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# Sovereign Wealth Funds and Target Firms: Does 'Networking' Matter?



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## Abstract

This paper analyses the impact of Sovereign Wealth Fund (SWF) equity investments on target firm operating performance. Metrics from network analysis are used to investigate whether target firms, that are better connected each other by means of the SWF investments, extract benefits from this network in terms of higher operating performance. The study dataset is made up of 507 SWF acquisition deals worldwide in the time span between 2000 and 2011. Findings indicate that more central firms in the SWF-target firm network enjoy better operating performance. In addition, the analysis points out that operating performance is higher: (i) the larger the stake acquired, (ii) if the investment is direct and domestic, (iii) if the SWF is run by a politician. Overall, the results reveal that only when a target firm can benefit from the network of both political and commercial connections created by SWFs, do they enjoy these benefits and gain in operating performance.

**Keywords:** Sovereign Wealth Funds, Firm Operating Performance, Network Analysis:

**JEL Codes:** G23; G32; G15:

## 1 Introduction

Sovereign Wealth Funds (SWFs) are becoming a new key player in the global equity market network (Pistor, 2009). Indeed, in the last decade, such networks have experienced a constant growth in the number of SWFs investing in companies located in different countries and belonging to several industrial sectors, as well as in the number of target firms owned by SWFs. Lack of confidence in financial markets following the 2007-2008 turmoil and subsequent flights of investors and funds from investments has exacerbated the role of SWFs in providing key funding sources to corporations. Many leading western institutions received sizeable capital infusions in 2007 and 2008 from Asian and Middle Eastern SWFs (Farrell *et al.*, 2008). As a consequence, SWFs are now the largest shareholders in a number of the world's biggest corporations. It is estimated that SWFs' assets under management totaled approximately \$5.3 trillion in 2013<sup>1</sup>. Morgan Stanley

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<sup>1</sup> See Sovereign Wealth Fund Institute's website (<http://www.swfinstitute.org>) accessed on March 2013.

projects that this could further grow to \$12 trillion by 2015<sup>2</sup>. In comparison, estimates of total hedge funds are about \$ 2.3 trillion globally<sup>3</sup>.

Thus, given the dimension that the SWFs' equity investment network has reached in recent years, this study examines the impact of SWFs on target firms and, specifically, on target firm operating performance. Indeed, it is not clear *a priori* what the impact on companies is, as there are arguments for both positive and negative impacts. On the one hand, by taking sizeable (and long-term) stakes in corporations, they may play a positive and active role in corporate governance that other shareholders should welcome. On the other hand, it is also possible for SWFs to expropriate wealth from minority shareholders and pursue private benefits instead of maximizing firm value.

We use the recognized capacity of the network theory discipline in analyzing financial markets (Schweitzer *et al.*, 2009) to better investigate the impact that SWFs may exert on target firm operating performance. So far, to our knowledge, there are not previous studies empirically deriving the network connectivity of SWF target firms and its influence on operating performances. This might be mainly due to recent employment of network analysis in financial and governance investigations, and to the lack of data on the behavior of SWFs. In contrast, a large number of works have investigated ownership, venture capitalist and credit networks (among others, Vitali *et al.*, 2012, Kogut *et al.*, 2006, Boss *et al.*, 2004). Moreover, in this literature some works have focused on the benefits arising from being part of a network of relations. In the case of firm equity network, where firms own shares of other firms, it has been found that connected firms outperform independent ones (Jin *et al.*, 2011). In the same vein, Meuleman *et al.* (2009) found that the network position of a private equity investor impacts on the relationship between agency costs and the decision to syndicate on the UK private equity market. In the case of strategic venture capital (VC), Hochberg *et al.* (2007) find that VC firms which are better connected have higher performances and that, at the same time, also portfolio companies of these networked venture capitalists are more likely to survive to subsequent financing and exit stages. In the credit network, Godlewski *et al.* (2012) found that borrowing companies obtain reduced loan pricing when they are funded by a group of syndicated banks composed of lenders that have an high level of connectivity with other banks in the lending market. Indeed, such central banks have access to a larger flow of information and resources.

