral hazard. This assumption is based on their simple model of spread determination

$$\text{SPREAD} = r - r^* = \frac{(1-\lambda)v}{1-(1-\lambda)v}$$

where λ and ν are the probability of being repaid conditional on a financial crisis having occurred and the probability of a financial crisis, respectively. Both λ and ν are functions of economic fundamentals ($\nu(X_i)$, $\lambda(X_i)$), where all three variables (the fundamentals, the probability of a crisis, and the probability of being repaid) can be distorted by a financial bailout (b_i). They presume that if there is an increase in an investor's future probability of being repaid then the result will be increased investor moral hazard.

Dell' Ariccia, Godde, and Zettelmeyer use this simple model as the foundation for their empirical analysis. Their empirical model applies the standard bond spread determination model as the basis of all of their regressions:

$$\mathbf{s_{ijt} = X\beta + \mu_{ijt}}$$

$$\mathbf{= \beta_0 + X_{ijt}\beta_1 + X_{it}\beta_2 + X_i\beta_3 + X_t\beta_4 + \mu_{ijt}}$$

where s_{ijt} represents the spread of a discrete bond j of a specific country i at time t. The X units represent the matrix of essential variables that determine the spreads of sovereign bonds, which can be bond, country, or time specific. Finally, the μ represents a random error.

Using this while not restricting the coefficient before and after an event that is assumed by the authors to reduce the probability of future bailouts , Dell' Ariccia, Godde, and Zettelmeyer estimate a pooled regression. This regression is used to test their three indications of moral hazard. However, as in all studies, this method includes inherent problems. The foremost, which they recognize in their study, is that what they take as evidence for moral hazard could in fact be a true decline in economic risk generated by

IMF lending. In other words, it could in fact be the case that the probability of liquidity shortages and severity of economic crises are reduced by IMF assistance, rather than simply insuring against losses associated with them. This problem aside, they conclude that their results provide strong evidence consistent with the existence of IMF induced moral hazard. For instance, spreads increased significantly after the crisis in many of their tests, while controlling for fundamentals. However, the significance varied across countries. For the most part, spreads increased in less stable countries, while stronger countries were unaffected or actually experienced spread decreases. Furthermore, events which occurred during Russia's financial crisis resulted in a significantly large positive effect on the cross-sectional variance of spreads. Which is used by Dell' Ariccia, Godde, and Zettelmeyer as evidence further suggesting differences between the spreads of greater and less stable countries. In total, these results suggest that following the Russian crisis, investors were more attentive to the risk in emerging market countries. Moreover, this is interpreted as evidence in favor of a significant presence of moral hazard in the emerging markets resulting from international lending.

Overall, Dell' Ariccia, Godde, and Zettelmeyer's conclude that disbursements administered by international financial institutions must be evaluated, though not necessarily halted. Instead, they conclude that true policy decisions relating to the actions of international lending institutions such as the IMF should undergo thorough benefit-cost analysis to justify the precise action resulting in the presence of moral hazard. Eventually, decisions should be made such that the benefits dominate the cost by mitigating the moral hazard phenomena, as lending is essential but so too is the avoidance of moral hazard.

d. Literature Summary

The three studies discussed here illustrate the status of the ongoing moral hazard debate. Overall, they depict the numerous barriers encountered while attempting to measure moral hazard, and the range of conclusions that can result from applying different methodologies or testing different time periods. Those conclusions are: (1) the IMF generates little if any moral hazard and (2) the IMF's rescue packages, by not saving the entire investment market, generate only a moderate degree of moral hazard and thereby the benefits of the program clearly outweigh its potential negatives and (3) The IMF generates moral hazard and to a concerning degree. Though, in the third conclusion, it remains unclear whether the negative aspects of international lending, in the form of moral hazard, outweigh the possible benefits. In the remainder of this paper, I will conduct my own analysis. I will attempt to generate results that will continue to inform this debate and perhaps align with one of the conclusions outlined above.

VI. Empirical Analysis:

My analysis will focus on more recent events, while using the methods of the previous studies as methodological guidance. This analysis will include two types of tests. Both of these will test for the presence of moral hazard during the 2001 crisis in Argentina. The first, a regression similar to those conducted by Zhang or Dell' Ariccia, Godde, and Zettelmeyer which apply a standard model of bond spreads, will test whether the recent financial support administered by the IMF has an effect on moral hazard in the international financial markets. While the second test will move away from the standard model of bonds and will instead reapply Lane and Philips' method of analysis, except

focusing the data analysis entirely on Argentina's crisis, in an attempt to support the results of the original regression in test one.

a. Standard Model of Bond Spreads

As discussed in the previous section, studies on investor moral hazard, such as those conducted by Zhang or Dell' Ariccia, Godde, and Zettelmeyer, have applied a standard regression model of spread determination

$$\mathbf{s_{ijt} = X\beta + \mu_{ijt}}$$

$$\mathbf{= \beta_0 + X_{ijt}\beta_1 + X_{it}\beta_2 + X_i\beta_3 + X_t\beta_4 + \mu_{ijt}}$$

where s_{ijt} represents the spread of a discrete bond j for a specific country i at time t. The X units represent a matrix of essential variables that determine the spreads of sovereign bonds, which can be specific to each j, i, and t[13]. The μ_{ijt} represents the random error.

When estimating the essential X matrix, researchers attempt to include all possible independent variables that could affect bond spreads. In past models, these have typically consisted of measures assumed to effect an investor's perception of risk[14]. These often include measures such as the changes in: GDP, budget deficits, and political parties for relevant countries. When the X matrix is defined and estimated correctly, the model should be capable of fully explaining the change in spreads[15]. Therefore,

[13] *This specificity explains why some variables in the regression model exclude one or various subscripts i, j, and t.*
[14] *Spreads are viewed to be acceptable measures of risk in current economics literature. Therefore, spread changes should be explained by factors influencing the perception of risk.*
[15] *Note that this perfect outcome is in theory. For, in reality perfectly estimating the change in bond spreads is impossible due to many factors, but especially in this case, given that the estimating variables are not available at the frequency that change is measured.*

researchers estimating bond spreads who think that the IMF may generate moral hazard in the financial markets should include a measure for IMF actions, among the other independent X matrix variables in their model. This IMF variable should suggest whether IMF actions affected a significant change in spreads. If so, this change would suggest that IMF actions can effect investor behavior, and therefore generate moral hazard.

b. Test One's Deviations from the Standard Model

Test one deviates in certain respects from the standard regression model, while retaining several qualities as well. However, the essence of my model emerges through a comparison with the standard bond spread regression model. Therefore, I will compare the two models here to explicate my model. This is done through the analysis of four general decisions made during the construction of my model. These are: (1) what to include as the dependent variable (2) the purpose of the model (3) what to include as the independent variables and (4) the precise data to use as measures to run the regression model and test for moral hazard.

In my first decision, choosing a dependent variable, I needed a variable capable of measuring moral hazard in the emerging markets. As discussed earlier, moral hazard is essentially the distortion of investors' willingness to take risk. Therefore, I wanted a variable which would reflect changes in investors' perception of risk. Like the typical regression model, I use the change in bond spreads for emerging market countries to measure this. I continue to assume, as in current economics literature, that when a bond spread changes this reflects a change in investors' perception of the risk inherent in investing in that particular bond. Therefore, bond spreads continue to be used as the

dependent variable in test one to measure changes in investors' perception of risk and thereby to detect moral hazard.

