The Certification Effect of Sovereign Wealth Funds on the Credit Risk of their Portfolio Companies☆

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Abstract

We study the certification effect of Sovereign Wealth Funds (SWF) on the credit risk of their portfolio companies. We compute an adjusted measure of Credit Default Swap (CDS) spread decrease (ADS) for 1 year and 5 year CDSs on a sample of 371 direct SWF investments between 2003 and 2010. Our findings point out that target company's credit risk decreases significantly in the aftermath of a SWF investment especially for the 1 year maturity CDS and even when the deal is secondary. The decrease is stable and no trend towards mean-reversion is found. Results on 5 years maturity are smaller in magnitude and weaker in statistical significance. ADS is higher for companies which have a higher pre-investment credit risk and are invested by large and unlevered SWFs. A higher ADS is found when the SWF is protected from discretionary withdrawals from the Government and when it is given an explicit mandate to pursue direct investments. Moreover, ADS is higher for companies whose credit risk is concentrated in the short-term. Our findings are consistent with the hypothesis that SWFs provide an implicit insurance against short-term liquidity shocks to their portfolio companies.

Keywords: Sovereign wealth funds, Credit risk, CDS spread, Certification.
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1. Introduction

Sovereign Wealth Funds (SWFs hereafter) have come to the fore in the last decade as an important new class of investors. The first SWFs were established in the second half of the 1950s in two British protectorates (Kuwait and the

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Gilbertine islands) to manage the revenues deriving from depletable resources (respectively, oil and phosphates). Since then, several other countries have established their own SWF. At the end of 2010, the SWF Institute reports 50 active SWFs (SWF Institute, 2010).

It is only recently, however, that these investors attracted substantial attention from regulators, academics, and market participants. One of the explanations for this surge in the interest towards SWFs is the active role these investors played during the recent financial crisis. Most of SWF assets are invested through external investment managers or in index-replication strategies.[1] However, part of the investments are carried out directly by SWFs in high-profile deals. In several cases these investments seem to have been targeting financially troubled companies. Possibly, the most well-known example is the \$69 billion injection made, during the most turbulent phase of the financial crisis, by some SWFs into US and European banks.[2] These investments alleviated market concerns about the stability of these companies but, at the same time, fueled a vast debate about the potential political interference by foreign governments in the western financial system (Gieve, 2008, Keller, 2008, Martin, 2008). There are, however, several other examples of active interventions of SWFs in troubled companies. In August 2009, CIC (the Chinese SWF) and QIA (the Qatari SWF) underwrote, together with other investors (namely Morgan Stanley and Simon Glick), a \$1.3 billion equity issue in Songbird Estates (a real estate owning the majority of London's Canary Wharf), which would have otherwise been unable to pay back a Citigroup loan.[3] In the same period, QIA was also involved in a \$10 billion transaction to refinance Porsche after the failed attempt to take over Volkswagen.[4] A few months later, CIC conducted a nifty deal buying \$900 million in Apax unfunded commitments.[5]

The rationale for these investments may be found in the peculiar characteristics of SWFs. SWFs are typically characterized by the lack of explicit liabilities, especially in the short term. This favors the pursuit of long-term investment strategies (Beck and Fidora, 2008). SWFs are also often shielded from sudden withdrawals from their own government. Moreover, as a result of government transfers of funds, SWFs often have fresh liquidity to invest.[6] These features put SWFs to a relative advantage in pursuing investments which yield returns in the long term and require substantial cash outlays in the short run (Kotter and Lel, 2011). More generally, Ang et al. (2009) claim that SWF characteristics suggest that they should get exposure to risk factors such as liquidity risk, which earn

[1] ADIA, the largest SWF, has about 80% of its assets managed by external investors, and about 60% invested in index replication strategies (ADIA, 2010)

[2] "The invasion of the sovereign-wealth funds". *The Economist.* January 17, 2008

[3] "China aids Canary Wharf owner". *The Financial Times.* August 31, 2009.

[4] "My other car firm's a Porsche". *The Economist.* August, 20 2009.

[5] "Apax 'coup' sees CIC invest €685m". *The Financial Times.* February 3, 2010.

[6] At the end of 2008, for instance, 87.4% of CIC's global portfolio (which accounted for slightly more than half the \$200 billion endowment of the fund) was invested in cash funds (CIC, 2009).

risk premiums over the long-run. At a more anecdotal level, this strategy is very effectively illustrated by Dr. Hussain Al-Abdulla (a QIA Executive Board Member) to the US Ambassador Joseph E. LeBaron in an alleged conversation reported in a Wiki-leaked cable:

> "In 2010 the QIA will also focus on business acquisition. It will seek to acquire businesses with good management and good products, but which have cash flow problems. "We are not interested in distressed assets or distressed debt. We are interested in distressed sellers", Al-Abdulla said".[7]

So far the literature has mainly focused on the impact of SWF investments from the perspective of shareholders, looking at stock abnormal returns (Bortolotti et al., 2010, Kotter and Lel, 2011, Dewenter et al., 2010), firm value (Dewenter et al., 2010, Fernandes, 2009, Sojli and Tham, 2010), accounting performance (Bortolotti et al., 2010), and degree of internationalization (Sojli and Tham, 2010). In this work we take a complementary perspective: we analyze the impact of SWF investments on the credit risk of target companies. We argue that SWFs could reduce firm's credit risk by implicitly guarantying its viability. This certification effect relates to SWFs idiosyncratic characteristics. With respect to other investors, SWFs have superior financial capacity and potential incentives to support financially distressed companies.

We measure credit risk by looking at target firm's Credit Default Swap (CDS) spread, and we use event study analysis to evaluate its evolution in the aftermath of a SWF investment. Using the SWF Transaction Database (SWFTD), we build a sample of 371 direct SWF investments for which essential information is available. For each investment event we build an adjusted measure of CDS spread decrease (ADS) using different event windows and CDS maturities. The decrease in target company's CDS spread is adjusted by comparing it against a matched sample of companies with similar pre-investment CDS spread. Our findings point out that after a SWF investment target company's credit risk decreases significantly; this result is confirmed when we only consider secondary deals, in which no fresh capital is injected in the firm. This supports the idea that the effect on credit risk is not only the mere reflection of an increase in financial resources but is due to a certification effect. Interestingly, ADS is higher for companies which have a higher pre-investment credit risk.

Moreover we identify some SWF, firm and deal characteristics that are likely to influence the magnitude of the expected credit risk reduction. Some interesting results emerge from the multivariate analysis. Most significant decreases in CDS spread are associated with large SWFs targeting smaller companies, especially those which exhibit immediate liquidity problems ("distressed sellers")

[7] The cable may be found at http://www.wikileaks.org/cable/2009/11/09DOHA691.html. See also: Ashby Monk's post: "Qatar Investment Authority Wikileaked" on July 12, 2011, available at this link: http://wp.me/ppGNt-2tW.

but not structural problems ("distressed assets"). A higher ADS is found when the SWF is protected from discretionary withdrawals from the Government and when it is given an explicit mandate to pursue direct investments. All these results are consistent with the hypothesis that SWFs benefit portfolio companies by providing a certification to their creditors.

The rest of the paper is organized as follows: in section 2, we briefly review the related literature and develop the theoretical background of this work. In section 3 we discuss the research methodology and sample. Results are reported in section 4. Finally, in section 5 we draw our concluding remarks.

2. Background

2.1. Sovereign wealth funds

The term SWF was first used by Rozanov (2005) to qualify the increasing tendency, especially in emerging economies, to shift the management of part of the national wealth to newly created entities closer to mutual funds than typical holding companies or central bank-linked entities. Since then, many possible definition of SWFs have been proposed (Balding, 2008).

A commonly accepted definition of SWF was set out by the IWG (2008): SWFs are special purpose investment funds or arrangements, created by the general government for macroeconomic purposes, which hold, manage, or administer assets to achieve financial objectives, and employ a set of investment strategies which include investing in foreign financial assets. Essentially SWFs combine some of the features of hedge funds and pension funds. As noticed by Bortolotti et al. (2010), SWFs are similar to hedge funds in that both are stand-alone, unregulated pools of capital allowed to pursue significant stakes in foreign firms. And SWFs are similar to pension funds for their long-term investment horizon. However, SWFs have some unique characteristics which make them different from any other private or public investor.

A first distinctive feature of SWFs is that they tend to be pretty big. According to the SWF Institute, SWFs manage about $4.2 trillion in assets (SWF Institute, 2010), which is twice the estimated size of the hedge funds industry (HFR, 2011). Moreover, the assets managed by SWF are highly concentrated, and several SWFs are very large compared to other institutional investors. The world's largest SWF is the Abu Dhabi Investment Authority (ADIA) which is estimated to manage $627 billion in 2010. As a matter of comparison, in the same period the world's largest hedge fund portfolio is Bridgewater's, with about $50.9 billion in assets[8], and CalPERS, the US largest pension fund, has assets for $201.6 billion (CalPERS, 2010).

Second, SWFs are government-linked entities and, as such, their investment behavior could include political objectives. This has raised a large debate about the risk that SWF investments could entail for target companies, the political

[8] "The Billion Dollar Club". *AR Magazine*. September 30, 2010.

stability of their host countries and, generally speaking, national security (e.g. Bahgat, 2008, Gieve, 2008, Keller, 2008). The debate was fueled by the creation, in the second half of 2007, of the CIC, the $200 billion Chinese SWF (e.g. Cognato, 2008, Martin, 2008, Zhang and He, 2009, Martin, 2010). The link of SWFs with governments may also favor portfolio companies, allowing them more effective lobbying and giving them a privileged access to captive markets (e.g. Dewenter and Malatesta, 1997, Sojli and Tham, 2010).

Third, contrarily to most professional investors, SWFs generally neither have explicit liabilities nor face the threat of abrupt withdrawals. SWF liabilities towards the government (and, ultimately, citizens), tend to be expressed as very long-run, generic, investment objectives. For instance, the objective of the Norwegian Government Pension Fund Global is "[...] to safeguard and build financial wealth for future generations [...] to safeguard the owners' long-term financial interests through active management and ownership." (NBIM, 2010, p. 12). The lack of short term, explicit, liabilities and withdrawal risk, favors the pursuit of long-term investment strategies (Beck and Fidora, 2008).

Eventually, the distinctive features of SWFs suggest that their impact at a micro (i.e. on firms) and macro (i.e. on financial) level are ambiguous from a theoretical perspective. On the one hand, SWFs could play a beneficial role in financial markets, by providing a long-term perspective which other investors lack, especially in periods of financial turmoil. But, at the same time, other factors suggest that their investments could be driven by political objectives which could lead to distortions capital allocation. In the next section we develop further this theoretical argument and present micro-level empirical evidence.

2.2. The impact of SWF on target companies

Several works have verified positive Cumulated Abnormal Return (CAR) in the days following SWF investment announcements. CAR is statistically significant and ranges, depending on the study, between 0.5% and 2.0% (e.g. Chhaochharia and Laeven, 2008, Bortolotti et al., 2010, Dewenter et al., 2010, Knill et al., 2010, Kotter and Lel, 2011). Similar results are found after investments by hedge funds (e.g. Klein and Zur, 2009) and pension funds (e.g. English et al., 2004).

However, findings about the long-term impact of SWF investments on target firms is mixed. Dewenter et al. (2010) find that Buy an Hold Abnormal Returns (BHAR) are not significantly different from zero considering 1, 3 and 5 year post-event windows. However, they find significantly positive Cumulative Market Adjusted Returns (CMAR) in the 3 and 5 years window (but not 1 year). Bortolotti et al. (2010) find (weak) evidence of negative BHAR over 1 and 2 years horizons; Kotter and Lel (2011) also find (non significant) negative BHAR over 1 and 2 years, but a significantly positive BAHR over 3 years. Fernandes (2009) and Sojli and Tham (2010) find a significant long-term increase in Tobin's Q for firms invested by SWFs.