SWF equity investments provide a further opportunity to examine the impact of a special class of network relations on the performance of connected firms. Indeed, recent studies (Dewenter *et al.*, 2010) have pointed out that SWF post-investment influence on the target firms includes some business-related contacts between the target firm and other companies of the SWF network of investments. Dewenter *et al.* (2010) define these «network transactions» as a form of SWF activism in the target firm, together with «monitoring» and «government actions». In their sample, networking activities involve one-third of target firms and are associated with significantly higher long-run abnormal returns, at least in cross-border investments. However, they control for networking by the use of a binary variable

<sup>2</sup> «Currencies: How Big Could Sovereign Wealth Funds be by 2015?», Morgan Stanley Research Global, May 3, 2007.

<sup>3</sup> «2013 Preqin Global Hedge Fund Report», Preqin Ltd, 2013.

and do not investigate the impact on operating performances. Hence, while the literature documents the presence of networks between firms targeted by SWFs, the performance consequences of this organizational structure remain largely unknown.

Prompted by this evidence, in this paper we study the network of target firms created by SWF equity investments in the time span between 2000 and 2011. The network includes both listed and unlisted target firms for a total of 399 companies (204 unlisted and 195 listed – 33 delisted). By the use of common network analysis indicators, we describe the topology and the evolution over time of such a SWF target firm network. Specifically, network analysis provides us with four tools for measuring the relative importance, or «centrality», of each target firm in the network: 1) the number of SWFs simultaneously investing in the firm, as a proxy of the firm attractiveness to different SWFs (*company in-degree*); 2) the number of firms each target firm is connected to by means of the common investing SWFs (*company degree*); 3) a measure of the distance between target firms and, thus, of the average path length that information or resources have to pass through to reach other firms in the network (*average path length*); 4) the ability of the firm to control the flow of information or other resources in the network, bridging target firms that lack a direct relationship (*betweenness centrality*). Then, we use these network indicators to test empirically the hypothesis that the connection between target firms created by SWFs positively influence the operating performance of these firms.

We also control for other potential aspects that may exacerbate the active role of SWFs on target firms. Firstly, it is possible that SWFs influence government policies or regulation in a manner that benefits, *ex post*, the companies they invest in. This is more likely when the SWF is run by a politician. Hence, we control for the SWF CEO characteristics, distinguishing between SWFs run by a politician and SWFs run by a business manager. Moreover, we suppose that the domestic location of target firm, the amount of final stake and the direct investment by SWF may facilitate the role of active shareholder employed by SWF and positively influence the operating performance of target firms.

Our principal aim is to investigate whether the connection between firms created by SWFs may exert a positive influence on the operating performance of target companies. This way, we also contribute to the debate about the activism of SWFs and its effect on target firms, as the creation of economic connections is recognized as a key way for the SWF to be an active shareholder. We summarize this debate in Section II. Section III describes our data, while Section IV provides a description of the network construction and of the network measures for our sample. Section V explores whether networking boosts operating performance in the target firms. Section VI concludes the paper.

## 2 The SWF activism controversy

Despite the amount of political attention that SWFs have garnered over the last few years and the recent notoriety in the popular press, there is no universal definition of «SWF». The term has been used to cover a spectrum of government investment vehicles from central banks and monetary authorities to government-owned enterprises that invest in specific sectors. Several organizations and commentators have offered somewhat differ-

ent definitions that can affect whether certain institutions would be considered SWFs (Balding, 2008). Broadly speaking, a SWF is a pool of capitals controlled by government or government related entities that are commonly established out of balance of payments surpluses, official foreign currency operations, the proceeds of privatizations, fiscal surpluses and/or receipts resulting from commodity exports<sup>4</sup>. Contained within this definition, some distinct aspects differentiate SWFs from other types of investors and acquirers.