My second decision, the purpose of my model, is perhaps the greatest deviation from the standard spread model. The general purpose of my model is to test for moral hazard. However, I am specifically concerned with detecting moral hazard during specific events, rather than over an extended period of time. Therefore, unlike the typical model, I do not attempt to explain the change in bond spreads overtime. Instead, the purpose of test one is to explain marginal changes in bond spreads. As such, I do not include the extensive list of independent variables in the regression model, represented earlier by the X matrix[16]. Instead, I assume that marginal changes in spreads are subject to much less influence than changes in spreads over a long time period, owing to its brief period of analysis[17]. Therefore, otherwise important data in the standard model, such as GDP and other economic data are absent from the model. Therefore, I ignore the larger factors and attempt to include only those variables that I assume affect the marginal change in spreads at precise times, which leads to my third decision.

[16] *It is important to note here that this approach is also loaded with many problems. The most important being the omitted variable problem. However, it should be noted that given the frequency of my data set, I have little choice but to omit these variables, since they are rarely available on a daily basis. Still though, by limiting my variables to announcements I am clearly omitting the majority of variables which alter spreads. As a result, this omission leaves open the possibility that the significance levels and coefficient directions are all incorrect. You see, by including variables such as a control for dates around the September 11th terrorist attack result in a higher r^2 value and alter very slightly the significance of some spreads. Therefore, given the low r^2 value we can only imagine the number of variables that could possibly change the results significantly either for or against the moral hazard hypothesis. The hypothesis is however that the regression will yield some pattern or accuracy that can overcome this problem, such as all the coefficients moving in the direction predicted by the moral hazard hypothesis. Also, for the short intervals that I use, IMF announcements or defaults are likely to dominate changes and to incorporate anticipation of future economic events such as longer term effects on growth, inflation, tax rates, etc.*

[17] *Additionally, these effects could be reflected in the dummy variables.*

In my third decision, what variables to include as my independent variables, based on the nature of my marginal analysis. I decided to include only one type of variable to explain the marginal change in spreads. Therefore, unlike the standard model, I limit my independent variables to include only the dates of significant IMF announcements regarding future disbursements. Applying these variables exclusively and given the presence of moral hazard, I assume that these announcements will significantly affect a change in bond spreads for the relevant countries around the date of the announcement. If not, this would suggest moral hazard is not present. Intuitively, if the IMF influences investor decisions, then around the dates of significant IMF announcements, bond spreads should respond correspondingly to the nature of the announcement.

The first three general decisions discussed up to this point shape the overall structure of my model, which takes the form

$$\mathbf{d(s_{pti}) = \beta_0 + \beta_1 X_{at} + ... + \beta_{10} X_{jt} + \mu_t}$$

where $d(s_{pti})$, β_0, $\beta_{1\ldots10}X_{a\ldots j}$, and μ are a measures of the change in bond spreads d(s) for a pool of countries p over a time series t for a set of bond types i, a constant term (β_0), a series of dummy variables each capturing a different event date ($a_t \ldots j_t$), and an error term respectively (μ_t).

In an attempt to run this general regression, I arrive at my fourth decision, what to select as the relevant measures for each of the variables included in my model. This decision encompassed three smaller decisions that involved choosing: (1) the index and countries to pool and form my dependent variable (2) the specific country I want to focus

my regression analysis on and (3) the precise set of announcements in the form of dates, to compose the independent variables in my model. Given these are not structural decisions, I cannot compare the outcome with the standard model, as it is only structural in nature. However, these smaller data decisions can be compared with the data used in the previous studies.

In the first of the four smaller data decisions, I decided to use a portion of the EMBI as a measure for the dependent variable, $d(s_{pti})$. This focus on the emerging markets resembles all three studies from the Literature Review section. However, in contrast, my precise composition consisted of a pool of thirteen emerging market countries which were selected from among those included in the EMBI index. The exact composition was randomly selected from the index with representation from countries that would be viewed by investors as "too big to fail", borderline "too big to fail", and not "too big to fail", whereas previous studies used the entire index in their analysis. However, the reduced pool in test one includes: Argentina, Bulgaria, Brazil, Ecuador, South Korea, Morocco, Mexico, Peru, Philippines, Poland, Russia, Turkey, and Venezuela[18].

In my second smaller decision, I chose the precise time period and event I wanted to test for the presence of moral hazard. As discussed in the Literature Review section, previous studies have often analyzed the 1995 Mexico crisis, 1997 East Asian crises, and 1998 crisis in Russia. In this study, I focus on Argentina, based on its satisfaction of four selection criteria: (1) It is an emerging market country perceived to be globally

[18] *Among these Argentina, Brazil, Mexico, Russia, and Turkey would be considered "too big to fail", whereas, countries such as Bulgaria, Ecuador, Peru, Poland, and Venezuela would not be considered "too big to fail".*

Important[19] (2) It recently experienced a financial crisis that resulted in default (3) IMF policies shifted during the course of financial crisis which provided the opportunity for investor's perception of risk to change and (4) It has not been the focus of any previous moral hazard studies.

In my third and final smaller decision, I selected the specific announcements to include as measures for my independent variables. Owing to the particular focus of my independent variables, on specific announcements during Argentina's financial crisis, these variables are in great contrast to an array for previous studies. The announcements constructing my independent variables were selected after being identified as the most significant announcements regarding future IMF disbursements to Argentina around the time of their crisis in 2001. I selected the ten announcements ($X_{a...j}$) that were discrete dates in which information was transmitted to investors that could have potentially altered the market's perception of the future of financial assistance administered by the IMF. To reduce potential criticism about date selection and to tightly focus my analysis, I limited my selection to include only those dates on which 1) announcements were made by the leading directors of the IMF or a significant worldwide news source and 2)that indicated a potential change in IMF policy towards Argentina. Refer to appendix 1 for a complete list of the dates and a description of the announcements made on each date.

[19] *In fact, at the time of default, Argentina had 25% of all emerging market debt.*

c. Test One Regression Model

The test one model takes the form

$$d(s_{pti}) = \beta_0 + \beta_1 X_{12/12/00} + \beta_2 X_{01/12/01} + \beta_3 X_{05/04/01} + \beta_4 X_{07/12/01} + \beta_5 X_{08/03/01} + \beta_6 X_{08/21/01} + \beta_7 X_{09/07/01} + \beta_8 X_{10/29/01} + \beta_9 X_{12/05/01} + \beta_{10} X_{12/21/01} + \mu_t$$

The general procedure of this model is to estimate the change in bond spreads for those bonds included in the EMBI index for the pool of thirteen emerging market countries over the course of Argentina's financial crisis (271 days) in response to the ten discrete dates identified above. However, as already stated my goal is to test whether there is a significant marginal change in the pool of country spreads around the pre-selected dates[20]. Therefore, in this model I assume that those announcement dates with a statistically significant coefficient indicate a significant marginal change in the pool of spreads in response to the particular IMF announcement. According to my hypothesis, this suggests the presence of moral hazard, given the coefficient is in the direction predicted by moral hazard. For, I assume that an announcement regarding IMF policies and future disbursements does not change the fundamentals known to investors about a particular country or set of countries[21]. Therefore, country fundamentals should be the

[20] *I decided to include a 10 day window around each date to account for investor anticipation or leaks. Presumably investors would be able to predict to some extent the future actions of the IMF. Therefore, I include a window that measures nine days prior to the event to account for anticipation and one day following the event to allow time for market reaction. The selection of this window presents a problem in that there is no reason to expect that the dates will share the same degree of anticipation and necessary market reaction time. As a result, slight alterations in the window size can in theory have a dramatic impact on the results of the regression. However, this problem is unavoidable and a standard window selection is difficult to justify. Therefore, I simply selected the window that is currently accepted in economics literature, 10 days.*