Findings about long-term impact on operating performance are equally mixed. Fernandes (2009) finds that firms with higher ownership by SWFs have better operating performance; Sojli and Tham (2010) find weak evidence that firms invested by SWFs have better operating performance than a matched sample of non-invested companies. Bortolotti et al. (2010) find evidence of a decline in long-term operating performance after SWF investments.

A possible explanation for the ambiguity in empirical results can be found in the heterogeneity of SWF investments. SWFs include fiscal stabilization funds, savings funds, reserve investment corporations, development funds, and pension reserve funds without explicit pension liabilities (IWG, 2008). These differences are likely to reflect in investment practices and time horizon (Kunzel et al., 2010). Accordingly it is not surprising that different studies, based on different samples and methodologies, may find inconsistent results. In order to understand the impact of SWFs on firm performance, a deeper understanding of its theoretical underpinnings is needed. So far, two main explanations have been proposed to justify theoretically a potentially significant impact, either positive or negative, of SWFs investments on firms performances.

The first one focuses on SWFs being large institutional investors: SWFs may act as blockholders and active shareholders in target companies and may bring value by monitoring and reducing free-riding along the lines of Grossman and Hart (1980) and Shleifer and Vishny (1986). Following the classification by Chen et al. (2007), SWFs, being independent long-term investors, should be particularly keen on engaging in monitoring and influencing, especially when they own large stakes in target companies. However, when the stake they own is such that they gain a controlling influence on the company, tunneling could arise (Johnson et al., 2000), reducing firm value. Consistently with this view, Dewenter et al. (2010) find that short-term abnormal returns have a non-monotonic relation with the stake acquired.

When more direct evidence is sought, little is found in support of an active involvement of SWFs. Bortolotti et al. (2010) find that only in 14.9% of the cases SWFs are represented in the board of directors, and that their presence in the board is actually associated with a negative, statistically significant effect on 1 year financial returns. They also find 1 year returns to be negatively correlated with the size of the stake acquired. Also Dewenter et al. (2010) find that senior management turnover in the year following the investment is about 14%, which is similar to average yearly turnover for CEOs worldwide, as reported by DeFond and Hung (2004). Moreover, no impact on financial performance is found on a 1 to 5 years horizon. Similarly, Kotter and Lel (2011) find CEO turnover and operative performance to be non statistically different from a control group of similar firms in the year following the investment.

Bortolotti et al. (2010) provide a compelling explanation about why SWFs could actually be ineffective in monitoring. Since they are seen as representing the interest of a foreign (often non-democratic) government, they may be restrained by public opinion and political pressure from challenging existing management. While this explanation is clearly supported by the absence of evidence on SWF monitoring activity and by the weak long-run performance of SWF investments, it does not explain the short term positive market reaction to SWF investment announcements.

The second distinctive feature of SWF is their relationship with the government. Generally speaking, SWFs have been seen as a symptom of a new surge in State-capitalism, conflicting with the long-run trend of privatizations worldwide (Lyons, 2007). It is however unclear the extent to which the results obtained by the vast literature on privatizations (e.g. Vickers and Yarrow, 1991, Megginson and Netter, 2001, Bortolotti and Faccio, 2009) can be used as a guideline to understand the potential impact of investments from investors linked to foreign governments, like SWFs.

The foreignness of SWFs changes the nature of their influence on portfolio companies. For instance, SWFs could add value to target firms by granting them a favorable access to their home market. An illustrative case is the $1.5 billion investment made by CIC in Teck Corp, a Canadian mining company. Don Lindsay, Teck's CEO, declared in an interview that:

> "This transaction is an endorsement of Teck's future and provides an immediate and very positive impact on Teck's balance sheet. [...] It puts Teck back on the growth track and allows us to deepen our relationship with the largest customer of our core products. [...] Clearly, CIC knows so much about the Chinese economy and all the people who run those [state-owned] companies. And not every mining company has a very friendly relationship with China right now."[9]

This argument could explain, at least partly, why positive short term market reactions are observed after SWF investments. Consistently with this view, Sojli and Tham (2010) find a significant increase in the degree of internationalization and in the number of government contracts in the year following a SWF investment.

Moreover, SWFs could provide their governments with an incentive to which could shape their political agenda. Dewenter et al. (2010) find that in 8.2% of the cases, SWF domestic governments make some decision which favor portfolio firms in the year following the investment. Unfavorable decision are observed, instead, only in 1.6% of the cases. In 35.3% of the cases, SWFs engage in active networking with portfolio companies.[10] Both government favorable decision and networking activity are found to have a positive impact on firm medium-term financial returns. Preferred access to emerging markets however also entails some risks: these countries are generally characterized by a high volatility of productivity (Aizenman, 2003) as well as financial and political risk (Click, 2005), which could increase return volatility.

2.3. The SWF certification hypothesis

The literature surveyed in Section 2.2 is of little help to understand when and how SWFs could provide a certification for firm's creditors. As we mentioned

[9] "CIC on Teck: the Commodities Buying Spree Continues". *China Stakes*. July 6, 2009.

[10] Examples of both network transaction and government action can be found in Dewenter et al. (2010, Table 12).

in Section 1, there are a few well-known cases of SWFs bailing out distressed companies in the past few years. In these cases SWFs have clearly played a stabilization role by injecting financial resources in troubled companies. Their impact can however be more subtle and extend well beyond the short-term. We provide here two anecdotal examples. In February 2009 Unicredit, one of the largest Italian banks, approved a $4 billion convertible bond issue to re-establish its core tier ratios. Cariverona, one of the largest shareholders in Unicredit, declared to be unable to underwrite pro-rata the issue. Libya's Central Bank, which owned a 4.6% stake in Unicredit, then agreed to compensate by buying as much as 25% of the issue.[11] In January 2010 the Libyan government subscribed pro-rata a $5.7 billion equity issue and increased its stake with open market operations, becoming the largest shareholder in the bank. Thanks to the support from the Libyan Government, Unicredit was able to waive Italian State aid.[12] A similar case occurred between QIA and Credit Suisse. In February 2008 QIA acquired a 2% stake in Credit Suisse through an open market transaction.[13] A few months later, Credit Suisse avoided state aids by raising $8.75 billion of new capital, the bulk of which was subscribed by QIA itself.[14]

In both cases SWFs, which were already shareholders of the company, provided "bridge financing" to face a liquidity shock. To the extent to which this behavior is perceived as sustainable or systematic, we should expect that SWFs provide a "certification effect" on the outstanding debt of their portfolio companies. More generally, Kotter and Lel (2011) argue that: "SWFs can benefit the firm by certifying its long-term economic viability through capital injections in times of elevated uncertainty". Consistently with this argument, they find that SWFs tend to invest in large, highly levered, companies.[15] By investing in firms which are closer to financial distress, SWFs exploit their comparative advantage and may gain extra returns from liquidity risk (Ang et al., 2009). Sudarsanam et al. (2011) make a similar argument for private equity, and find that the level of distress is positively correlated to short-term abnormal returns after private equity investments.

The certification argument has already been indirectly investigated in few recent studies on firms owned by their domestic governments. Iannotta et al. (2009) find that government-owned banks have higher issuer ratings than private ones. Borisova and Megginson (2011), studying partial privatizations, show that the higher the stake maintained in the firm by the State, the lower its cost of

[11] "Libya sets sights on majority stake in UniCredit". *The Financial Times*. February 10, 2009.

[12] "Unicredit to raise $5.7bn with rights issue". *The Financial Times*. January 7, 2010.

[13] "Qatar fund buys Credit Suisse stake". *The Financial Times*. February 18, 2008

[14] "No thanks, we'll raise £5bn and go it alone, says Credit Suisse". *The Evening Standard*. October 16, 2008

[15] Bortolotti et al. (2010) suggest that evidence indicating that SWFs invest in more distressed firms could be due, instead, to a different selection mechanism: when investing in troubled firms, SWFs find weaker political contention. Investments in distressed companies would then be the result of a strategic disadvantage (the liability of foreignness) rather than of a strategic advantage (the absence of short-termism).

debt. Understanding the extent to which this phenomenon is also determined by SWFs is an interesting and non trivial research question.

It is worth pointing out that credit risk reduction is not a common feature among institutional investors. Cremers et al. (2007) find that institutional blockholders are associated with higher bond yields, especially when the firm is exposed to takeovers. Klein and Zur (2011) observe that hedge funds have a positive impact on stock returns, but that this comes to the expense of creditors, who experience instead negative abnormal returns. Institutional blockholders are thus more likely to exacerbate credit risk, due to risk-shifting, rather than to provide a certification effect. An implicit guarantee of firms viability by its shareholders is, instead, largely accepted in the literature on parent-subsidiary relationships (i.e. when the relevant blockholder is an other firm). Gopalan et al. (2007), studying Indian groups, show that firms are willing to financially support affiliates in order to avoid their defaults. Boot et al. (1993) document and provide a theoretical justification for the common practice of non-binding guarantee contracts between affiliates when the parent company is not legally hold responsible for the subsidiary liabilities.

The relevance of firms linkage on credit risk goes thus beyond the existence of covenants or legally binding guarantees. In the S&P Corporate Rating Criteria guideline, Samson (2006, p. 85) notes that:

> "Economic incentive is the most important factor on which to base judgments about the degree of linkage that exists between a parent and subsidiary. This matters more than covenants, support agreements, management assertions, or legal opinions".

The incentive and financial possibility of SWFs to provide financial resources to troubled portfolio companies could then matter more than any explicit contract or covenant.

Firms linkages play such a relevant role in determining credit risk that the parent company's rating often represents a factor included in the estimation of subsidiary's credit risk. Among the elements influencing the strength of the linkage - and thus the likelihood of the parent firm supporting the subsidiary in case of need - S&P highlight: (a) the track record of parent company in similar circumstances; (b) the financial capacity for providing support; (c) the strategic importance of the venture; and (d) the nature of potential risk (Samson, 2006). SWFs rank pretty high in most of these dimensions. As we already noted, SWFs have set their track record by showing a considerable propensity to contribute to distressed firms bail-outs. They also have a remarkable financial capacity: SWFs are larger than most private investors and often have substantial liquidity to invest and a long time-horizon.

Not all SWFs are however the same with this respect. First, SWFs vary substantially in size. The largest SWF in our sample (ADIA) is almost 50 times larger than the smallest (Mubadala). Other things being equal, larger funds should be able to face larger liquidity calls from portfolio companies: the larger the fund, the smaller the loss of diversification and the need of portfolio re-balancing after a new capital investment.

Second, SWFs exhibit different levels of protection from discretionary withdrawals from the Government. The Australian government has stipulated that "money may not be withdrawn from the Future Fund until 2020" (Future Fund, 2010). Article 9 of the Korean Investment Corporation Act, instead, allows the Steering Committee to increase or decrease discretionary the KIC capital (KIC, 2009). SWFs better shielded against the risk of Government withdrawals should be more able to support portfolio companies and maintain illiquid investments. Stronger certification should be associated to funds protected from discretionary Government withdrawals.