First, SWFs normally derive their capital base from natural resource earnings, even though some countries have built their SWFs through the transfer of assets from foreign exchange reserves and continued fiscal surpluses<sup>5</sup>. Second, a SWF is controlled by a government or government linked entity, although the exact relationship between the government and SWFs varies from country to country. No major country completely incorporates its SWF activities into governmental bodies, such as finance ministries, but they usually assign to the government an oversight role at least (Balding, 2008). Third, another important distinction between SWFs and other types of investors is their ability to act quickly and with fewer public reporting obligations. Whereas other types of investors (such as private equity firms and hedge funds) often have internal governance and other processes that prevent them from acting quickly, SWFs generally have significant amount of autonomy and immediate access to large amounts of capital, which, at least during the recent financial turmoil, enabled them to be a crucial lifeline for many prominent commercial and investment banks (such as Citigroup, UBS, Morgan Stanley, Credit Suisse and Merrill Lynch, as reported in Pistor, 2009). Finally, another important difference from other institutional investors is that SWFs do not have liabilities (as opposed to pension funds or insurance companies). This implies that they can make long-term investments without having to worry about short term demands for liquidity and this, in turn, may bring significant advantages for their invested firms. Fernandes (2009) finds that SWF average turnover is very low when compared to that of other investors.

On the less positive side, SWFs were subject to broader international concerns over their potential political and strategic equity investments. Hemphill (2009) aptly summarizes the main SWF-related concerns. These concerns are related to the SWF investment motivations and, in particular, to the use of their influence on target companies, whether explicit or implicit, to secure sensitive assets in some strategic sectors (such as telecommunications, media, financial service industries and so on) or gain access to vital domestic resources to improve the position of their «home country». In other terms, there is a widespread fear that SWFs will not strictly act as financial investors, seeking only the highest possible financial return, but will instead be prone to invest strategically in order to achieve political influence or access to foreign resources<sup>6</sup>. On the opposite side, some researchers (Fernandes and Bris, 2009) assert that SWFs create tremendous

<sup>4</sup> Sovereign Wealth Fund Institute's website (<http://www.swfinstitute.org>).

<sup>5</sup> Examples of funds held by natural resource-exporting countries include Norway's Government Pension Fund and the United Arab Emirates' Abu Dhabi Investment Authority. Non-natural resource exporting countries such as Singapore, China and South Korea are the primary users of the second route to build a SWF.

<sup>6</sup> Following this possibility, in October 2008 an agreement was reached on general practices that should govern SWF investments, called the *Santiago Principles*. These principles include a number of agreed procedures including governance, transparency, risk management and leverage utilization.

value for other shareholders and bring more to the table than other institutional investors. The economic analysis developed by Fernandes and Bris (2009) concludes that the year in which a SWF invests in a company the company's market value ratio to its book value increases by 15%, demonstrating how SWF ownership is usually valued by the market as a positive development.

Interestingly, many of the anti-SWF concerns as well as some of the benefits that SWFs could bring to shareholders depend on SWF activism. As defined by Ryan and Schneider (2002), investor activism is «the use of power by an investor either to influence the processes or outcomes across multiple firms through the symbolic targeting of one or more portfolio firms». Active behaviors include submitting shareholder proposals, frequently contacting firm management, and voting proxies to oppose management positions. Forms of activism may also appear behind-the-scene and engage in private negotiations with management.

Investor activism is often associated with holding large blocks of shares. Shleifer and Vishny (1986) hypothesize that large shareholders (blockholders) have the proper incentives to monitor portfolio firm managers and the capability to intervene decisively to punish or replace poorly performing executives. In this perspective, SWF stock purchases are large enough to make the funds significant blockholders in target firms, with the potential to play an active role in corporate governance. In Dewenter *et al.* (2010) the average block of shares sought is 27.5% (median 20%) and sometimes (7.9%) SWFs launch 100% takeover bids against target companies. Recently, Ghahramani (2013) have pointed out that, despite their image of being mostly passive investors, SWFs possess a natural tendency toward shareholder activism: the size of their stakes combined with their very long investment horizon render them very likely to be activist shareholders. Indeed, in recent years, several SWFs have assumed more visible or active positions in respect of their portfolio companies<sup>7</sup>.