[21] *The fundamentals known to investors do not change, except what is reflected in the dummy variable.*

motivating force behind a change in spreads under conditions free of moral hazard as suggested by Zhang and Lane and Philips in their studies. Therefore, without moral hazard we should expect that the announcement regarding IMF policies should affect no change in the spreads (H_o). However, if moral hazard is a pervasive phenomenon, we should expect that announcements suggesting an alteration of IMF policy will result in a significant change in spreads in a predicted direction based on the nature of the announcement (H_a). More specifically, in the presence of moral hazard, I expect announcements that indicate the IMF will be providing greater assistance to a country (here Argentina) will result in decreased spreads. This will result, as investors feel insured against default by the IMF's financial commitment to the country and will therefore react by displaying a lower perception of risk. Alternatively, I expect announcements that indicate a reduction in IMF support will result in increased spreads. As in this case, investors will begin to question the commitment their supposed insurance and will therefore respond by perceiving greater risk in the form of increased bond spreads.

d. Test One Regression Results:

The results of the regression are mixed, though overall relatively strong. Refer to appendix 2 for the regression output. Perhaps the strongest result, the coefficient for every date included in the regression is in the direction predicted by the moral hazard hypothesis. In addition, the results suggest relatively large effects on several dates. The mean spread change in the absence of an announcement is about one percentage point. News of Argentina's default raised this average spread by 8.4 percentage points; the decision to hold back IMF assistance, on July 12, raised the average spread by 11.2

percentage points, while the May 4 agreement between Argentina and the IMF lowered the spread by 8.8 percentage points. Overall though, on each date an announcement was made suggesting that the IMF would increase their financial support to Argentina, the pooled spreads decreased, indicating, as predicted by moral hazard, that the investors perceived less risk upon the IMF announcement. Alternatively, on each date an announcement was made suggesting that the IMF would fail to support Argentina, the pooled spreads increased, suggesting, as predicted by moral hazard, that investors perceived greater risk. However, despite being in the predicted direction for moral hazard, the level of each coefficient's significance varies widely across the dates. The null hypothesis, that spreads do not change significantly (which I assume to be indicative of a lack of a significant degree of moral hazard), can be rejected for some but not all of the included dates. Though not ideal, this result is to be expected given the variation in the nature, degree, and anticipation across the announcements, which cannot be controlled for[22]. However, despite this variation, those dates which are significant are typically very significant. Three are significant at the 99% level of confidence: May 5, 2001, July 12, 2001, December 21, 2001 and one other is significant at the 90% level of confidence: January 12, 2001.

Before beginning my analysis, it is important to verify that these results are not likely to have occurred simply by chance. Therefore, I reran the regression using a new set of ten randomly selected dates. Refer to appendix 3 for the regression output. The results from this regression show that every random date included in the regression fails

[22] *Though, it should be noted that those announcements which lack significance may simply have failed to provide any new information to the market. Under this condition, it should not be expected for the announcement to result in any change, regardless of moral hazard.*

to be significant and there is no pattern in the direction of the coefficient. Therefore, I conclude that it is highly unlikely that the particular results, especially those that are found to be significant, could have simply occurred by chance.

Now, having verified that the regression results are unlikely to have occurred by chance, I return to my analysis. Despite the mixed results, a careful analysis of the significance relative to the nature and sequence of the dates yields a very intriguing interpretation. To begin, those dates which are reported to be significant, with the exception of one, which is the date of Argentina's default, occur at the very beginning of Argentina's financial crisis. Looking more closely at these dates, we see that the IMF began with three sequential announcements (December 12, 2000, January 12, 2001, and May 4, 2001), each making commitments and granting further assistance to support Argentina during its financial troubles. The results of the regression show that as the sequence progresses the significance of the announcements increases. On the first announcement, December 12, the IMF announced that there would be a "strengthened" program between the IMF and Argentina indicating that it would provide greater assistance to Argentina. The regression results show, as already stated, that the spreads respond to this announcement in the predicted moral hazard direction. Furthermore, the pooled spreads decrease an average of over four points in a period where the average change is approximately one point, and though not highly significant it is close with α=.1697. This announcement was followed by the January 21 announcement that the IMF would be increasing their credit to Argentina, to assist them in decreasing the severity of their financial crisis. In response to this, spreads again decreased by over four points. Again, though not significant at the 5% level, the significance did increase from a

previous announcement to α =.0916. On the third announcement in the sequence, May 4, the IMF and Argentina announced that they reached an agreement on certain terms that would clear the way for even further financial assistance by the IMF. The regression results show that in response to this announcement, spreads again decreased as on the December 12 and January 21 announcements. However, the coefficient is very significant for this announcement. The results show a nearly nine point decrease in spreads with α =.0027.

The progression of increasing significance suggests that with every new announcement, investors perceived progressively less risk. This aligns with the nature of the announcements. It appears that with each announcement suggesting further and further financial assistance, the investor felt further and further immunity against financial losses. That is, investors gradually shifted their view of the IMF from an ambiguous or weaker insurer against default to one where they felt greater certainty that the IMF would continue to give financial assistance to Argentina and thereby insure them against financial losses. This increasing perception of immunity would then result in the distortion of risk as indicated by the significant change in spreads and therefore promotes investors to invest with less caution, the phenomena referred to here as moral hazard. Therefore, the output shows that the events in Argentina begin with a lesser degree of moral hazard.

However, on the very next date in the sequence of announcements, July 12, 2001, the investor's increasing perception of immunity insured by the IMF shatters as reports are published that despite their troubles the IMF will withhold its aid to Argentina. The pooled spreads respond to this announcement with the greatest change, where in a

complete reverse course the spreads increase by over eleven points at a significance of α=.0001. However, none of the subsequent announcements had much effect, quantitatively, until Argentina's default.

Continuing with the earlier analysis, investors, as indicated by significantly decreased spreads, responded to this very sudden and significant reversal in IMF support. It appears that this announcement was perceived by investors to indicate an emerging threat to their immunity. Unlike the earlier announcements, the IMF support was no longer unwavering. Without previous events, such as Russia in 1998, this initial alteration may not have resulted in such a large alteration in risk perception. In other words, it could have simply been perceived, as occurred in Russia, a glitch in an otherwise continuous flow of assistance. However, being reminiscent of Russia in 1998, this announcement reminded many investors that the IMF could and has allowed "important" countries to default and thereby resulted in greater financial losses to investors. Therefore, as witnessed and learned by investors through great financial losses in Russia, the perception of the IMF as a form of insurance against default could in fact be a detriment. Therefore, given the nature and significance of their response, it appears that investors used their experience in Russia to respond here by taking the IMF's possible decline in support to indicate the possibility that the IMF would allow Argentina to default, despite their desire to prevent it. As such, to avoid repeating the dramatic losses of 1998, the investors responded by readjusting their interpretation of risk on the first news of the IMF withdrawal, or in other words loss of insurance. This reaction then of course suggests that there was a decline in the degree of moral hazard generated by the IMF. Nonetheless, the fact that a change with this degree of significance did occur

indicates the propensity for investors to be influenced by the IMF in all manner of directions. As such, the moral hazard could, given the appropriate circumstances, rebound or may regardless of this adjustment in spreads continue to loom large, as we do not know how uninfluenced spreads would appear.