Third, while most SWFs are financed by pure equity, some of them are levered. Leverage clearly limits the certification potential of a SWF. Debt service constitutes a short-term liability, thus reducing the ability of the SWF to focus on long-term results and neglect short-term returns. Moreover, a SWF could decide to leverage to compensate the reluctance or the impossibility of the Government to provide it with additional funding. There is some factual evidence that this could actually be the case: Temasek Holdings, which started issuing bonds by mid-2005, is barred from receiving further transfers from the Government.[16] GIC, the other Singaporean SWF, has a preferential access to country's excess reserves and is thus not leveraged. Interestingly, Temasek sold its stake in Merrill Lynch/Bank of America after just one year, while GIC kept its stake in similarly struggling UBS.[17]

So far we have discussed the general propensity and capability of SWFs to support distressed firms; however, the strategic importance of the firm for the fund must also be considered. Bortolotti et al. (2010) underlines how SWFs could be reluctant to leave one of its portfolio firms going bankrupt, as this could entail a political cost for its Government. Taking a positive view, some Governments could use their SWFs to bail-out troubled western firms in order to achieve a "political goodwill" that the size of their economies would not otherwise allow (e.g. Drezner, 2008).[18] We could thus expect that, ceteris paribus, SWFs from smaller, non western countries should be more keen to support their portfolio firms, since their political return would be higher.

The strategic importance of an investment will also be, on average, higher for SWFs whose primary goal is to make direct and strategic investments, such as United Arab Emirates' IPIC (IPIC, 2009), than for SWFs which invest mainly in index replicating strategies, such as Norway's GPF (NBIM, 2010). We expect the certification effect to be stronger for investments made by SWFs whose mandate explicitly mentions direct and strategic investments.

The willingness and the ability to take risk of the SWF are also likely to influence its certification potential. Some SWFs are not totally separated from

[16] "Temasek says it is not a sovereign wealth fund". The Straits Times (Singapore), March 22, 2008.

[17] Temasek has not been totally neglected by the Government, and received a S$ 10 billions lump sum in 2007 to make up for its losses.

[18] See also: "Analysis - Qatar SWF's hefty appetite draws global players". *Reuters*. March 3, 2011.

the Central Bank. This is the case for instance of SAMA (Saudi Arabia) and SAFE (China). In these cases the safety-first objectives of the Central Bank could be inherited by the SWF, and we could expect a higher risk aversion of the SWF, and thus a less pronounced certification effect. Moreover, SWF's ability to face a sudden call for liquidity could be hampered if it is due to a systemic, rather than idiosyncratic, shock. A systemic shock would affect all portfolio companies at the same time and increase the likelihood of a withdrawal from the Government. We should then expect a lower certification role for SWFs in periods of high market turbulence.

The source of risk is also particularly important. SWFs are of little help for firms with structural, medium-term issues ("distressed assets"). SWFs rarely engage existing management and, when this happens, there is no evidence of a positive effect on firm performance (Bortolotti et al., 2010, Dewenter et al., 2010). On the contrary, SWFs can provide a strong support to firms experiencing severe short-term capital shortage ("distressed sellers"). We thus expect that firms whose short-term credit risk is high (relative to medium-term credit risk) are those which could benefit more from SWF's certification. Firms with a good short-term outlook but potentially struggling in the medium-term should instead benefit less from SWF investments.

Overall, we argue that *SWFs are expected to bring a significant reduction in the perceived credit risk of invested companies*. This effect will be stronger for: (a) financially more capable SWFs, measured by their size, protection from Government withdrawals, and the absence of leverage; (b) strategic investments, measured by active investment policy and small, non western country of origin; (c) idiosyncratic and contingent rather than systemic or structural sources of risk, captured by the low degree of market turbulence and the difference between short-term and medium-term credit risk.

3. Data and methodology

In this section we first describe our methodology to measure firm's credit risk and its changes after SWF investments (section 3.1). Then we describe the sample construction process and the variables included in our analysis (section 3.2). Finally, we provide relevant descriptive statistics (section 3.3).

3.1. Measuring credit risk

In order to measure credit risk we focus on CDS spreads. CDSs are derivative contracts in which a counterpart (the protection buyer) gets insured against a firm defaulting on its liabilities by paying a percentage over an underlying nominal notional (the spread) to a protection seller. Traditionally, the literature on credit risk premiums has focused on bond yields (e.g. Bhojraj and Sengupta, 2003, Klock et al., 2005, Cremers et al., 2007). As the CDS market develops and gains liquidity, CDSs are becoming increasingly popular to measure credit risk.

When using bond yields, strong assumptions on the benchmark interest curve are needed to extract the expected present value of default; CDS spreads, instead, are already a direct market measure of this value. CDS spreads are attractive because "no adjustment is required: they are already credit spreads" (Hull et al., 2004, p. 2792). Moreover, the CDS market has been found to lead the bond market (Blanco et al., 2005) and to be more responsive to changes in credit conditions (Zhu, 2006). In our context, this suggests that changes in market expectations can be more easily captured by looking at CDS spreads around an investment event than bond yields.

Using CDS spreads to gauge credit risk also requires some caution. First, as underlined by Hull and White (2001), the relationship between CDS spread and credit risk can be altered by counterpart risk. Second, the ability of CDSs to predict credit risk is hampered by the fact that CDSs may reflect premiums for liquidity risk (Düllmann and Sosinska, 2007). Incidentally, Longstaff et al. (2005) argue that CDS spreads are less affected by liquidity premiums than corporate bond spreads, since swaps are not in fixed supply and can be easily offset by entering a reverse contract. Moreover, our research setting limits the extent to which liquidity and counterpart risk may affect our results. The dependent variable of our study is the *change* in CDS spread. This means that unless SWF investments systematically alter the magnitude of CDS liquidity and counterpart risk, changes in CDS premiums will give us a consistent estimate of changes in credit conditions.

The main variable in our study is the adjusted decrease in CDS spread (ADS) after the announcement of SWF investments. Our methodology to compute ADS is broadly consistent with other event studies on CDS spreads (e.g. Hull et al., 2004, Norden and Weber, 2004). The most notable peculiarity of our measure is that we compare CDS spread over different time windows (estimation vs. event) rather than between two days (i.e. a day proceeding and a day following the investment event). This gives us some additional flexibility in analyzing changes in CDS spreads and their dynamics. On the one hand, CDSs are sometimes not liquid enough to reflect immediately changes in market expectations. As a consequence, spreads may take a few days to reach their post-investment equilibrium. On the other hand, information leakage could cause premiums to lead the actual event announcement. Accordingly, we borrow from the well-established literature of abnormal returns the idea of comparing changes in the dependent variable between an estimation window set to precede the investment event enough to be reasonably unperturbed by information leakage, and a set of event windows, some of which may actually span across the investment event itself. Notably, moving from a day-to-day to a window-to-window comparison allows us to avoid using interpolation to impute missing CDS premiums, which could rely on invalid smoothness assumptions given the nature of the phenomenon we are studying.

For each event j we obtain CDS bid-ask medium spreads from Credit Market Analysis (CMA) via Datastream, which provides data for every firm with at least one recorded CDS transaction collected from a consortium of sell and buy side institutions. We collect daily spreads on 1 year and 5 years maturity CDS, which are the most commonly used. Whenever possible we use senior CDS spread, and use subordinated CDS spread only when senior CDS is unavailable.

CMA reports a veracity score indicating the quality of the data: a veracity score of 1 indicates an actual transaction, a veracity score of 2 indicates a commitment to trade, a veracity score of 3 indicates that quote is indicative. Veracity scores of 4 or higher are associated with derived, theoretical spreads. Given the purpose of our analysis, and similarly to what done in other event studies on CDS spreads (e.g. Hull et al., 2004, Pop and Pop, 2009) we only consider data associated to a veracity score of 3 or lower.

We compute the average CDS spread in a pre-investment (estimation) window (CDS_j^{Pre}) set between 24 and 15 trading days before the investment announcement ($[-24, -15]$). We then compute the average CDS spread in an event window ranging between 5 trading days before and 4 trading days after the investment announcement ($[-5, +4]$). We exclude observations for which CDS spreads with a veracity of 3 or better are available for less than half the days in each window. To control for the stability of CDS spread reduction we also compute the post-investment CDS spread for three other non-overlapping event windows: $[+5, +14]$, $[+15, +24]$, and $[+25, +34]$. For the sake of notational simplicity we will indicate, in this section, the average post-investment CDS spread in the post-event window as CDS_j^{Post}, omitting the event window to which it refers to.

The unadjusted CDS decrease across the investment event is given by:

$$DS_j = \left(CDS_j^{Pre} - CDS_j^{Post}\right). \tag{1}$$

It should be noted that a positive value of DS_j indicates a *decrease* in CDS spread. While this notation is opposed to what is normally used, it makes the presentation of our results more straightforward. Since several investments in our sample occur in a period of significant economic and financial turbulence (2008-2009), it is important to adjust DS_j for aggregate movements in CDS spreads across the investment event. For each investment j, we build a CDS index which includes companies with comparable pre-investment financial status. As an indicator of financial status we use the level of CDS premium rather than credit rating, which is sometimes used (e.g. Hull et al., 2004). The reason why CDS premium is preferable to rating in this context is its better timeliness. Ratings not only have to be accurate, but stable as well. They have to reflect a judgment that may provide a counterpoint to volatile market-based assessments (Cantor and Mann, 2007). In facing this trade off between accuracy and stability, ratings may diverge from the market perception of firm's financial stability in any point in time and companies with very similar rating may have substantially different CDS premiums. This is particularly true when markets are extremely turbulent.[19]

[19] For instance, looking at data on 1 year maturity CDS for US firms rated BBB by S&P on September 29, 2009, we see spreads roughly ranged between 14 to 944 bps; on the same day of 2006 , the wedge was almost one order of magnitude smaller (5-188bps).

We identify all companies in the CMA dataset having a CDS with the same maturity and same seniority as the one used to compute DS_j, and for which at least half days in the pre and post-event windows include non-missing spreads with veracity score of 3 or lower. We then select, within this sample, the 10 companies whose CDS spread in the pre-event windows is closest to (i.e. has minimum absolute deviation from) CDS_j^{PRE}. We compute the average CDS spread for the 10 companies in the pre-event window (I_j^{PRE}) and in the post-event window (I_j^{POST}).

The decrease in CDS spread for the index across the investment event will be given by:

$$IDS_j = \left(I_j^{Pre} - I_j^{Post}\right). \tag{2}$$

Combining equations (1) and (2) we obtain the definition of the adjusted decrease in CDS spread for the j-th investment (ADS_j) :

$$ADS_j = DS_j - IDS_j. \tag{3}$$

ADS_j, defined in equation (3), measures the CDS spread decrease, adjusted for variations in CDS spreads for companies with similar credit risk in the same period, and is the dependent variable of our study.

3.2. Sample and sample construction

The list of SWF investments used in this study derives from the Sovereign Wealth Funds Transaction Database (SWFTD). The SWFTD, provided by the SWF Institute, is one of the most comprehensive commercial datasets on SWF investment activity, with 1,853 recorded transactions in listed equity and 22 in convertible securities between June 1984 and mid-December 2010.[20] For every recorded transaction the SWFTD reports the announcement and effective date and some characteristics of the deal. Since CMA data via Datastream are only available since January 2003, we only consider investments occurred after that date. This period includes the majority of recorded investments in listed equity and convertible securities (1,253 transactions, or 66.8% of all transactions in the SWFTD). From this initial sample we exclude 10 investments made by the FSI, the investment arm of the French government, which is not a SWF according to the definition used in the Santiago Principles (IWG, 2008).[21] We are then left with 1,243 investments in 772 firms. In 39 cases (corresponding to 89 observations) SWFs invested in a syndicate; in these cases we attribute the investment to the lead SWF in the syndicate (i.e. the one with the highest amount invested or equity interest acquired).[22] The target population of investment events is then constituted by 1,193 investment events in 772 firms. CMA

[20] This work is based on version 2.3 of the SWFTD, released on December 2010.

[21] The FSI only invests within its national borders while IWG (2008) specify that SWFs have an investment strategy which includes foreign equities. For a discussion on the nature of the FSI see also Balding (2008).

[22] Results are qualitatively similar if all syndicated deals are removed from the sample.

data are available for only 239 of these firms, reducing the number of events to 499.