There is evidence that several types of active blockholders (especially private pension funds and hedge funds) are associated with significant improvements in target firms performance (Brav *et al.*, 2008; Klein and Zur, 2009; Ferreira *et al.*, 2010). However, there is also a second stream of literature that underlines negative effects associated with blockholders. Blockholders may pursue objectives other than the maximization of shareholder value and extract private benefits of control, for example in the form of tunneling (Johnson *et al.*, 2000; Edmans, 2013).

These issues are even more meaningful when we consider the special case of blockholders represented by SWFs. Besides being large investors with an increasing amount of assets under management, they are also government-related entities investing in domestic and foreign companies. In relation to active role of SWF as blockholders and its impact on target firm performance, the predictions are few and unclear. On the one hand, Dewenter *et al.* (2010) find that SWFs are often active investors and that their activity is associated with differential long-run abnormal returns. On the other hand, Kotter and Lel (2011) do not find support for the idea of SWF activism by examining the relationship between target firm operating performance and CEO turnover as a proxy of activism. In the same

<sup>7</sup> A notable example of increased activism is Qatar Holding regarding its investment in Xstrata PLC. Qatar Holding actively participated in the proposed merger of equals between Xstrata PLC. and Glencore International PLC in order to increase the number of Glencore PLC. shares to be received by Xstrata PLC. shareholders. See O'Brien *et al.* (2012).

vein, Bortolotti *et al.* (2010) study the relationship between the degree of involvement of the SWF and long-term stock performance of target firms: they observe negative abnormal long-term returns over 6 months, one, two and three years, which are higher than the positive reaction at the time of the deal. This empirical evidence supports the assumption of SWFs as passive foreign investors (or ‘quiet leviathans’): despite the fact that the investments acquired are sufficient to exert some influence in the target company, the authors show that SWFs do not ask for seats on the board of directors after the investment, nor try to interfere in target firm management in order to not generate political opposition or regulatory backlash in the target firm country. These results are in line with Mehropouya *et al.* (2009) who observe that SWFs rarely propose resolutions to be voted and almost always support the management.

We point out that previous studies addressing, whether directly or indirectly, SWF activism have mainly focused on the potential monitoring role (or lack thereof) exercised by SWFs as shareholders in terms of board of director representation or voting rights. However, potential channels through which SWFs may exert their activism and add value to target firms can be more and more effective than monitoring. Following Dewenter *et al.* (2010), there are two further forms of SWF activism in target firms: «government actions», where SWF-related government authorities make decisions with a positive effect on the target firms, and «network transactions», where the target firms have some business-related contact with the SWF’s network of investments. This implies that SWFs may be cautious passive investors in terms of monitoring, yet may also play an active role by creating a network of both political and business connections in favor of target firms. Dewenter *et al.* (2010) find that network transactions occur in 35.3% of the target firms recorded; in their sample, this is the most frequent form of SWF activism and is associated with a positive effect on performance. However, they control for network transactions by collecting news from public press and using a dummy variable if the target firm was involved in at least one event labelled as «network transaction». Moreover, they study the impact of «network transactions» on target firm long-run returns, without taking operating performance into consideration.

Prompted by this evidence, we use common tools of network analysis in order to better investigate the potential connections among target firms created by SWF investments and their impact on operating performance.

### 3 Empirical design and sample data

We construct a novel data set of SWF international equity holdings in the time span between 2000 and 2011<sup>8</sup>. Across this time frame, the data set contains investments of SWFs in more than 300 firms in 58 countries. Our data collection follows a three-step procedure. As a first step, we use the Sovereign Wealth Fund Institute source of infor-

<sup>8</sup> The time span we analyse goes from 2000 to 2011 as we derive our data on SWF investments from Orbis, a Bureau van Dyck database, that has a limitation of 10 years.

mation to identify the list of SWFs and relative vehicles, as well as an overview of their main features.

In a second step, we obtained SWF stock holding data from Orbis database using the SWF name as «acquirer» and under the condition that acquisitions were related to a «completed» deal in order to exclude cases where SWFs unsuccessfully attempted firm acquisition. The result was a sample of 507 SWF acquisition deals worldwide, 227 of which were related to unlisted companies and 280 relative to listed companies (44 to afterwards delisted firms). Overall, the number of target companies involved in these deals is 399. We referred to this universe of 507 acquisition deals for 399 companies in order to perform our network analysis on SWF target firms (Section III).