Due to the nature of the July 12 announcement, it is no surprise then that at this point and until the end of the sequence the remaining coefficients cease to be significant. As already stated, the spreads respond to the events in the predicted moral hazard direction. However, not only are the events not significant but they are highly insignificant, which is a sudden and highly dramatic change from the earlier events. I interpret this to mean that the investors were cautioned by the July 12 announcement and having experienced Russia's default continued to perceive a greater possibility of default despite new monetary commitments made by the IMF to Argentina. In other words, the circumstances necessary to allow moral hazard to rebound had not occurred. Investors now interpreted country fundamentals to be a greater tool for investment analysis. Therefore, the additional commitment of $1.2 billion on August 3 and $8 billion on August 21 did not yield significant changes in spreads, as these disbursements didn't yield any new information about the status of Argentina's economic stability. In fact, the spreads remain insignificant up until the date of Argentina's default.

The dates surrounding Argentina's default are highly significant, at α=.0042. This is an average increase in the pool of spreads of over eight points. However, if this regression is rerun, excluding Argentina from the pool of spreads, this significance disappears. Refer to appendix 4 for the regression output. This indicates that, overall, investors did not have their risk perception greatly altered as the IMF allowed Argentina

to default. Instead, the output shows that the effect on spreads was limited to Argentina. The impending default in Argentina of course changed the fundamentals of Argentina's economy. Therefore, investors revised their perception of investing risk in this country. However, Argentina's default didn't seriously weaken other countries' fundamentals. Therefore, having revised their perception of the IMF following the July 12 announcement and not having the presence of moral hazard change in the subsequent announcements, the default did not significantly change the pool of spreads in the emerging markets. However, had the July 12 flag not been raised, the markets might have experienced a change more similar to Russia's following their default in 1998. That is, investors would have been surprised by the default and therefore forced to now readjust their risk, as would be indicated by a large spread change, or in other words a decrease in moral hazard.

e. Test One Conclusion

From this more detailed analysis I conclude that the IMF does in fact generate moral hazard. Previous studies, such as those conducted by Lane and Philips or Dell' Ariccia, Godde, and Zettelmeyer, have shown quite significantly the presence of moral hazard during Russia's default. In Argentina's case, I see that moral hazard built up in the beginning of the financial crisis but declined after an announcement that signals a potential weakness in their immunity (made possible by Russia's previous failure). Overall, these reactions indicate that investor's risk perceptions are altered by IMF actions and are sensitive to even minor alterations in IMF actions. However, the response to the July 12 and subsequent announcements indicate that investors are learning, though

the IMF still has the propensity to generate moral hazard and must be cautious in disbursing their rescue packages. For a long history of unconditional support is sure to convince investors that they are insured against default, as occurred during a large part of the 1990's beginning with the IMF's large bailout in Mexico in 1995 and continues today as is seen by the nature of the changes in spreads in the early part of Argentina's crisis. Therefore, like Dell' Ariccia, Godde, and Zettelmeyer, I conclude that true policy decisions relating to the actions of international lending institutions such as the IMF should undergo thorough benefit-cost analysis to justify the precise action resulting in the presence of moral hazard. Eventually decisions should be made such that the benefits dominate the cost by mitigating the moral hazard phenomena, as lending is essential but so too is the avoidance of moral hazard.

f. Additional Regressions (Test One Extension)

Since, like all pooled regressions, my results are averaged across the sample, some degree of accuracy is lost. A symptom of this was discussed earlier; when the significance in changes to bond spreads around the date of Argentina's default disappear after Argentina is removed from the sample. Recognizing this problem, it is necessary to validate my general interpretation using a more precise but less general analysis. To do so, I rerun the regression thirteen times to test each country individually that was originally included in the pool. Refer to appendices 5 through 17 for the regression output. Overall, the general results hold but in a modified form. It appears that countries which are economically unstable respond in the interpreted manner to the various IMF announcements. However, those countries with strong fundamentals are significantly less affected by the IMF announcement and therefore fail to align with the general

interpretation as strictly as their less stable counterparts. For instance, in Russia, Turkey, and Venezuela, all less stable counties at the time, the January 12, May 4, and July 12 dates continue to be relatively significant. Meanwhile, the majority of the remaining dates fail to be, as is predicted in my earlier interpretation. However, interestingly, in Mexico a much more stable country, there appears to be little significance in spread change in response to these dates. Though, this result continues to support the moral hazard hypothesis. I expect countries with a weak economy to be influenced by the IMF, as they are the countries which will be potentially receiving assistance. Whereas countries with a stable economy should not be greatly affected by IMF actions, as they are not potentially in need of financial assistance. Therefore, investors experience neither greater nor lesser risk in response to IMF actions.

VII. Supplementary Test:

This section introduces a second test. This test, like the first, also attempts to measure the presence of moral hazard in response to IMF actions. However, the overall purpose of this test is to supplement the results from test one. Therefore, tests one and two are inherently similar. However, their method of analysis differs.

a. Methodology

In this second test, I duplicate the precise methods of the "news"- based approach applied by Lane and Philips in their study "Does IMF Financing Result in Moral Hazard". This approach has many features with test one. Therefore, tests one and two also share many similarities. For instance, the second approach, like test one, uses

distinct events that have been broadcasted to the market in the form of a public announcement or news print to test whether bond spreads respond to these events. This similarity leads to a second major similarity, where in continuing with Lane and Philips hypothesis, I expect secondary market bond prices to respond immediately to important IMF announcements, if investor's investment risk level is influenced by the availability of IMF financing. Moreover, like test one, I expect that if the IMF generates a significant degree of moral hazard then an announcement which suggests strengthened IMF support will result in a decrease in the pool of bond spreads. Whereas, if the very same announcement is made under identical conditions but without the presence of moral hazard, then I expect there should not be a significant change in bond spreads[23].

Although tests one and two apply identical data to a common hypothesis, test two is still able to supplement test one's findings as it applies a different method of analysis. Using Lane and Philips approach, in test two, I calculate the change in spreads around the window[24] of each event and then compare this change with another computed change to evaluate whether it is significant. The calculated change that the announcement spreads are compared with is simply a two-hundred day[25] average of bond spread changes from

[23] *As stated earlier, bond spreads are an indication of the relative risks between two bonds. Therefore, the larger the bond spread, the greater the disparity between the two bonds and therefore the greater risk that is associated with the particular EMBI bond in this case. Therefore, assuming the moral hazard hypothesis to be true, the bond spreads are expected to decrease upon the announcement of a positive event and increase upon the announcement of a negative event.*

[24] *In test two I also apply a large range of window sizes. In test one I included one window size, ten days. However, in this study I include five different window sizes. The windows in this second test range in size from two days to fifteen days.*

[25] *I choose to use a two-hundred day time period rather than a shorter or longer one, as this is how Lane and Philips test for significance.*

the same list of thirteen emerging market countries and during the same time period. Those results, where the bond spread change is in the direction predicted by moral hazard and is more than one standard deviation larger than the two-hundred day average are considered significant. As stated earlier, like Lane and Philips, I assume in these significant cases, that the potential IMF actions captured by the news or announcement were able to provide new information to investors about the risk inherent in investing in the emerging markets. Upon which investors altered their investing behavior and thereby experienced moral hazard.

b. Analysis of Approach

This "news"- based approach as opposed to a pooled time series regression has many advantages as well as disadvantages[26]. First and perhaps most importantly, as Lane and Philips note, this method excels in the analysis of "very short term responses to discrete events" rather than simply averaging out over the course of the entire crisis as would occur in many pooled time series analysis, such as Zhang's study. Further still, this method mitigates the simultaneity and omitted variable problems[27] that are "the bane of econometrics", again which are potential problems in Zhang's study. However, the "news"- based approach is not without disadvantages. It lacks the robust nature of a large and complete regression equation. Furthermore, it is impossible to accurately control for the anticipation of each announcement. In other words, an expectation for particular IMF