Finally, we collect CDS spread time series from CMA, information on SWF characteristics from the SWF Institute and firm characteristics from Worldscope and exclude investment events for which the information set is incomplete.[23] Our final sample is composed by 371 investments in 191 firms, made by 16 SWFs from 12 countries. The size of the sample is comparable to that in other studies on SWF investments (Dewenter et al., 2010, Kotter and Lel, 2011). The distribution of the sample by SWF is illustrated in Table 1.

[Insert Table1 about here]

Overall, the 16 SWFs included in our sample manage $3,182 billion, which is 77.5% of the total assets managed by SWFs.[24]

3.2.1. SWF characteristics

We consider several SWF-related variables that are likely to affect the impact on credit risk, as discussed in Section 2.3. The first variable is the SWF size, measured in terms of the logarithm of its estimated portfolio holdings ($Size_{SWF}$) as reported by the SWF Institute (SWF Institute, 2010). The largest SWF included in our sample (and world's largest) is ADIA, which has assets estimated at $627 billion, and is involved in 25 investment events. The two largest non-commodity SWFs in our sample are SAFE and CIC, both from China, which are involved in, respectively, 29 and 38 investment events. The smallest SWF in our sample is Mubadala, which has $13 billion in assets and is involved in only 2 investment events.

In order to assess the financial capability of a SWF, we also use different dummy variables. *Direct* is equal to one if the SWF has a mandate to make direct, strategic deals and 0 when the SWF mainly invest in passive, index-replicating strategies. *Shield* is equal to 1 if there is a rule explicitly limiting the amount of discretionary withdrawals from the SWF by the Government. We built these two variables by combining all available public official information; a detailed explanation is reported in AppendixA. Out of the 16 SWFs in our sample, 9 are given an explicit mandate to pursue direct investments and 7 are shielded from government withdrawals. Some 114 investments are performed by SWFs with explicit mandate to pursue direct investments, and 144 by SWFs sheltered from discretionary Government withdrawals. We create a dummy equal to 1 when the SWF is levered (*Debt*). Despite 4 out of 16 SWFs are levered, their investments account for less than 4% of our sample, thus clearly limiting the reliability of our results to this respect.

[23]As explained above, we consider CDS spread to have a sufficient liquidity when at least in half the trading days in the estimation and event window they have a spread priced with veracity of 3 or better.

[24]According to SWF Institute rankings at the end of December 2010 SWFs manage overall $4,156.80 billion (SWF Institute, 2010).

We create a dummy equal to 1 when the SWF comes from a "western" country, namely Norway or Australia ($Western$) and 0 otherwise: if SWFs can also have political incentives to support their portfolio companies, these are likely to be lower for countries which already have a mature economy and well-established relationships with other developed economies. Political incentives are instead likely to be higher for countries whose economies are small compared to their SWF. Country size is captured by GDP, as reported by the World Bank (GDP). We also create a dummy equal to 1 when the SWF is a CB-related Entity, namely SAFE or SAMA, (CBE), as it is expected to have an higher risk aversion and thus to be less likely to further invest in a distressed firm.

Finally, we add to our analysis other SWF characteristics which are found to be relevant in other studies. Following Bortolotti et al. (2010) and Kotter and Lel (2011) we control for SWF transparency using the Linaburg-Maduell Transparency Index (LM). The index ranges from 0 to 10 based on the adoption of best practices on information transparency[25]. We control for the origin of the SWF by including in the regressions a dummy equal to 1 if the fund is constituted from oil revenues and 0 otherwise (Oil).

3.2.2. Firm and deal characteristics

Table 2 shows the distribution of observations by sector and country of invested firms. The highest investment activity is in the Financials sector, with 86 investment events (i.e. 23.2% of our sample). The importance of this sector in SWF portfolios is confirmed by several other studies. In the sample used by Bortolotti et al. (2010), for example, the fraction of financial companies is even higher: 136 out of 376 observations, or 36.1%. Beck and Fidora (2008) suggest that the appetite of commodity SWFs for Financials could be driven by their low correlation with oil returns. Given their relevance in the sample and the amount of capital injections by SWFs in the struggling banking system in the last years, we use a dummy to control for the invested firm being a financial institution ($Finance$).

[Insert Table 2 about here]

The majority of the investments in our sample is concentrated in two countries: the UK (192 investments, 51.8% of our sample) and the US (103 investments, 27.8% of our sample). This is partly because these two countries possess large and highly developed stock markets (e.g Demirgüç-Kunt and Levine, 1996) which attract SWF investments (Chhaochharia and Laeven, 2009). Moreover,

[25]The best practices correspond to disclosure requirements about: general information on the fund, percentage and geographical locations of holdings, market value and returns, reference on ethical standards, investment policies, clear strategies and objectives, clear identification of subsidiaries and external managers, website, address and contacts. Moreover an additional point is given to funds with independently audited annual reports. The transparency of IPIC (a SWF of the United Arab Emirates) is not reported by the SWF institute and is estimated by the authors to be 1. Results are largely unaffected by this assumption.

our sample only includes companies for which CDSs are traded, which increases further the portion of US and UK investment events compared to the initial sample (in the SWFTD they represent 64% of SWF investments in the period considered).

To control for firm size ($Size_{Firm}$), we use the logarithm of its enterprise value, computed as firm's market capitalization plus book value of liabilities (source: Worldscope). The larger the firm, the harder it would be for the SWF to support it in case of need; we thus expect this variable to have a negative impact on ADS.

SWF certification should be larger the less a company is financially sound. Following the discussion above, the pre-investment level of CDS spread (CDS^{PRE}) can be used as a measure of credit risk. We also include two other firm-specific characteristics which may be related to credit risk: firm $Leverage$ (the ratio between total book liabilities at book value and enterprise value), which relevance among firm-specific characteristics in determining credit spreads has been assessed in several studies (see, for example, Collin-Dufresne et al., 2001), and Tobin's Q (the ratio between enterprise value and book value of assets). As customary, to reduce endogeneity, we use 1 year lags for $Size_{Firm}$, $Leverage$ and Q.

As assessed in Section 2.3, the more the source of financial instability is idiosyncratic, the more SWFs should be able to cover firm's liquidity needs. If firm's instability is due to market-wide, systemic uncertainty, the capability of a SWF to stabilize any portfolio company could be hampered. Controlling for turbulence is particularly important in our sample, since the period we analyze is characterized by very different market conditions. Accordingly, we include, as a control, the CBOE Volatility Index (Vix), which is proportional to aggregate market volatility (e.g. Fleming et al., 1995).

Finally, we control for some firms and deal characteristics that are likely to mitigate the impact of SWFs investments on credit risk. First, since some companies receive more than one investment by SWFs in the period, we introduce a dummy equal to 1 when the investment occurs in a company which is not SWF-backed and 0 otherwise ($First$); we include a dummy equal to 1 if the firm and the SWF belong to the same country ($Domestic$). We control for the type of deal by identifying investments where the SWF provides fresh money to the firm ($Injection$), and when the SWF buys convertible securities rather than equity ($Conv$).

3.3. Descriptive statistics

The summary statistics for dependent and control variables are summarized in Table 3.

[Insert Table 3 about here]

The average unadjusted reduction in 1 year maturity CDS spread between the estimation window ($[-25, -14]$), and the event window ($[-5, +4]$), DS, defined in equation (1), is 9.99 bps. A simple t-test rejects the null hypothesis that the sample mean of DS is 0 at the 10% confidence level (p-value 0.057). The reduction in CDS spread in the index of comparable companies (IDS, defined in equation (2)), using the same windows as for DS is instead, on average, 2.23 bps, which is (unsurprisingly) not statistically different from zero at customary confidence levels (p-value 0.487). The adjusted reduction in CDS spread (ADS, defined in equation (3)), which is the difference between DS and IDS, is equal to 7.76 bps. As expected, DS and IDS are strongly correlated (Pearson correlation, reported in Table 4, is 0.79). As a result, the adjustment process reduces the standard deviation of ADS much more than it decreases its mean. Accordingly, the null hypothesis that the distribution of ADS has a zero mean can be rejected for a larger set of confidence thresholds (p-value 0.020). We will analyze more thoughtfully the robustness and stability of this result in Section 4.1 and limit ourselves here to highlighting that this descriptive evidence confirms that the adjustment process seems to be effective in filtering common underlying factors of CDS spreads variation.

Pre-investment mean (median) 1 year CDS spread is 141.55 bps (65.51 bps). Mean (median) $Size_{SWF}$ is 5.342 (5.511), which correspond to a SWF with $284.4 billion ($247.5 billion) in assets. Mean (median) $Size_{Firm}$ is 4.113 (3.899), which corresponds to an enterprise value of $60.9 billion ($49.4. billion).

Mean (median) LM-index is 6.71 (6.00). Companies in our sample have an average leverage of 0.58 and Tobin's Q of 1.6. Slightly less than half of the observations (46%) refer to a first SWF investment, opposed to a follow-up investment by the same or a different SWF. Some of the dummies are related to rare events, so we must be careful in interpreting their effect in the analysis of determinants of changes in CDS spread. Only 1% of the investments are in firms located in the same country as the SWF; 6% of investments are capital injections, and the 33% of them (2% of the total sample) are performed buying convertibles bonds instead of equity.

[Insert Table 4 about here]

Table 4 reports Pearson correlation among variables. As expected, data on 1 and 5 years CDS are strongly correlated: for example, the correlation between CDS_{1y}^{PRE} and CDS_{5y}^{PRE} is 0.96, which makes it non trivial to jointly assess short and medium-term risk. Following Han and Zhou (2011), we control for the term structure of risk by using the CDS spreads curve slope, computed as the difference between CDS_{5y}^{PRE} and CDS_{1y}^{PRE} ($Slope$); its correlation with CDS_{1y}^{PRE} is -0.26. Finally, it is worth pointing out that larger SWFs do not seem on average to target more distressed firms (the correlation between $Size_{SWF}$ and CDS_{1y}^{PRE} is -0.02), and that SWFs with a mandate for direct investments seem to invest on average in more levered firms (correlation is 0.32).

4. Empirical Results

In this section we analyze the statistical significance of the adjusted CDS spread and try to identify its determinants. In Section 4.1 we study ADS using event-study methodology. In Section 4.2 we analyze the determinants of ADS using multivariate analysis.

4.1. Event study on adjusted decrease of CDS spreads

To investigate the magnitude and stability of the impact on SWFs investment announcements on adjusted CDS spread reduction, we perform an event study analysis on ADS (as defined in Section 3.2 and Equation (3)). We use, as estimation window, the period between 24 and 15 trading days before the event ($[-24, -15]$). We consider four non overlapping event windows of 10 trading days each: $[-5, +4]$, $[+5, +14]$, $[+15, +24]$, and $[+25, +34]$. We repeat the analysis using both 1 year and 5 year maturity CDS spreads. To reduce the impact of outliers, we winsorize ADS using a 1% threshold for each tail (Dixon, 1960).[26] Results are reported in Table 5.

[Insert Table 5 about here]

Panel A of Table 5 confirms that mean 1 year maturity $ADS_{[-5,+4]}$ is positive and significant at 1% level. ADS is positive and significant also for windows up to 24 trading days after the event (at the 10% significance level). Moving farther away from the announcement date, the magnitude of average 1 year maturity ADS remains remarkably stable (in the $[+25, +34]$ event window, mean 1 year ADS is 6.464 bps, which is only slightly below the 7.019 bps in the $[-5, +4]$ event window). The statistical significance of ADS slightly declines as a result of an increase in standard deviation, which reflects the dispersion of CDS spreads as new events alter market expectations about firm financial stability. Interestingly, very similar patterns are found by studies on cumulative abnormal returns, albeit CDS premiums appear to have a more stable evolution (see, for instance, Bortolotti et al., 2010). Our results are even more robust when, instead of a parametric t-test on the mean, we use a non-parametric Wilcoxon signed-rank test on the median 1 year ADS.