In the final step, we applied several screens to the sample deals in order to ensure a clean and reliable sample for our empirical analysis on target firm operating performance (Section IV). First, we eliminated from the sample acquisition deals where target firms were not listed (totally, 227 acquisition deals for 204 unlisted companies), since operating performance data for these firms are not recorded on Worldscope database and may not be completely reliable. Moreover, we removed from the remaining 280 acquisition deals 19 observations because of lack of data. Finally, we treated some simultaneous transactions as single events. For example, if an SWF acquired partial stakes in the same target firm on the same day or the day after, we treated this as a single purchase event. These adjustments eliminated 28 acquisition deals. We refer to the remaining 233 acquisition deals as the final sample, for a total of 195 listed companies.

Table 1 provides a list of SWFs included in our sample with information on their location, inception date, primary source of funds, legal entity, size and number of acquisitions made by the main fund and its subsidiaries. All these funds are covered in the network analysis of SWF target firms developed in Section IV. For the purpose of clarity, we also add a column indicating which funds are also included in the empirical analysis of target firm operating performance implemented in Section V.

The Norway Government Pension Fund Global, estimated to have \$715.9 billion under management, is by far the largest SWF. Abu Dhabi Investment Authority and SAMA Foreign Holdings come next, with \$627 and \$532.8 billion respectively. The United Arab Emirates and China governments alone account for one-third of the overall sample in terms of assets. Most of the other countries' funds are much smaller. Vietnam has the smallest fund, called State Capital Investment Corporation (\$0.5 billion). In terms of number of acquisitions, the Singapore SWFs are the most heavily represented in our sample. Temasek and Government of Singapore Investment Corporation (GIC) together account for one-third of the 507 deals recorded. The Norway Government Pension Fund Global, even if it is the largest one in terms of assets, appears in our sample with only one transaction.

Table 2 reports the number of deals in our sample broken down by year, target firm country and target firm industry.

Table 2 shows the increase in SWFs acquisition activity from 2004 onwards, with a peak of activity in 2007-2008. Clearly, this was a period when political oppositions to SWFs was lowest as financing was most needed to overcome binding financial constraints. SWFs invest in virtually all countries in the developed world as well as in several emerg-