[26] *These advantages and disadvantages are discussed briefly in Lane and Philips paper "Does IMF Financing Result in Moral Hazard".*
[27] *These problems are discussed in some detail in the study conducted by Lane and Philips "Does IMF Financing Result in Moral Hazard".*

actions may have formed well before or only minutes before the actual announcement. Therefore, the windows that were constructed to account for this anticipation may have missed the magnitude of the true response by investors, which obviously complicates gauging moral hazard (Lane and Philips 8).

c. Results

The supplemental test produces very supportive results. Refer to Appendix 18 for test two's results. I will highlight three of these results here. First, the results align perfectly with the first study. As the output shows, January 12, May 4, and July 12 have significant changes in bond spreads and in the correct direction, as would be expected by the moral hazard hypothesis. Second, those announcements following the July 12 IMF policy change, again fail to alter market perceptions as they do not yield any information relating to the country fundamentals. By this time, the actions of the IMF are not useful on the margin. Again, like the previous test, these subsequent announcements are in the correct direction predicted by the moral hazard hypothesis. Third, the variety of window sizes validates with greater depth the significance and degree of significance of those dates found to be significant. However, the inclusion of a greater variety of windows results in one additional significant date missed by the regression analysis in test one, December 12, 2000. However, the significance of this date does not alter the interpretation presented in the previous section, as it comes before the July 12 trigger date. In fact, the significance of the December 18 date strengthens the interpretation. Given investors would not have yet been deterred by the July 12 announcement, the IMF's announcement of December 18 of a strengthened program should likely result in a

decrease in spreads. Overall, these results validate the regression results and therefore support the conclusions in test one.

VIII. Conclusion

Overall, the results and conclusions from tests one and two are very similar to those in Dell' Ariccia, Godde, and Zettelmeyers' study. Through my interpretation, there very clearly appears to be an interaction between the actions of the IMF and investor's perception of risk. However, my study is too narrow to conclude definitively that Lane and Philips are too dismissive when they minimize the extent of the threat of the moral hazard problem. Though there very clearly appears to be an association between the actions of the IMF and the actions of creditors, I cannot make conclusions about the pervasiveness of the problem, after focusing exclusively on Argentina. However, my study does contribute to the mounting evidence in support of the occurrence of creditor moral hazard. Furthermore, tests one and two suggest that if not already a pervasive phenomenon, creditor moral hazard is certainly vulnerable to becoming so. As such, it is foolish to simply ignore the potential creditor moral hazard problem. Therefore, economists and policy makers alike should pursue and embrace IMF reforms that could mitigate the current presence of moral hazard and combat any future occurrences while continuing to assist emerging market countries and maintaining global economic stability.

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Appendix 1: IMF Announcements Included in the Study

Variable	Event Date	Effect on Risk Perception	Expected direction of the coefficient under the moral hazard hypothesis	Announcement
dum10date00_12_18	12-Dec-00	Positive*	Negative	Kohler indicates that there will be a strengthened program between the IMF and Argentina in a public announcement
dum10date01_01_12	12-Jan-01	Positive	Negative	The IMF approves an increased augmentation of Argentina's credit in a public announcement
dum10date01_05_04	4-May-01	Positive	Negative	Argentina and the IMF come to an agreement that clears the way for further debt exchange which is announced publicly
dum10date01_07_12	12-Jul-01	Negative	Positive	Reports are published that the IMF will hold back its aid to Argentina putting greater pressure on its finances
dum10date01_08_03	3-Aug-01	Positive	Negative	Kohler recommends in a public announcement to the IMF the Argentina receive a disbursement of $1.2 Billion
dum10date01_08_21	21-Aug-01	Positive	Negative	It is publicly announced that the IMF is preparing to recommend an addition of $8 Billion to Argentina's stand-by credit
dum10date01_09_07	7-Sep-01	Positive	Negative	The IMF announces that Argentina's stand-by credit has been augmented to 21.57 Billion
dum10date01_10_29	29-Oct-01	Negative	Positive	The IMF indicates that it may not further assist Argentina with any further financial aid
dum10date01_12_05	5-Dec-01	Negative	Positive	It is announced that the IMF denies an additional loan requested by Argentina to help avoid default
dum10date01_12_21	21-Dec-01	Negative	Positive	It is announced that Argentina will suspend payments on their loans

* A positive effect on risk perception means that I expect this announcement to be positive and therefore decrease the risk that the investor perceives. Based on this I expect spreads to decrease in the presence of moral hazard

Appendix 2: Test One: EMBI Pool Regression Output

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	0.937322	0.74207	1.263117	0.2066
DUM10DATE00_12_18	-4.042217	2.942875	-1.373561	0.1697
DUM10DATE01_01_12	-4.965294	2.942875	-1.687226	0.0916
DUM10DATE01_05_04	-8.846413	2.942875	-3.006045	0.0027
DUM10DATE01_07_12	11.28645	2.942875	3.83518	0.0001
DUM10DATE01_08_03	-1.426832	2.942875	-0.484843	0.6278
DUM10DATE01_08_21	-0.154105	2.942875	-0.052366	0.9582
DUM10DATE01_09_07	-1.734525	2.942875	-0.589398	0.5556
DUM10DATE01_10_29	0.964776	2.942875	0.327835	0.7431
DUM10DATE01_12_05	2.16058	2.942875	0.734173	0.4629
DUM10DATE01_12_21	8.433307	2.942875	2.86567	0.0042

R-squared	0.011354
Adjusted R-squared	0.008549
S.E. of regression	34.05448
Log likelihood	-17486.73
Durbin-Watson statistic	2.094114
Mean dependent variable	1.00509
S.D. dependent variable	34.20099
Sum of squared residual	4087969
F-statistic	4.048301
Probability (F-statistic)	0.000015

Appendix 3: Test One: EMBI Pool with Random Dates

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	1.281576	0.74558	1.718898	0.0857
RANDOM1	-1.49836	2.956793	-0.506752	0.6124
RANDOM2	1.333808	2.956793	0.4511	0.6519
RANDOM3	-2.91794	2.956793	-0.98686	0.3238
RANDOM4	-2.253604	2.956793	-0.762178	0.446
RANDOM5	-4.106751	2.956793	-1.388921	0.1649
RANDOM6	-2.49836	2.956793	-0.844956	0.3982
RANDOM7	-0.015842	2.956793	-0.005358	0.9957
RANDOM8	3.138004	2.956793	1.061286	0.2886
RANDOM9	2.809333	2.956793	0.950128	0.3421
RANDOM99	-0.827031	2.956793	-0.279705	0.7797

R-squared	0.00198
Adjusted R-squared	-0.000851
S.E. of regression	34.21555
Log likelihood	-17503.41
Durbin-Watson stat	2.080035
Mean dependent var	1.00509
S.D. dependent var	34.20099
Sum squared resid	4126730
F-statistic	0.699397
Prob(F-statistic)	0.72592

Test 4: EMBI Pool Regression Output (Eliminating Argentina)

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	0.086934	0.398708	0.21804	0.8274
DUM10DATE00_12_18	-2.912692	1.58118	-1.842099	0.0656
DUM10DATE01_01_12	-3.988449	1.58118	-2.52245	0.0117
DUM10DATE01_05_04	-6.39754	1.58118	-4.046053	0.0001
DUM10DATE01_07_12	8.413066	1.58118	5.32075	0
DUM10DATE01_08_03	-1.64754	1.58118	-1.041968	0.2975
DUM10DATE01_08_21	1.761551	1.58118	1.114073	0.2653
DUM10DATE01_09_07	-1.602086	1.58118	-1.013221	0.311
DUM10DATE01_10_29	-0.079358	1.58118	-0.050189	0.96
DUM10DATE01_12_05	-4.109661	1.58118	-2.59911	0.0094
DUM10DATE01_12_21	-0.132389	1.58118	-0.083728	0.9333