Results for the 5 year maturity ADS are generally weaker than those on 1 year maturity. Mean ADS is always lower for 5 years than for 1 year maturity and is statistically significant only in the $[+5, +14]$ window. Median 5-years ADS is always positive and statistically significant, albeit with a lower p-value than the 1 year maturity. The disparity between 1 year and 5 years ADS confirms that the certification effect by SWFs is stronger against immediate distress due to short-run financial constraints, but is weaker on longer-term credit risk.

As stated in Section 1, SWFs have gained newspapers headlines in the last few years mainly by performing big capital injections in financially troubled companies; it could then be argued that our results are simply driven by an increase of firms liquid assets, and that the source of this liquidity (i.e. SWFs)

[26] We repeat the analysis on non-winsorized data and find very similar results.

is irrelevant. In order to assess this potential criticism, we repeat the event study analysis by excluding from the sample all those investments where the SWF injected new capital in the firm. Results, shown in Panel B of Table 5, are coherent with those obtained for the full sample: in the $[-5, +4]$ event window we still obtain a positive ADS with a 1% significance level for 1 year maturity CDS; the size of the decrease is clearly smaller than for the full sample but is still significant at the 10% level up to $[+25, +34]$. Wilcoxon signed-rank tests on ADS median values are still significant at 1% level for all the event windows considered. Significance for 5 years maturity CDS follows a similar path in Panel B as it does in Panel A. Overall, these results support our hypothesis that perceived credit risk reduction around SWFs investments is not only due to effective capital injections (which, incidentally, represent less than 6.5% of our sample, as shown in Table 3). Finally, in Panel C we report the results obtained by excluding investments made by the Government Pension Fund-Global (GPF), the Norwegian SWF. Both Bortolotti et al. (2010) and Dewenter et al. (2010) suggest that the GPF could be incomparable to other SWFs. Excluding the GPF from our sample does not however seem to alter our results substantially.

We perform a number of additional robustness checks. First, we repeat the event study analysis including observations which were dropped from the initial sample because of missing data on SWF and firm characteristics and obtain qualitatively similar results for 1 year maturity ADS.[27] For 5 years maturity ADS, the $[-5, +4]$ event window becomes significant at 5% level. Second, we repeat the analysis using only the balanced set of 363 observations available in the $[+25, +34]$ window, obtaining virtually identical results. Results are reported in Table B.10 in AppendixB.

Before moving to a multivariate analysis, we present in Table 6 a simple one-way comparison of $ADS_{[-5,+4]}$ across different quartiles of CDS^{Pre}. [28]

[Insert Table 6 about here]

The mean and median ADS increase monotonically moving from low to high pre-investment levels of CDS spread. Corresponding to the lowest quartile of CDS^{Pre}, 1 and 5 years maturity ADSs are positive but not significantly different from zero in both mean and median. Magnitude and significance increase when moving from the first to the second and third quartile. For 5 years maturity, mean and median ADS are positive but not significantly different from zero in the first quartile and highly significant in the second and third quartile, as for their 1 year maturity counterparts. In the fourth quartile, mean ADS is not significantly different from zero *and* is lower than that for the second and third quartile. For both maturities, standard deviations increase substantially when moving from the third to the fourth quartile. While mean 1 year (5 years) ADS

[27] The only exception is that in the $[+15, +24]$ and $[+25, +34]$ event windows ADS is significant only at 5% and 10% level respectively.

[28] Again, we repeat the analysis also on non-winsorized data and find very similar results.

goes from 7.996 bps (6.342 bps) to 17.407 bps (0.893 bps), standard deviation increases from 1.700 bps (1.735 bps) to 6.620 bps (8.368 bps). This suggests the use of heteroskedasticity consistent estimates in the parametric analysis.

Overall, these results support the view that, on average, SWFs reduce significantly the credit risk of portfolio companies. The phenomenon is particularly important for short-run credit risk (captured by 1 year maturity CDS) and for companies whose pre-investment level of credit risk is high. We study, in the next section, which other factors moderate this relationship.

4.2. Analysis of determinants

To study the factors that moderate the certification effect of SWFs, we perform a multivariate analysis on 1 year ADS computed in the $[-5, +4]$ event window. To take into account sectoral differences in capital structure and growth prospects, we center *Leverage* and Tobin's Q on their sectoral means. We also center all other continuous variables to their sample mean, which allows us to give a more immediate interpretation to the constant parameter, which represents the expected ADS corresponding to an average SWF in an average company, with all dummies set to zero. Following evidence of increasing dispersion of ADS for high levels of pre-investment CDS spread, reported in Table 6, we compute robust standard errors using, as customary, the correction for heteroskedasticity proposed by White (1980). To reduce the impact of outliers, we winsorize all continuous variables using a 1% threshold for each tail (Dixon, 1960).[29] We estimate different models, including different sets of covariates. Results are reported in Table 7.

[Insert Table 7 about here]

Column (1) in Table 7 reports the simplest model, which includes basic information on SWF (size, transparency, and origin) and target company (size, leverage, and Tobin's Q). Results show that an investment in an "average" company by an "average" SWF with non-commodity origin has an expected ADS of 10.36 bps (significant at the 1% level). *Leverage* is positive and significant at the 5% level. Besides statistical significance, leverage has an economically sizable effect on ADS. Other things being equal, a 1 standard deviation increase in *Leverage* determines an increase in expected ADS by 7.3 bps.

In model (2) we introduce CDS_{1y}^{PRE} as a more direct measure of firm credit risk. It is interesting to highlight that CDS_{1y}^{Pre} seems to be a sufficient statistic for the pre-investment credit risk of target companies, since *Leverage* is no longer significant once the variable is introduced. The average CDS spread in the estimation window is highly significant both statistically and economically: a 1 standard deviation increase in CDS_{1y}^{PRE} brings a 14.0 bps higher decrease in spread.

[29] We repeat the analysis reported in Table 7 and 8 using non-winsorized data and find qualitatively similar results.

In model (3) we augment model (2) by including a dummy variable which distinguishes between first and follow-up investments in the same company. The coefficient associated to the dummy is small (0.494 bps) and not statistically significant. This indicates that follow-up SWF investments have the same impact on firm credit risk than first investments. This result is somewhat puzzling. If SWFs had an enduring certification impact on firm's credit risk, follow up investments would add little effect. A possible interpretation for this result is that the certification impact is significant only for a limited time after SWF investment, after which new SWF investments will provide additional "commitment" to the firm.

In model (4) we control whether the certification impact of SWFs for financial companies is different. Given the attention which SWFs gained after their intervention in support of the US and European financial system at the end of 2007, it is interesting to assess whether SWFs have any special impact on the credit risk of financial companies. Results from model (4) show that the dummy associated to financial companies is positive but not significant. This suggests that certification and stabilization are hardly a phenomenon limited to the extensively debated investments in distressed western banks occurred from 2007. Financial firms do not seem to constitute a special class of targets to this respect.

In model (5), we include market-wide turbulence, measured by Vix. The associated coefficient is negative, as expected, but not statistically significant (albeit close to significance). In model (6) we check for differences among CB-related SWF and the others; consistently with our prediction CBE coefficient is negative and significant. An investment carried out by a CB-related SWF produces, other things being equal, a reduction in CDS spread which is 14.67 bps smaller than what would be produced by an independent SWF.

The parameters corresponding to $Size_{SWF}$ is positive and significant in all specifications. This suggests that, consistently with the certification hypothesis, the impact of SWF investments on CDS spread is stronger for large SWFs. On the contrary, $Size_{Firm}$ has a negative coefficient in all model specifications, consistently with the idea that the larger the firm the less a SWF may provide certification for its liabilities.

Contrarily to what found by Kotter and Lel (2011) for stock returns, transparency has a very small and non statistically significant impact on ADS. This suggests that the determinants of stock returns and credit risk may be different, which confirms the importance of analyzing the phenomenon from both perspectives. The parameter associated to capital injections is positive, as expected, but not statistically significant, possibly because of the limited number of observations.

We test for the relevance of the others SWFs characteristics which could mitigate the certification effect in Models (7) to (9) presented in Table 8.

[Insert Table 8 about here]

The strongest evidence regards SWFs typically performing direct investments: the coefficient of *Direct* is positive and both statistically and economically relevant. Other things being equal, those SWFs bring an additional reduction in CDS spread between 12.247 and 12.954 bps (depending on the model). We also find that leveraged SWFs, as expected, have a significantly smaller impact on *ADS*. A levered SWF determines a reduction in CDS spread which is between 20.564 bps and 25.373 bps smaller than an unlevered SWF. The small number of investments made by levered SWFs, however, calls to some caution in interpreting this result. Protection from discretionary withdrawals from the Government has the predicted sign, but is significant (at the 10% level) only in one of the three models.

Finally, in model (9) we control for the effect of the medium-term credit risk using the slope of the risk term structure curve, as suggested by Han and Zhou (2011). As expected, the estimated coefficient is negative and statistically significant (at 10% level). It seems thus confirmed our hypothesis that, keeping constant the level of short-term financial distress, SWFs can be of little help for firms expected to face significant medium-term structural problems.

We perform several tests to confirm the robustness of our results. First of all, we repeat all models estimations using the 5 years maturity *ADS* as the dependent variables (results are reported in AppendixB, Tables B.12 and B.13). Unsurprisingly, results are somehow weaker (coherently with results of the event study), but still qualitatively similar. The most relevant difference is that *Leverage* is now significant at the 5% level in all models, while CDS^{PRE} is no longer significant. This suggests that, when looking at the medium-term, *Leverage* is the driver of credit risk which is most closely associated to a certification from SWFs.

For all regressions, we compute the Variance Inflation Factor to check for potential collinearity problems; values are well below the customary critical threshold of 5 both at covariates and model level. Finally, we control for the possible endogeneity of CDS^{Pre}, as its inclusion in the computation of *ADS* in Equation (3) could in principle engender a correlation between the variable and the error term of the estimate. We thus instrument CDS^{Pre} using Leverage and Tobin's Q. We estimate a full model, including all other covariates in models (2)-(9), using 2SLS. Results are qualitatively similar to those presented in Tables 7 and 8 and are reported in AppendixB, Table B.11.

In summary, results in Tables 7 and 8 are quite robust and suggest that while, on average, the impact of SWFs on credit risk is positive (i.e. credit risk is reduced), the expected impact is substantially influenced by firm, SWF and deal characteristics. The highest impact is found for large, unlevered SWFs which are explicitly given a mandate to pursue direct investments. Small firms exhibiting short-term financial troubles (but with a relatively good medium-term outlook) are those for which the certification effect is most significant. All these results are highly consistent with the SWFs certification hypothesis.

5. Conclusion

In this work we analyze the impact of SWFs on the credit risk of target companies. We argue that SWFs reduce the credit risk of portfolio companies by implicitly guarantying a financial support in case of short-term distress. We measure credit risk by looking at target firm's CDS spread, and use event study analysis to evaluate its evolution across SWF investment. For each investment event we build an adjusted measure of CDS spread decrease (ADS) using different event windows and CDS maturities. Using the SWF Transaction Database (SWFTD), we identify a sample of 371 SWF investments for which we are able to find essential company, SWF and deal specific information.

Our findings point out that after a SWF investment target company's credit risk decreases significantly. We estimate the mean (median) adjusted decrease in 1 year maturity CDS spread in a $[-5, +4]$ event window across the investment event to be 7.019 bps (1.791 bps) . The 1 year CDS spread exhibits no tendency to revert to its pre-investment value in the days following the event. The magnitude of the mean (median) decrease in 1 year CDS spread is only marginally altered and is still statistically different from zero up to a $[+25, +34]$ event window. These results are confirmed when we only consider deals which have not determined a capital injections to the target firm. This supports the idea that the effect on credit risk is not only the mere reflection of an increase in financial resources but is due to a certification effect. Results for 5 year CDS spread are weaker in both magnitude and statistical significance. The difference between 1 year and 5 year CDS spread decrease suggests that markets perceive SWFs as more effective in stabilizing companies whose credit risk derives from short-term factors (such as the shortage in financial resources), rather than medium-term issues.