**Table 1:** Sovereign Wealth Funds in our sample

SWF	Country	Birth	Funding source	Entity	AuM (Billion)	Acquisitions	Performance Analysis
Abu Dhabi Investment Authority (ADIA)	AE	1976	Oil	Fund	627.0	10	Yes
Abu Dhabi Investment Council (ADIC)	AE	2007	Oil	Council	n/a	5	No
Alaska Permanent Fund Corporation	US	1976	Oil	Corporation	45	1	No
Alberta Heritage Fund	CA	1976	Oil	Fund	16.4	12	Yes
Australian Government Future Fund	AU	2004	Non-Comm.	Fund	83	2	No
Brunei Investment Agency	BN	1983	Oil	Fund	30	1	No
China Investment Corporation (CIC)	CN	2007	Non-Comm.	Corporation	482	30	Yes
Government of Singapore Investment Corporation (GIC)	SG	1981	Non-Comm.	Corporation	247.5	93	Yes
Investment Corporation of Dubai	AE	2006	Oil	Corporation	70	63	Yes
International Petroleum Investment Company (IPIC)	AE	1984	Oil	Corporation	65.3	13	Yes
Kazakhstan National Fund	KZ	2000	Oil, gas, metals	Fund	61.8	8	Yes
Khazanah Nasional	MY	1993	Non-Comm.	Fund	39.1	25	Yes
Korea Investment Corporation (KIC)	KR	2005	Non-Comm.	Corporation	56.6	4	Yes
Kuwait Investment Authority (KIA)	KW	1953	Oil	Fund	342	18	Yes
Libyan Investment Authority (LIA)	LY	2006	Oil	Fund	65	15	Yes
Mubadala	AE	2002	Oil	Corporation	53.1	26	Yes
Mumtalakat Holdings	BH	2006	Non-Comm.	Corporate	7.1	1	No
National Pensions Reserve Fund	IE	2001	Non-Comm.	Fund	19.4	3	Yes
National Social Security Fund	CN	2000	Non-Comm.	Fund	160.6	8	Yes
New Mexico State Investment Office Trust (IOT)	MX	1958	Non-Comm.	Fund	16.3	1	No
New Zealand Superannuation Fund	NZ	2003	Non-Comm.	Fund	16.6	1	Yes
Norway Government Pension Fund Global	NO	1990	Oil	Fund	715.9	1	Yes
Oman Investment Fund	OM	2006	Oil, Gas	Fund	n/a	4	No
Oman State General Reserve Fund	OM	1980	Oil, Gas	Fund	8.2	3	No
Public Investment Fund	SA	2008	Oil	Fund	5.3	1	No
Qatar Investment Authority (QIA)	QA	2005	Oil	Fund	115	10	Yes
RAK Investment Authority	AE	2004	Oil		1.2	2	No
SAMA Foreign Holdings	SA	1952	Oil	Fund	532.8	2	Yes
State Capital Investment Corporation (SCIC)	VN	2006	Non-Comm.		0.5	2	No
State Oil Fund of Azerbaijan	AZ	1999	Oil	Fund	32.7	2	No
Strategic Investment Fund (FSI)	FR	2008	Non-Comm.	Fund	25.5	31	Yes
Temasek Holdings	SG	1974	Non-Comm.	Corporation	157.5	109	Yes

*Note:* The Table reports the distribution of SWFs in our sample by identity of acquiring SWF. *Country* is the nationality of the SWF. *Birth* is the year of SWF foundation. *Funding Source* represents the origin of funds. *Entity* is the legal entity of the SWF. *AuM* is the asset under management and is expressed in \$billion at March 2013. *Acquisitions* is the number of acquisitions completed in the 2000-2011 period. *Performance analysis* reports which SWFs are also included in the regression analysis on target firm operating performance.

**Table 2:** Sovereign Wealth Fund deals in our sample

Distribution by year		
Year	Acquisitions	%
2000	8	1,6
2001	6	1,2
2002	15	3,0
2003	19	3,7
2004	38	7,5
2005	48	9,5
2006	47	9,3
2007	90	17,8
2008	92	18,1
2009	71	14,0
2010	61	12,0
2011	12	2,4
Total	507	100

Distribution by target firm country		
Country	Acquisitions	%
N&S America	100	19,7
Europe	143	28,2
Asia	204	40,2
ME & Africa	60	11,8
Total	507	100

Distribution by target firm industry		
Industry	Acquisitions	%
Finance	126	24,9
Real Estate	37	7,3
Manufacturing	103	20,3
Other	241	47,5
Total	507	100

Note: The Table reports the distribution of SWF deals in our sample across years, target firm countries and target firm industries.