R-squared	0.02017
Adjusted R-squared	0.017158
S.E. of regression	17.57935
Log likelihood	-13982.9
Durbin-Watson statistic	1.948257
Mean dependent variable	-0.345588
S.D. dependent variable	17.73213
Sum of squared residual	1005286
F-statistic	6.696289
Probability (F-statistic)	0

Appendix 5: Test One: Single Country Regression Output (Argentina)

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	11.14198	8.117257	1.372628	0.171
DUM10DATE00_12_18	-17.59652	32.19111	-0.546627	0.5851
DUM10DATE01_01_12	-16.68743	32.19111	-0.518386	0.6046
DUM10DATE01_05_04	-38.23288	32.19111	-1.187684	0.236
DUM10DATE01_07_12	45.76712	32.19111	1.421731	0.1563
DUM10DATE01_08_03	1.221661	32.19111	0.03795	0.9698
DUM10DATE01_08_21	-23.14198	32.19111	-0.718893	0.4728
DUM10DATE01_09_07	-3.323793	32.19111	-0.103252	0.9178
DUM10DATE01_10_29	13.49439	32.19111	0.419196	0.6754
DUM10DATE01_12_05	77.40348	32.19111	2.404498	0.0169
DUM10DATE01_12_21	111.2217	32.19111	3.455042	0.0006
R-squared	0.081006			
Adjusted R-squared	0.045796			
S.E. of regression	103.3158			
Sum squared residual	2785955			
Log likelihood	-1641.816			
Durbin-Watson statistic	2.3199			
Mean dependent variable	17.21324			
S.D. dependent variable	105.766			
Akaike info criterion	12.15306			
Schwarz criterion	12.29888			
F-statistic	2.300628			
Probability (F-statistic)	0.01327			

Appendix 6: Test One: Single Country Regression Output (Bulgaria)

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	-0.555556	1.36795	-0.406123	0.685
DUM10DATE00_12_18	-11.08081	5.424967	-2.042558	0.0421
DUM10DATE01_01_12	-6.171717	5.424967	-1.137651	0.2563
DUM10DATE01_05_04	-4.171717	5.424967	-0.768985	0.4426
DUM10DATE01_07_12	8.919192	5.424967	1.644101	0.1014
DUM10DATE01_08_03	-0.444444	5.424967	-0.081926	0.9348
DUM10DATE01_08_21	-0.353535	5.424967	-0.065168	0.9481
DUM10DATE01_09_07	-4.171717	5.424967	-0.768985	0.4426
DUM10DATE01_10_29	-0.626263	5.424967	-0.115441	0.9082
DUM10DATE01_12_05	-2.989899	5.424967	-0.551137	0.582
DUM10DATE01_12_21	-3.353535	5.424967	-0.618167	0.537

R-squared	0.036433
Adjusted R-squared	-0.000485
S.E. of regression	17.41117
Sum squared residual	79121.82
Log likelihood	-1157.471
Durbin-Watson statistic	2.152736
Mean dependent variable	-1.544118
S.D. dependent variable	17.40695
Akaike info criterion	8.591701
Schwarz criterion	8.737524
F-statistic	0.98686
Probability (F-statistic)	0.455173

Appendix 7: Test One: Single Country Regression Output (Brazil)

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	0.450617	1.601232	0.281419	0.7786
DUM10DATE00_12_18	-4.905163	6.350105	-0.772454	0.4405
DUM10DATE01_01_12	-1.632435	6.350105	-0.257072	0.7973
DUM10DATE01_05_04	-7.17789	6.350105	-1.130358	0.2594
DUM10DATE01_07_12	12.45847	6.350105	1.961932	0.0508
DUM10DATE01_08_03	-2.450617	6.350105	-0.385918	0.6999
DUM10DATE01_08_21	1.185746	6.350105	0.186729	0.852
DUM10DATE01_09_07	2.640292	6.350105	0.415787	0.6779
DUM10DATE01_10_29	1.458474	6.350105	0.229677	0.8185
DUM10DATE01_12_05	-3.17789	6.350105	-0.500447	0.6172
DUM10DATE01_12_21	1.913019	6.350105	0.301258	0.7635

R-squared	0.026062
Adjusted R-squared	-0.011253
S.E. of regression	20.38035
Sum squared residual	108408.7
Log likelihood	-1200.3
Durbin-Watson statistic	1.75944
Mean dependent variable	0.463235
S.D. dependent variable	20.26664
Akaike info criterion	8.906621
Schwarz criterion	9.052443
F-statistic	0.698428
Probability (F-statistic)	0.725684

Appendix 8: Test One: Single Country Regression Output (Ecuador)

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	1.080247	2.065137	0.523087	0.6014
DUM10DATE00_12_18	1.19248	8.189845	0.145605	0.8843
DUM10DATE01_01_12	-9.352974	8.189845	-1.142021	0.2545
DUM10DATE01_05_04	-15.08025	8.189845	-1.841335	0.0667
DUM10DATE01_07_12	8.828844	8.189845	1.078023	0.282
DUM10DATE01_08_03	-0.898429	8.189845	-0.1097	0.9127
DUM10DATE01_08_21	2.919753	8.189845	0.356509	0.7217
DUM10DATE01_09_07	-5.898429	8.189845	-0.720213	0.472
DUM10DATE01_10_29	-2.625701	8.189845	-0.320605	0.7488
DUM10DATE01_12_05	-10.35297	8.189845	-1.264123	0.2073
DUM10DATE01_12_21	-4.716611	8.189845	-0.57591	0.5652

R-squared	0.03088
Adjusted R-squared	-0.006251
S.E. of regression	26.28491
Sum squared residual	180324
Log likelihood	-1269.504
Durbin-Watson statistic	2.090725
Mean dependent variable	-0.375
S.D. dependent variable	26.20313
Akaike info criterion	9.415468
Schwarz criterion	9.561291
F-statistic	0.831643
Probability (F-statistic)	0.598453

Appendix 9: Test One: Single Country Regression Output (Korea)

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	-0.098765	0.506709	-0.194916	0.8456
DUM10DATE00_12_18	-1.083053	2.009486	-0.53897	0.5904
DUM10DATE01_01_12	-1.173962	2.009486	-0.58421	0.5596
DUM10DATE01_05_04	-1.810325	2.009486	-0.90089	0.3685
DUM10DATE01_07_12	1.826038	2.009486	0.908709	0.3643
DUM10DATE01_08_03	-0.992144	2.009486	-0.49373	0.6219
DUM10DATE01_08_21	-0.719416	2.009486	-0.35801	0.7206
DUM10DATE01_09_07	1.735129	2.009486	0.863469	0.3887
DUM10DATE01_10_29	-0.173962	2.009486	-0.08657	0.9311
DUM10DATE01_12_05	-2.992144	2.009486	-1.489009	0.1377
DUM10DATE01_12_21	-0.264871	2.009486	-0.13181	0.8952

R-squared	0.021261
Adjusted R-squared	-0.016239
S.E. of regression	6.449348
Sum squared residual	10856.06
Log likelihood	-887.3393
Durbin-Watson statistic	2.261859
Mean dependent variable	-0.327206
S.D. dependent variable	6.397612
Akaike info criterion	6.605436
Schwarz criterion	6.751259
F-statistic	0.566962
Probability (F-statistic)	0.840252