Interestingly, ADS is higher for companies which have a higher pre-investment credit risk. If we divide target companies based on their pre-investment CDS spread, we find that mean (median) ADS (computed on 1 year maturity and a $[-5, +4]$ event windows) in the first quartile (i.e. lowest pre-investment CDS spread) is only 0.227 bps (0.113 bps), but is as high as 17.407 bps (13.603 bps) in the top quartile (i.e. highest pre-investment CDS spread).

This result is confirmed by a multivariate analysis on ADS. We find that, controlling for firm, deal, and SWF characteristics, the higher is the pre-investment level of credit risk, the higher is the decrease in credit spread following the investment event: other things being equal a 1 standard deviation increase in pre-investment CDS spread is associated to an increase in ADS between 13 bps and 18 bps (depending on the model). Some other interesting results emerge from the multivariate analysis. First, larger SWFs are associated to a more significant decrease in CDS spread: other things being equal, a 1 standard deviation increase in SWF size determines an increase in ADS between 4.7 bps and 6.4 bps. This is consistent with the idea that the larger the SWF, the more it could afford to back the firm through tough times. SWFs with an explicit mandate to pursue direct investments generate an ADS between 12 and 13 bps higher than SWFs pursuing mostly index-replication strategies. We also find (weak) evidence that

SWFs explicitly protected from Government's withdrawals, and those that are not leveraged, have a larger impact on ADS. Finally, we find that firms with higher medium-term credit risk (compared to short-term credit risk) benefit less from SWFs investments, consistently with the idea that SWFs as shareholders are most effective in solving short-term financial distress rather than structural problems. Overall, our results are consistent with a SWFs certification hypothesis, according to which SWFs may support the financial viability of portfolio companies by "insuring" them against liquidity shocks. The magnitude of the certification effect is however significantly affected by the characteristics of the deal. Moreover, the effect seems to be far more significant for short-run than medium-run credit risk.

It must be stressed that the positive view which market participants seem to have on the impact of SWFs on firm's stability is not necessarily shared by market regulators. On the wake of the US Dodd-Frank Wall Street Reform and Consumer Protection Act, the Commodity Futures Trading Commission has proposed on April 28, 2011 that:

> "[..] a tight link with the health of its domestic banking system, and by extension with the broader global financial system, makes a sovereign counterparty similar to a financial entity both in the nature of the systemic risk and the risk to the safety and soundness of the covered swap entity. As a result, the Commission preliminarily believes that sovereign counterparties should be treated as financial entities for purposes of the proposed rule's margin requirements".[30]

It is then interesting to compare our findings with those of other works on the impact of institutional investors on the firm credit risk. Klein and Zur (2011) observe that abnormal positive stock returns associated with hedge fund investments come to the expense of bondholders, who experience instead significant negative abnormal returns. To this extent, SWFs seem to be quite different. While most studies in the literature find that SWF investments, like hedge fund's, are associated with positive stock returns (e.g. Chhaochharia and Laeven, 2008, Bortolotti et al., 2010, Dewenter et al., 2010, Knill et al., 2010, Kotter and Lel, 2011), our results suggest that this does not come to the expense of creditors, since CDS spreads indicate, on average, a significant decrease in credit risk. Our results are, instead, remarkably in line with studies on the impact of government investments on firm's credit risk and cost of debt (e.g. Iannotta et al., 2009, Borisova and Megginson, 2011). This suggests that, when seen from a creditor's perspective, SWFs, even when investing abroad, resemble more closely State-owned investment vehicles than private institutional investors like hedge funds or pension funds.

[30]The proposal can be found at this link: http://federalregister.gov/a/2011-9598

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Tables and figures

Table 1: Sample descriptive statistics

This table describes the distribution and key characteristics of SWFs included in the analysis. *Country*, *Origin* and *Assets* (in $ billion) are obtained from SWF Institute, 2010. The definition of *LM*, *Direct*, *Shield* and *Debt* is reported in Table 3. *Events* is the number of investment events in our sample where the SWF in involved.

SWF	Country	Assets	Origin	*LM*	Direct	Shield	Debt	Events
KIA	Kuwait	202.8	Oil	6	0	0	0	70
GIC	Singapore	247.5	Non-oil	6	0	1	0	65
GPF	Norway	512	Oil	10	0	1	0	63
KIC	South Korea	37	Non-oil	9	1	0	0	58
CIC	China	332.4	Non-oil	7	1	0	0	38
SAFE	China	347.1	Non-oil	2	0	0	0	29
ADIA	UAE	627	Oil	3	0	0	0	25
Temasek	Singapore	133	Non-oil	10	1	1	1	6
QIA	Qatar	85	Oil	5	1	1	0	4
BIA	Brunei	30	Oil	1	0	0	0	3
IPIC	UAE	14	Oil	1	1	1	1	2
Khazanah Na.	Malaysia	25	Non-oil	4	1	0	1	2
Mubadala	UAE	13.3	Oil	10	1	1	1	2
SAMA	Saudi Arabia	439.1	Oil	2	0	0	0	2
Future Fund	Australia	67.2	Non-oil	9	1	1	0	1
LIA	Libya	70	Oil	2	1	0	0	1
Total								371

Table 2: Distribution of investments by sector and country

Sector	Events	Region	Events
Financials	86	United Kingdom	192
Consumer Discretionary	64	United States	103
Industrials	46	Europe (ex UK)	45
Materials	38	Asia	16
Energy	35	Other	15
Consumer Staples	32		
Healthcare	18		
Information Technology	18		
Telecommunications	18		
Utilities	16		
Total	371		371

Table 3: Descriptive statistics

Variable	Mean	St. Dev.	Median	Min	Max	Description
ADS_{1y}	7.76	64.09	1.79	-499.51	750.17	Adjusted 1 year maturity CDS spread reduction (basis points), see equation (3).
ADS_{5y}	3.34	53.75	2.43	-455.75	392.50	Adjusted 5 year maturity CDS spread reduction (basis points), see equation (3).
DS_{1y}	9.99	100.93	2.92	-1046.33	768.04	Reduction in 1 year maturity CDS spread (basis points) for target companies, see equation (1).
DS_{5y}	7.36	100.88	3.64	-1292.54	659.69	Reduction in 5 year maturity CDS spread (basis points) for target companies, see equation (1).
IDS_{1y}	2.23	61.81	1.38	-717.26	245.75	Reduction in 1 year maturity CDS spread for an index of matched companies (basis points), see equation (2).
IDS_{5y}	4.02	62.60	1.54	-913.37	313.10	Reduction in 5 year maturity CDS spread for an index of matched companies (basis points), see equation (2).
CDS_{1y}^{PRE}	141.55	255.10	65.51	0.88	3020.19	Average CDS premium in the estimation window for 1 year maturity CDSs (basis points), source: Credit Market Analysis.
CDS_{5y}^{PRE}	180.74	246.75	105.25	2.73	2516.20	Average CDS premium in the estimation window for 5 year maturity CDSs (basis points), source: Credit Market Analysis.
$Size_{SWF}$	5.34	0.93	5.51	2.59	6.44	Logarithm of the estimated value of SWF portfolio (USD billion), source: SWF Institute (2010).
$Size_{Firm}$	4.11	1.66	3.90	0.23	8.42	Logarithm of enterprise value (market capitalization and book value of liabilities of target firm) (USD billion) lagged 1 year, source: Worldscope

Table 3: Descriptive statistics

Variable	Mean	St. Dev.	Median	Min	Max	Description
Q	1.60	1.24	1.14	0.73	10.57	Tobin's Q ratio measured as the ratio between enterprise value (market capitalization and book value of liabilities) and book value of assets, lagged 1 year, source: Worldscope.
$Leverage$	0.58	0.25	0.58	0.00	1.00	Ratio between book value of liabilities and enterprise value (market capitalization and book value of liabilities), lagged 1 year, source: Worldscope.
Vix	26.87	10.41	25.12	11.01	69.95	Closing value of CBOE Volatility Index in the investment announcement date, source: CBOE.
LM	6.71	2.54	6	1	10	Linaburg-Maduell transparency index, source: SWF Institute (2010).
$Slope$	39.19	73.33	30.03	-503.99	501.23	Difference between CDS_{5y}^{PRE} and CDS_{1y}^{PRE}.
$Finance$	0.23	0.42	0	0	1	Dummy=1 for investments in financial companies, source: Worldscope.
Oil	0.46	0.50	0	0	1	Dummy=1 for oil-related SWF, source: SWF Institute (2010).
$Shield$	0.39	0.49	0	0	1	Dummy=1 if SWF is protected from Government withdrawals, see AppendixA.
$Direct$	0.31	0.46	0	0	1	Dummy=1 if SWF pursues a direct strategic investment (vs. index-replicating) strategy , see AppendixA.
$Debt$	0.03	0.18	0	0	1	Dummy=1 if the SWF is leveraged, source: SWF websites and press releases.
$First$	0.46	0.50	0	0	1	Dummy=1 for first investment by a SWF in a company, source: SWFTD.

Table 3: Descriptive statistics

Variable	Mean	St. Dev.	Median	Min	Max	Description
Western	0.17	0.38	0	0	1	Dummy=1 if the SWF belongs to a western country (Norway or Australia), source: SWFTD.
Domestic	0.01	0.10	0	0	1	Dummy=1 when the invested firm and the SWF belong to the same country, source: SWFTD.
Conv	0.02	0.14	0	0	1	Dummy=1 if investment in convertible securities, source: SWFTD.
Injection	0.06	0.25	0	0	1	Dummy=1 if the SWF provides the firm with new capital, source: SWFTD.
CBE	0.08	0.27	0	0	1	Dummy=1 if SWF is a Central Bank Entity, source: SWF Institute (2010), SWFTD.
GDP	1,156.15	1,586.82	336.73	11.47	4,985.46	SWF country GDP lagged 1 year, source: World Bank Database.

Table 4: Correlation matrix

In this table we provide the sample correlation among all variables included in our study. Variables are defined as in Table 3.