Appendix 10: Test One: Single Country Regression Output (Morocco)

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	-0.179012	1.327977	-0.134801	0.8929
DUM10DATE00_12_18	1.269921	5.266441	0.241135	0.8096
DUM10DATE01_01_12	-6.093715	5.266441	-1.157084	0.2483
DUM10DATE01_05_04	0.724467	5.266441	0.137563	0.8907
DUM10DATE01_07_12	9.633558	5.266441	1.829235	0.0685
DUM10DATE01_08_03	0.45174	5.266441	0.085777	0.9317
DUM10DATE01_08_21	2.724467	5.266441	0.517326	0.6054
DUM10DATE01_09_07	-2.54826	5.266441	-0.483868	0.6289
DUM10DATE01_10_29	0.45174	5.266441	0.085777	0.9317
DUM10DATE01_12_05	1.360831	5.266441	0.258397	0.7963
DUM10DATE01_12_21	-5.820988	5.266441	-1.105298	0.27

R-squared	0.02614
Adjusted R-squared	-0.011173
S.E. of regression	16.90239
Sum squared residual	74565.26
Log likelihood	-1149.405
Durbin-Watson statistic	1.99648
Mean dependent variable	-0.091912
S.D. dependent variable	16.80875
Akaike info criterion	8.532387
Schwarz criterion	8.67821
F-statistic	0.700562
Probability (F-statistic)	0.723692

Appendix 11: Test One: Single Country Regression Output (Mexico)

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	-0.5	1.307296	-0.382469	0.7024
DUM10DATE00_12_18	2.863636	5.184424	0.552354	0.5812
DUM10DATE01_01_12	-0.409091	5.184424	-0.078908	0.9372
DUM10DATE01_05_04	-7.409091	5.184424	-1.429106	0.1542
DUM10DATE01_07_12	6.681818	5.184424	1.288826	0.1986
DUM10DATE01_08_03	-0.5	5.184424	-0.096443	0.9232
DUM10DATE01_08_21	2.863636	5.184424	0.552354	0.5812
DUM10DATE01_09_07	1.954545	5.184424	0.377003	0.7065
DUM10DATE01_10_29	1.045455	5.184424	0.201653	0.8403
DUM10DATE01_12_05	-0.954545	5.184424	-0.184118	0.8541
DUM10DATE01_12_21	2.318182	5.184424	0.447144	0.6551

R-squared	0.018624
Adjusted R-squared	-0.018976
S.E. of regression	16.63916
Sum squared residual	72260.86
Log likelihood	-1145.135
Durbin-Watson statistic	2.187835
Mean dependent variable	-0.158088
S.D. dependent variable	16.48349
Akaike info criterion	8.500995
Schwarz criterion	8.646818
F-statistic	0.495316
Probability (F-statistic)	0.892408

Appendix 12: Test One: Single Country Regression Output (Peru)

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	-0.012346	1.379808	-0.008947	0.9929
DUM10DATE00_12_18	-5.4422	5.471991	-0.994556	0.3209
DUM10DATE01_01_12	-3.805836	5.471991	-0.695512	0.4874
DUM10DATE01_05_04	-9.624018	5.471991	-1.758778	0.0798
DUM10DATE01_07_12	2.285073	5.471991	0.417594	0.6766
DUM10DATE01_08_03	-1.4422	5.471991	-0.26356	0.7923
DUM10DATE01_08_21	3.103255	5.471991	0.567116	0.5711
DUM10DATE01_09_07	-1.260382	5.471991	-0.230333	0.818
DUM10DATE01_10_29	-1.260382	5.471991	-0.230333	0.818
DUM10DATE01_12_05	-5.260382	5.471991	-0.961329	0.3373
DUM10DATE01_12_21	1.739618	5.471991	0.317913	0.7508

R-squared	0.02267
Adjusted R-squared	-0.014775
S.E. of regression	17.56209
Sum squared residual	80499.43
Log likelihood	-1159.819
Durbin-Watson statistic	1.87557
Mean dependent variable	-0.860294
S.D. dependent variable	17.43376
Akaike info criterion	8.608963
Schwarz criterion	8.754786
F-statistic	0.605414
Probability (F-statistic)	0.808821

Appendix 13: Test One: Single Country Regression Output (Philippines)

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	-1.117284	0.971431	-1.150143	0.2511
DUM10DATE00_12_18	0.935466	3.852464	0.242823	0.8083
DUM10DATE01_01_12	2.390011	3.852464	0.620385	0.5355
DUM10DATE01_05_04	-1.337262	3.852464	-0.347118	0.7288
DUM10DATE01_07_12	7.208193	3.852464	1.87106	0.0625
DUM10DATE01_08_03	0.208193	3.852464	0.054042	0.9569
DUM10DATE01_08_21	3.390011	3.852464	0.879959	0.3797
DUM10DATE01_09_07	1.48092	3.852464	0.384409	0.701
DUM10DATE01_10_29	1.662738	3.852464	0.431604	0.6664
DUM10DATE01_12_05	-4.882716	3.852464	-1.267427	0.2061
DUM10DATE01_12_21	-0.882716	3.852464	-0.22913	0.8189

R-squared	0.026113
Adjusted R-squared	-0.0112
S.E. of regression	12.3643
Sum squared residual	39900.59
Log likelihood	-1064.366
Durbin-Watson statistic	1.874458
Mean dependent variable	-0.705882
S.D. dependent variable	12.29563
Akaike info criterion	7.907104
Schwarz criterion	8.052927
F-statistic	0.699836
Probability (F-statistic)	0.724369

Appendix 14: Test One: Single Country Regression Output (Poland)

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	-0.320988	0.598597	-0.536234	0.5923
DUM10DATE00_12_18	-2.133558	2.373892	-0.898759	0.3696
DUM10DATE01_01_12	-1.406285	2.373892	-0.592396	0.5541
DUM10DATE01_05_04	-0.95174	2.373892	-0.400919	0.6888
DUM10DATE01_07_12	1.04826	2.373892	0.441579	0.6592
DUM10DATE01_08_03	-0.042649	2.373892	-0.017966	0.9857
DUM10DATE01_08_21	2.320988	2.373892	0.977714	0.3291
DUM10DATE01_09_07	0.593715	2.373892	0.250102	0.8027
DUM10DATE01_10_29	2.320988	2.373892	0.977714	0.3291
DUM10DATE01_12_05	-0.042649	2.373892	-0.017966	0.9857
DUM10DATE01_12_21	0.684624	2.373892	0.288397	0.7733

R-squared	0.014244
Adjusted R-squared	-0.023524
S.E. of regression	7.618892
Sum squared residual	15150.4
Log likelihood	-932.6686
Durbin-Watson statistic	2.226544
Mean dependent variable	-0.224265
S.D. dependent variable	7.530827
Akaike info criterion	6.93874
Schwarz criterion	7.084562
F-statistic	0.37714
Probability (F-statistic)	0.955857

Appendix 15: Test One: Single Country Regression Output (Russia)

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	-1.160494	1.382635	-0.839335	0.402
DUM10DATE00_12_18	-4.021324	5.483202	-0.73339	0.464
DUM10DATE01_01_12	-6.930415	5.483202	-1.263936	0.2074
DUM10DATE01_05_04	-6.930415	5.483202	-1.263936	0.2074
DUM10DATE01_07_12	16.16049	5.483202	2.947273	0.0035
DUM10DATE01_08_03	-0.839506	5.483202	-0.153105	0.8784
DUM10DATE01_08_21	0.887767	5.483202	0.161907	0.8715
DUM10DATE01_09_07	-2.021324	5.483202	-0.368639	0.7127
DUM10DATE01_10_29	3.160494	5.483202	0.576396	0.5648
DUM10DATE01_12_05	-6.657688	5.483202	-1.214197	0.2258
DUM10DATE01_12_21	0.069585	5.483202	0.012691	0.9899