	ADS_{1y}	ADS_{5y}	DS_{1y}	DS_{5y}	IDS_{1y}	IDS_{5y}	CDS_{1y}^{PRE}
ADS_{5y}	0.73	1.00					
DS_{1y}	0.81	0.83	1.00				
DS_{5y}	0.70	0.85	0.96	1.00			
IDS_{1y}	0.29	0.60	0.79	0.84	1.00		
IDS_{5y}	0.50	0.51	0.83	0.89	0.83	1.00	
CDS_{1y}^{PRE}	0.54	0.21	0.36	0.24	0.04	0.21	1.00
CDS_{5y}^{PRE}	0.46	0.16	0.27	0.16	-0.03	0.11	0.96

	$Size_{Firm}$	$Size_{SWF}$	Q	$Leverage$	Vix	LM	$Slope$	$Finance$	Oil
$Size_{Firm}$	0.24	1.00							
Q	0.30	0.05	1.00						
$Leverage$	-0.23	0.00	-0.63	1.00					
Vix	0.00	0.01	0.02	0.00	1.00				
LM	-0.25	-0.02	0.02	0.09	-0.16	1.00			
$Slope$	-0.09	-0.20	-0.04	0.09	-0.06	0.08	1.00		
$Finance$	0.04	0.55	0.00	-0.01	-0.04	-0.05	-0.22	1.00	
Oil	0.42	0.14	0.28	-0.21	0.03	0.10	0.00	-0.04	1.00
$Shield$	0.31	0.17	0.22	-0.14	0.06	0.36	-0.12	0.04	0.16
$Direct$	-0.69	-0.22	-0.30	0.32	-0.16	0.32	0.19	-0.05	-0.48
$Debt$	-0.25	-0.08	-0.03	0.03	0.02	0.05	0.18	0.05	-0.03
$First$	-0.31	-0.29	-0.11	0.14	-0.17	0.28	-0.01	-0.12	-0.21
$Western$	0.43	0.15	0.30	-0.12	-0.09	0.58	-0.03	-0.06	0.57
$Domestic$	-0.15	-0.08	0.01	-0.08	0.00	0.00	0.00	0.01	-0.09
$Conv$	-0.05	0.15	-0.01	0.01	-0.03	0.02	0.12	0.12	-0.03
$Injection$	-0.18	0.07	-0.03	0.11	-0.06	0.02	0.19	0.07	0.01
CBE	0.17	-0.01	0.02	-0.04	0.01	-0.59	0.04	0.00	-0.22
GDP	0.12	-0.04	-0.16	0.22	-0.13	-0.26	0.17	-0.03	-0.47

	Oil	$Shield$	$Direct$	$Debt$	$First$	$Western$	$Domestic$	$Conv$	$Injection$	CBE
$Shield$	0.16	1.00								
$Direct$	-0.48	-0.43	1.00							
$Debt$	-0.03	0.16	0.27	1.00						
$First$	-0.21	-0.16	0.49	0.04	1.00					
$Western$	0.57	0.56	-0.33	-0.09	-0.03	1.00				
$Domestic$	-0.09	0.02	0.15	0.42	0.00	0.02	1.00			
$Conv$	-0.03	-0.04	0.07	0.08	-0.02	-0.07	-0.02	1.00		
$Injection$	0.01	0.11	0.26	0.51	0.10	-0.11	0.08	0.53	1.00	
CBE	-0.22	-0.28	-0.23	-0.06	-0.13	-0.15	-0.04	-0.05	-0.09	1.00
GDP	-0.47	-0.49	0.38	-0.12	0.17	-0.24	-0.06	-0.04	-0.05	0.51

Table 5: CDS spreads adjusted decrease for different event windows

Univariate analysis on the adjusted decrease in CDS spread (ADS, defined in Equation (3), measured in basis points and winsorized at the 1% threshold for each tail) between the estimation window ($[-25, -14]$) and different event windows for both 1 year and 5 year maturity. Panel A includes all observations in our final dataset described in section 3; Panel B excludes capital injections. Panel C exclude investments made by the Norwegian GPF. *,** and ***indicate significance at the 10%, 5% and 1% level for the rejection of the null hypothesis of zero mean (t-test) or median (Wilcoxon signed-ranks test).

Panel A: Full Sample

		$[-5, +4]$	$[+5, +14]$	$[+15, +24]$	$[+25, +34]$
1 year maturity	Mean	7.019***	8.265***	6.933***	6.464**
	St. dev.	1.740	2.207	2.552	3.052
	Median	1.791***	2.154***	1.946***	1.574***
	Percent positive	63.61	61.62	60.99	59.50
5 years maturity	Mean	2.833	5.512**	3.359	3.013
.	St. dev.	2.130	2.134	3.046	2.906
	Median	2.434***	2.137***	2.404***	2.774***
	Percent positive	60.65	59.19	56.32	58.13
	N	371	370	364	363

Panel B: Excluding capital injections

		$[-5, +4]$	$[+5, +14]$	$[+15, +24]$	$[+25, +34]$
1 year maturity	Mean	6.644***	6.271***	5.588**	5.803*
	St. dev.	1.774	2.175	2.493	2.971
	Median	1.559***	1.924***	1.656***	1.489***
	Percent positive	63.40	60.40	60.00	58.70
5 years maturity	Mean	2.463	4.260**	2.212	1.858
	St. dev.	2.067	2.100	2.993	2.860
	Median	2.034***	1.677***	1.933**	2.323*
	Percent positive	59.65	57.80	54.71	56.43
	N	347	346	340	339

Panel C: Excluding investments by the Government Pension Fund - Global

		$[-5, +4]$	$[+5, +14]$	$[+15, +24]$	$[+25, +34]$
1 year maturity	Mean	7.985***	9.430***	7.290**	6.798*
	St. dev.	2.047	2.555	2.879	3.509
	Median	2.469***	2.814***	2.030***	2.209***
	Percent positive	63.64%	60.26%	59.54%	58.41%
5 years maturity	Mean	3.106	5.558**	3.003	2.975
	St. dev.	2.511	2.488	3.567	3.392
	Median	2.813***	1.665***	1.994**	2.579*
	Percent positive	59.74%	56.68%	53.95%	56.44%
	N	308	307	304	303

Table 6: Abnormal spread decrease across CDS^{Pre} quartiles

Univariate analysis on the adjusted decrease in CDS spread (ADS, defined in Equation (3), measured in basis points) between the estimation window ($[-25,-14]$) and the $[-5,+4]$ event window for the 1 and 5 year maturity CDS. The sample is split by quartiles of CDS^{PRE} (of the respective maturity) in columns 1-4, . *,** and ***indicate significance at the 10%, 5% and 1% level for the rejection of the null hypothesis of zero mean (t-test) or median (Wilcoxon signed-ranks test).

		Quartile CDS^{PRE}			
		1 (low)	2	3	4 (high)
1 year maturity	Mean	0.227	2.557***	7.996***	17.407**
	St. dev.	0.381	0.892	1.700	6.620
	Median	0.113	1.947***	4.692***	13.603**
	Percent positive	54.84	67.74	68.82	63.04
5 years maturity	Mean	0.226	3.851***	6.342***	0.893
	St. dev.	0.508	0.959	1.735	8.358
	Median	0.243	3.768***	5.521***	7.236
	Percent positive	53.76	69.89	64.52	54.35
	N	93	93	93	92

Table 7: Analysis of abnormal 1 year CDS spread decrease

The dependent variable is the 1 year maturity CDS spread adjusted decrease (ADS, defined in Equation (3) and expressed in basis points) between a $[-25, -14]$ estimation window and a $[-5, +4]$ event window. All independent variables are as defined in Table 3, but, except for dummies, are normalized around their mean. *Leverage* and Q are normalized by subtracting their sector-specific mean. All continuous variables are winsorized at the 1% threshold in each tail. Regression are estimated using OLS. Standard errors, reported in round brackets, are adjusted for heteroskedasticity (White, 1980) and clustered by firm. *, ** and *** indicate significance levels at the 10%, 5% and 1% confidence.

Model	(1)	(2)	(3)	(4)	(5)	(6)
$Size_{SWF}$	5.305***	5.082***	5.104***	5.211***	4.739**	5.327***
	(1.973)	(1.878)	(1.905)	(1.903)	(1.898)	(2.039)
$Size_{Firm}$	-2.382**	-1.87*	-1.835*	-2.277*	-1.785*	-1.812*
	(1.039)	(0.961)	(0.962)	(1.155)	(0.951)	(0.936)
LM	-0.482	-0.028	-0.055	-0.007	-0.219	-1.073
	(0.489)	(0.517)	(0.588)	(0.52)	(0.519)	(0.678)
Oil	-8.252**	-7.196*	-7.103*	-7.101*	-6.418*	-8.715**
	(4.015)	(3.732)	(3.972)	(3.716)	(3.634)	(4.328)
$Leverage$	29.107**	9.991	9.881	10.548	8.266	9.96
	(14.691)	(12.326)	(12.315)	(12.228)	(12.396)	(12.587)
Q	-0.289	-1.617	-1.625	-1.582	-1.628	-1.287
	(1.579)	(1.6)	(1.614)	(1.592)	(1.619)	(1.544)
$Injection$	7.392	4.803	4.717	4.778	3.108	
	(4.613)	(4.917)	(5.152)	(4.964)	(5.223)	
CDS_{1y}^{PRE}		0.055**	0.055**	0.054**	0.065**	0.064**
		(0.024)	(0.025)	(0.025)	(0.026)	(0.025)
$First$			0.494			
			(4.522)			
$Financials$				2.610		
				(4.65)		
Vix					-0.405	-0.430
					(0.305)	(0.298)
CBE						-14.673**
						(5.906)
$Cons.$	10.36***	10.51***	10.24***	9.85***	10.37***	12.84***
	(2.88)	(2.691)	(3.796)	(2.931)	(2.668)	(3.19)
N obs.	371	371	371	371	370	370
R^2	0.06	0.146	0.146	0.147	0.158	0.167
$Adj.\ R^2$	0.042	0.127	0.125	0.126	0.137	0.146

Table 8: Analysis of abnormal 1 year CDS spread decrease: additional evidence

The dependent variable is the 1 year maturity CDS spread adjusted decrease (ADS, defined in Equation (3) and expressed in basis points) between a $[-25, -14]$ estimation window and a $[-5, +4]$ event window. All independent variables are as defined in Table 3), but, except for dummies, are normalized around their mean. All continuous variables are winsorized at the 1% threshold in each tail. Regression are estimated using OLS. Standard errors, reported in round brackets, are adjusted for heteroskedasticity (White, 1980) and clustered by firm. *, ** and *** indicate significance levels at the 10%, 5% and 1% confidence.

Model	(7)	(8)	(9)
$Size_{SWF}$	6.152***	6.432*	6.854***
	(2.226)	(3.285)	(2.212)
$Size_{Firm}$	-1.932**	-1.962*	-2.634***
	(0.938)	(1.131)	(0.984)
CDS_{1y}^{PRE}	0.068***	0.071***	0.067***
	(0.026)	(0.027)	(0.025)
$First$	-2.147	-1.79	-3.395
	(5.157)	(5.647)	(4.971)
Vix	-0.422	-0.456	-0.423
	(0.313)	(0.339)	(0.311)
$Shield$	10.295*	9.91	8.932
	(5.996)	(6.91)	(5.768)
$Direct$	12.424**	12.954**	14.247***
	(4.881)	(6.301)	(4.732)
$Debt$	-24.762**	-25.373**	-20.564**
	(10.788)	(11.15)	(8.906)
$Conv$	7.535*	7.487	11.738*
	(4.233)	(4.588)	(6.323)
$Western$	-12.413**	-12.505**	-11.401*
	(6.203)	(6.331)	(5.91)
$Domestic$	17.190*	17.409*	13.119
	(9.952)	(10.197)	(8.044)
GDP		-0.000	
		(0.001)	
$Slope$			-0.067*
			(0.036)
$Cons.$	3.431	3.231	3.656
	(2.451)	(3.165)	(2.486)
N obs.	370	333	370
R^2	0.168	0.166	0.180
$Adj.\ R^2$	0.142	0.134	0.153

AppendixA. Details about SWF dummies

Table A.9: Justification for Shield and Direct dummies

SWF	*Direct*	Justification	*Shield*	Justification	Source
ADIA	0	60% of assets are invested in index-replicating strategy	0	"ADIA is required to make available to the Government of Abu Dhabi, as needed, the financial resources to secure and maintain the future welfare of the Emirate".	ADIA annual report 2009
BIA	0	No information available	0	No information available	n.a.
CIC	1	"Direct investments constitute the largest individual positions in CIC's global investment portfolio".	0	"Income from CIC's investments is expected to provide dividend income to the shareholder"	CIC annual report 2009
Future Fund	1	Few limitations on asset allocation or selection of markets. 20% maximum in each company. A long-term portfolio composition defined only for assets macro classes	1	"The governing legislation stipulates that money may not be withdrawn from the Future Fund until 2020 except for the purpose of meeting the operating costs or unless the Fund's balance exceeds the target asset"	Future Fund annual report 2009
GIC	0	The anchor of GIC's investment activities is the policy portfolio. It defines the asset classes that GIC invests in, and how it allocates funds to these asset classes.	1	"The spending rule allows up to 50% of the long-term expected real return on the reserves managed by GIC and those owned by the Monetary Authority of Singapore"	GIC annual report 2010