R-squared	0.055434
Adjusted R-squared	0.019243
S.E. of regression	17.59807
Sum squared residual	80829.65
Log likelihood	-1160.376
Durbin-Watson statistic	1.888324
Mean dependent variable	-1.448529
S.D. dependent variable	17.76988
Akaike info criterion	8.613056
Schwarz criterion	8.758879
F-statistic	1.531726
Probability (F-statistic)	0.128074

Appendix 16: Test One: Single Country Regression Output (Turkey)

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	2.567901	2.175394	1.18043	0.2389
DUM10DATE00_12_18	-15.93154	8.627098	-1.846686	0.0659
DUM10DATE01_01_12	-6.931538	8.627098	-0.803461	0.4224
DUM10DATE01_05_04	-16.65881	8.627098	-1.930987	0.0546
DUM10DATE01_07_12	18.79574	8.627098	2.178686	0.0302
DUM10DATE01_08_03	-12.65881	8.627098	-1.467331	0.1435
DUM10DATE01_08_21	2.250281	8.627098	0.260839	0.7944
DUM10DATE01_09_07	-12.02245	8.627098	-1.393568	0.1646
DUM10DATE01_10_29	-4.476992	8.627098	-0.518945	0.6042
DUM10DATE01_12_05	-7.113356	8.627098	-0.824536	0.4104
DUM10DATE01_12_21	-4.386083	8.627098	-0.508408	0.6116

R-squared	0.06145
Adjusted R-squared	0.02549
S.E. of regression	27.68825
Sum squared residual	200092.8
Log likelihood	-1283.651
Durbin-Watson statistic	1.906826
Mean dependent variable	0.176471
S.D. dependent variable	28.04803
Akaike info criterion	9.519494
Schwarz criterion	9.665317
F-statistic	1.708846
Probability (F-statistic)	0.078822

Appendix 17: Test One: Single Country Regression Output (Venezuela)

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	0.888889	1.005598	0.88394	0.3775
DUM10DATE00_12_18	3.383838	3.987964	0.848513	0.3969
DUM10DATE01_01_12	-6.343434	3.987964	-1.590645	0.1129
DUM10DATE01_05_04	-6.343434	3.987964	-1.590645	0.1129
DUM10DATE01_07_12	7.111111	3.987964	1.783143	0.0757
DUM10DATE01_08_03	-0.161616	3.987964	-0.040526	0.9677
DUM10DATE01_08_21	0.565657	3.987964	0.141841	0.8873
DUM10DATE01_09_07	0.292929	3.987964	0.073453	0.9415
DUM10DATE01_10_29	-1.888889	3.987964	-0.473647	0.6361
DUM10DATE01_12_05	-6.252525	3.987964	-1.567849	0.1181
DUM10DATE01_12_21	11.11111	3.987964	2.786162	0.0057

R-squared	0.073633
Adjusted R-squared	0.03814
S.E. of regression	12.79917
Sum squared residual	42756.73
Log likelihood	-1073.769
Durbin-Watson statistic	2.0909
Mean dependent variable	0.948529
S.D. dependent variable	13.05047
Akaike info criterion	7.976239
Schwarz criterion	8.122062
F-statistic	2.074579
Probability (F-statistic)	0.02684

Appendix 18: Test One: Test Two Results

Event	Window	Window Length in days	Change in bond spread	the 200 day stdev	Change in bond spread as a ratio to of the 200 day stdev	In expected direction
Kohler on agreement on strengthened Argentine Program						
d= December 18, 2000						
	d-1 to d+1	2	-320	247	**1.295547**	yes
	d-2 to d+1	3	-220	308	0.714286	yes
	d-4 to d+1	5	-159	403	0.394541	yes
	d-9 to d+1	10	-230	578	0.397924	yes
	d-14 to d+1	15	-213	698	0.305158	yes
IMF approves augmentation of Argentina's stand-by credit						
d= January 12, 2001						
	d-1 to d+1	2	-103	235	0.438298	yes
	d-2 to d+1	3	-201	294	0.683673	yes
	d-4 to d+1	5	-279	388	0.719072	yes
	d-9 to d+1	10	-619	538	**1.150558**	yes
	d-14 to d+1	15	-814	655	**1.242748**	yes
Argentina IMF agreement clears way for debt exchange						
d= May 4, 2001						
	d-1 to d+1	2	-214	803	0.266501	yes
	d-2 to d+1	3	-334	819	0.407814	yes
	d-4 to d+1	5	-212	854	0.248244	yes
	d-9 to d+1	10	-1028	957	**1.07419**	yes
	d-14 to d+1	15	-15	1054	0.014231	yes
IMF holds back on new Argentina Aid						
d= July 12, 2001						
	d-1 to d+1	2	619	862	0.718097	yes
	d-2 to d+1	3	1116	917	**1.217012**	yes
	d-4 to d+1	5	1177	931	**1.264232**	yes
	d-9 to d+1	10	1780	968	**1.838843**	yes
	d-14 to d+1	15	1654	1001	**1.652348**	yes

Kohler: IMF to recommend accelerated disbursement of $1.2 Billion for Argentina						
d= August 3, 2001						
	d-1 to d+1	2	-95	915	0.103825	yes
	d-2 to d+1	3	-42	966	0.043478	yes
	d-4 to d+1	5	-175	1032	0.169574	yes
	d-9 to d+1	10	174	1019	0.170756	no
	d-14 to d+1	15	-702	1066	0.658537	yes

IMF prepared to recommend addition of $8 Billion to Argentina's stand-by credit						
d= August 21, 2001						
	d-1 to d+1	2	-294	967	0.304033	yes
	d-2 to d+1	3	-191	991	0.192735	yes
	d-4 to d+1	5	18	1031	0.017459	no
	d-9 to d+1	10	186	1030	0.180583	no
	d-14 to d+1	15	-439	1125	0.390222	yes

IMF augments Argentina's stand-by credit to 21.57 Billion						
d= September 7, 2001						
	d-1 to d+1	2	108	894	0.120805	no
	d-2 to d+1	3	334	928	0.359914	no
	d-4 to d+1	5	77	1032	0.074612	no
	d-9 to d+1	10	-148	1081	0.13691	yes
	d-14 to d+1	15	-415	1151	0.360556	yes

IMF announces it may not help						
d= October 29, 2001						
	d-1 to d+1	2	494	860	0.574419	yes
	d-2 to d+1	3	618	881	0.701476	yes
	d-4 to d+1	5	772	924	0.835498	yes
	d-9 to d+1	10	449	1009	0.444995	yes
	d-14 to d+1	15	-166	1072	0.154851	no

IMF denies loan to Argentina						
d= December 5, 2001						
	d-1 to d+1	2	-352	837	0.42055	no
	d-2 to d+1	3	543	858	0.632867	yes
	d-4 to d+1	5	177	923	0.191766	yes
	d-9 to d+1	10	666	986	0.675456	yes
	d-14 to d+1	15	609	1066	0.571295	yes

Argentina suspends payment						
d= December 21, 2001						
	d-1 to d+1	2	733	848	0.864387	yes
	d-2 to d+1	3	1257	871	**1.443169**	yes
	d-4 to d+1	5	1432	927	**1.544768**	yes
	d-9 to d+1	10	1254	985	**1.273096**	yes
	d-14 to d+1	15	1826	1030	**1.772816**	yes