Table A.9: Justification for Shield and Direct dummies

SWF	*Direct*	Justification	*Shield*	Justification	Source
GPF	0	"The Ministry of Finance has defined a limit on the expected volatility in the discrepancy between the return on the actual portfolio and the benchmark portfolio".	1	"Under the government's fiscal rule, petroleum revenue spending must not exceed 4 percent of the fund's value"	National budget 2009 - Chapter 5
IPIC	1	"For IPIC, creating value is about Investing in strategic partnerships that in turn contribute to Abu Dhabi's long term economic growth"	1	"The Company has not paid any dividends to the Government to date. While the Government does not guarantee the obligations of the Company [...] in terms of credit risk, it is impossible to differentiate between the Government and the Company"	IPIC website
Khazanah Nasional	1	"Khazanah Nasional is empowered as the Government's strategic investor in new industries and markets".	0	No information available	Kazanah Nasional website
KIA	0	"KIA aims to achieve a rate of return on its investment that, on a three-year rolling average, exceeds its composite benchmarks by designing and maintaining an asset allocation consistent with its mandated return and risk objectives".	0	"KIA also provides liquidity to the State's Treasury when needed"	KIA website

Table A.9: Justification for Shield and Direct dummies

SWF	*Direct*	Justification	*Shield*	Justification	Source
KIC	1	"A *small* amount of assets is kept in passive index replication"	0	Article 9 of the Korea Investment Corporation Act: The Steering Committee has the authority to increase or decrease capital	KIC annual report 2009
LIA	1	Strategic investments account for more than 50% of the Equity portfolio	0	No information available	LIA management information report 2010
Mubadala	1	"While our investments have to be commercially viable, generating sustainable profits over the long-term, they also have to deliver strong social returns to Abu Dhabi. We bring together and manage a diverse portfolio of opportunities, investing for the long term as an active and diligent partner".	1	"Through the patient and robust support of its shareholder, Mubadala is able to take a long term perspective when developing projects and deploying capital, both within the UAE and internationally".	Mubadala website
QIA	1	"QIA is responsible for investing funds in asset classes such as equities and fixed income and private equity, as well as through direct investment. The QIA takes a flexible approach [. . .] If a portfolio company has synergies with Qatar, it is a positive factor".	1	"QIA benefits from being a central part of the State of Qatar's economic vision which allows it to invest in a manner which transcends the cyclicality of economic cycles and fluctuations of the financial markets".	QIA website
SAFE	0	Central Bank Vehicle	0	No information available	SWF Institute

Table A.9: Justification for Shield and Direct dummies

SWF	*Direct*	Justification	*Shield*	Justification	Source
SAMA	0	Central Bank Vehicle	0	No information available	SWF Institute
Temasek	1	"As an active shareholder, we act to enhance sustainable value, consolidating or transforming our holdings where it makes sense. As an active investor, we invest, hold or divest where we can achieve clear shareholder value".	1	Less than 50% of net investment income. Protection of past reserves (previous governments)	Temasek Annual Report 2010

AppendixB. Robustness checks

Table B.10: Additional robustness checks for the abnormal CDS spread decrease

This table presents the same analysis of Table 5 using a different sampling process. In *Panel A* estimates include observations which are instead excluded in Table 5 because information on some control variables used in further analysis is not available. *In Panel B* estimates are made on a balanced dataset, which includes only observations available for all event windows. Analyses are performed after winsorizing ADS at 1% level for each tail.

Panel A: All observations available for the event study

		$[-5, +4]$	$[+5, +14]$	$[+15, +24]$	$[+25, +34]$
1 year maturity	Mean	6.142***	7.287***	6.147**	5.359*
	St. dev.	1.594	2.060	2.540	3.083
	Median	1.719***	2.234***	1.981***	1.574***
	Percent positive	63.69	61.35	60.67	58.96
5 years maturity	Mean	3.457**	4.359**	2.486	2.396
	St. dev.	1.697	1.921	3.142	2.913
	Median	2.033***	1.944***	2.225***	2.569**
	Percent positive	59.45	58.60	56.04	58.40
	N	402	401	389	387

Panel B: Balanced set of observations

		$[-5, +4]$	$[+5, +14]$	$[+15, +24]$	$[+25, +34]$
1 year maturity	Mean	7.255***	8.549***	7.063***	6.464**
	St. dev.	1.755	2.253	2.572	3.052
	Median	1.877***	2.587***	1.988***	1.574***
	Percent positive	64.19	62.16	61.50	59.50
5 years maturity	Mean	3.022	5.692***	3.459	3.013
	St. dev.	2.175	2.179	3.071	2.906
	Median	2.623***	2.174***	2.564***	2.774**
	Percent positive	61.43	59.67	56.79	58.13
	N	363	363	363	363

Table B.11: Determinats of abnormal 1 year CDS spread decrease 2SLS

This table present results obtained instrumenting CDS_{1y}^{PRE} using *Leverage* and *Q*, and including all the other regressors in Models (2)-(9), reported in Table 7 and 8.

	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Size_{SWF}$	4.417**	4.428**	4.369**	3.862*	4.579**	5.510**	6.447**	5.958**
	(1.893)	(1.943)	(1.933)	(1.979)	(2.150)	(2.327)	(3.238)	(2.371)
$Size_{Firm}$	-1.481	-1.466	-1.326	-1.402	-1.459	-1.792*	-1.704	-2.361**
	(0.989)	(1.028)	(1.413)	(0.985)	(0.968)	(0.984)	(1.201)	(1.063)
LM	0.259	0.245	0.246	-0.159	-0.920			
	(0.607)	(0.687)	(0.594)	(0.571)	(0.775)			
Oil	-7.237*	-7.195*	-7.281*	-5.947	-8.035*			
	(3.821)	(3.987)	(3.804)	(3.852)	(4.635)			
$Injection$	2.618	2.583	2.648	-0.024				
	(5.958)	(6.250)	(5.928)	(6.375)				
CDS_{1y}^{PRE}	0.095**	0.095**	0.095***	0.105**	0.105***	0.106**	0.110***	0.113***
	(0.037)	(0.037)	(0.036)	(0.041)	(0.040)	(0.041)	(0.041)	(0.041)
$First$		0.235				-3.520	-3.353	-4.930
		(4.915)				(5.719)	(6.182)	(5.441)
$Finance$			-1.026					
			(5.997)					
Vix				-0.721	-0.744*	-0.719	-0.785	-0.792*
				(0.460)	(0.438)	(0.464)	(0.484)	(0.456)
BCE					-13.370**			
					(6.691)			
$Shield$						8.570	7.953	6.974
						(5.860)	(6.756)	(5.637)
$Direct$						11.149**	13.512**	12.409***
						(4.802)	(6.358)	(4.565)
$Debt$						-27.922**	-29.567**	-25.076**
						(11.906)	(12.349)	(10.479)
$Conv$						8.979**	8.466*	12.953**
						(4.105)	(4.453)	(6.345)
$Western$						-9.819	-10.184	-8.314
						(6.648)	(6.785)	(6.378)
$Domestic$						20.682*	21.175*	18.026*
						(11.247)	(11.654)	(9.796)
GDP							-0.001	
							(0.001)	
$Slope$								-0.057
								(0.037)
$Cons.$	11.010***	10.883***	11.264***	10.694***	12.770***	5.039*	4.364	5.624**
	(2.635)	(3.710)	(3.063)	(2.655)	(3.228)	(2.671)	(3.432)	(2.640)
N obs.	371	371	371	370	370	370	333	370
R^2	0.095	0.096	0.096	0.118	0.125	0.134	0.129	0.128
$Adj.\ R^2$	0.081	0.078	0.079	0.101	0.108	0.107	0.096	0.098

Table B.12: Determinants of Abnormal 5 years CDS Spread Decrease

This table presents the same analysis as Table 7, using 5 years ADS as the dependent variable.

	(1)	(2)	(3)	(4)	(5)	(6)
$Size_{SWF}$	6.906***	6.974***	6.940***	7.565***	5.976***	6.464***
	(2.324)	(2.342)	(2.424)	(2.422)	(2.169)	(2.449)
$Size_{Firm}$	-2.154*	-2.311*	-2.365*	-4.186*	-2.056*	-2.066*
	(1.295)	(1.362)	(1.384)	(2.342)	(1.228)	(1.218)
LM	0.180	0.041	0.082	0.142	-0.506	-1.292
	(0.603)	(0.615)	(0.844)	(0.614)	(0.712)	(0.878)
Oil	-11.448**	-11.772**	-11.919**	-11.334**	-9.709**	-11.792**
	(4.849)	(4.971)	(5.322)	(4.967)	(4.731)	(5.685)
$Leverage$	32.432**	38.297**	38.471**	40.857**	33.229**	34.919**
	(14.338)	(19.405)	(19.006)	(20.011)	(16.351)	(16.698)
Q	0.486	0.893	0.906	1.050	0.825	1.154
	(1.512)	(1.539)	(1.535)	(1.628)	(1.548)	(1.555)
$Injection$	7.615	8.409	8.545	8.290	3.807	
	(10.122)	(9.401)	(9.987)	(9.341)	(9.197)	
CDS_{1y}^{PRE}		-0.017	-0.017	-0.021	0.011	0.010
		(0.035)	(0.035)	(0.037)	(0.028)	(0.028)
$First$			-0.780			
			(6.917)			
$Financials$				12.013		
				(8.873)		
Vix					-1.106**	-1.132**
					(0.526)	(0.522)
CBE						-13.473
						(9.229)
$Cons.$	7.630**	7.585**	8.007	4.580	7.186**	9.512**
	(3.303)	(3.362)	(5.756)	(4.729)	(3.326)	(4.011)
N obs.	371	371	371	371	370	370
R^2	0.048	0.053	0.053	0.063	0.114	0.118
$Adj.\ R^2$	0.029	0.032	0.030	0.040	0.092	0.096

Table B.13: Determinants of Abnormal 5 years CDS Spread Decrease: additional evidence

This table presents the same analysis as Table 8, using 5 years ADS as the dependent variable.

	(7)	(8)	(9)
$Size_{SWF}$	7.845***	7.785*	8.554***
	(2.538)	(3.980)	(2.596)
$Size_{Firm}$	-2.355*	-2.532	-3.064*
	(1.347)	(1.607)	(1.601)
CDS_{1y}^{PRE}	0.024	0.026	0.022
	(0.026)	(0.027)	(0.026)
$First$	-6.565	-6.109	-7.825
	(7.120)	(7.803)	(6.495)
Vix	-1.143**	-1.208**	-1.144**
	(0.546)	(0.582)	(0.541)
$Shield$	4.997	6.503	3.619
	(6.735)	(7.739)	(7.264)
$Direct$	18.041***	18.018**	19.884***
	(6.784)	(8.839)	(6.273)
$Debt$	-34.609*	-35.177*	-30.367*
	(18.550)	(19.129)	(15.411)
$Conv$	22.610**	23.633**	26.858**
	(8.841)	(9.301)	(11.672)
$Western$	-7.984	-8.128	-6.960
	(6.524)	(7.084)	(6.564)
$Domestic$	26.671	27.435	22.557
	(25.695)	(26.430)	(23.279)
GDP		0.000	
		(0.002)	
$Slope$			-0.067
			(0.077)
$Cons.$	0.373	-0.787	0.600
	(3.837)	(4.930)	(3.754)
N obs.	370	333	370
R^2	0.117	0.120	0.125
$Adj.\ R^2$	0.090	0.088	0.096