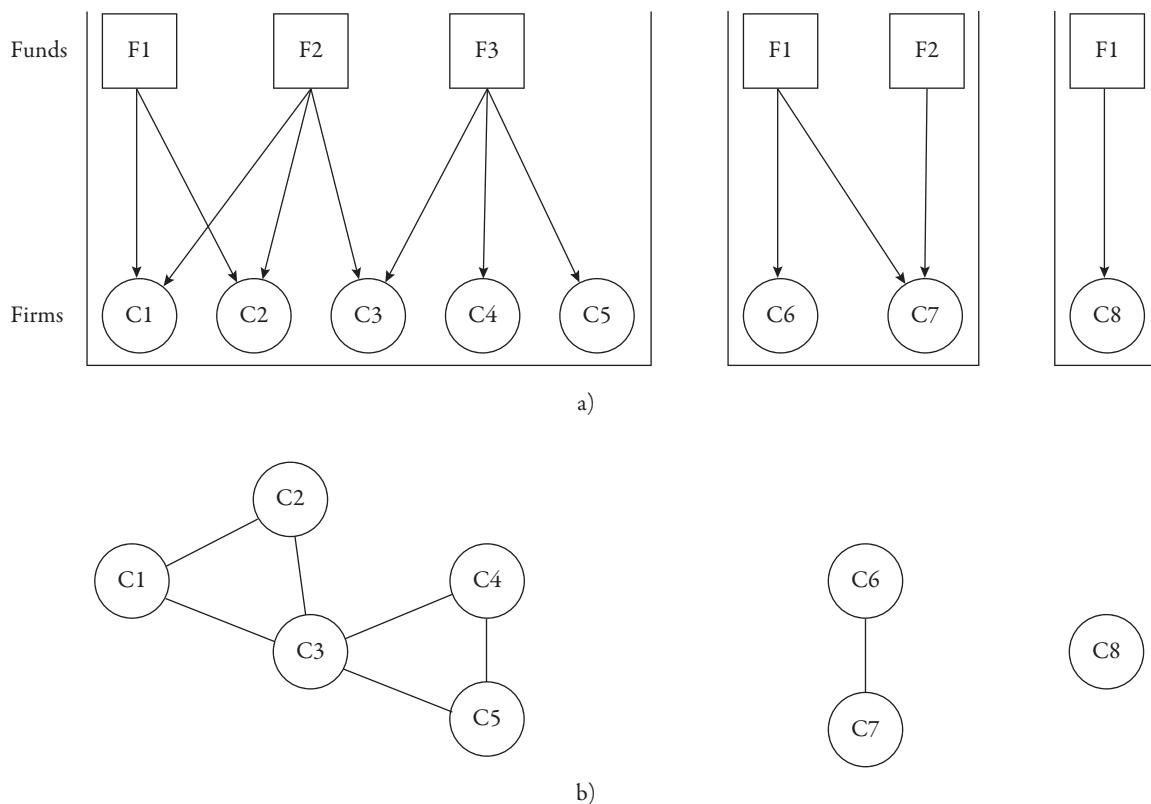
ing market economies; however, the majority of SWF equity investments (40.2%) are in Asian firms and 126 (24.9%) of the target firms are in the finance industry. The average ownership by SWF in firms in our sample is 27%.

We apply network analysis on this universe of SWF target firms, both listed and unlisted. Given the novelty of network measures in our discipline, we devote Session IV to a general overview of network analysis and its indicators, in a generic set and with specific reference to our sample of target firms. These indicators are preparatory for the empirical analysis discussed in section IV.

#### 4 Network analysis of target firms

The concept of a network is intuitive: it represents a sample of *nodes* and *links* connecting them. The nodes could be thought of as individuals, firms, banks, funds or countries. A link between two nodes identifies any kind of relationship between them.

In our sample, the information on the acquisition of the firms' equity by SWFs allow us to construct a network of relations. Such a network is «bipartite» or also called «two-mode» in the network theory jargon, because there are two types of nodes (SWFs and firms) and only one directed link (from SWFs to firms), without a possible link back



**Figure 1:** Visual representation of networks.

Construction of a projected network of firms. a) Bipartite network of SWFs (F1, F2, F3, F4, F5 and F6) and firms (C1, C2, C3, C4, C5, C6, C7 and C8). b) One-mode projection of the bipartite network onto the set of firms. The link between C1 and C2 is stronger because there are two SWFs investing simultaneously in both.

(from firms to SWFs). An example of this type of network is illustrated in Figure 1, a). Since bipartite networks are not very informative and as there are not that many methods to investigate them, they are usually transformed into «projected» or «weighted one-mode» networks. This is done by selecting one type of node and linking two nodes of this group if they are connected to the same node of the other type. For the purpose of our investigation, we have projected the bipartite SWF-firm network on the target firm side, by using target firms as nodes and assigning a link to two target firms when there exists at least one SWF which is acquiring shares of these two firms. Note that while the original bipartite SWF-firm network is directed, as relations originate from SWFs and point to firms, the projected target firm network is undirected. See Figure 1, b) for an illustration of how the bipartite SWF-firm network is projected onto the set of target firms to derive a one-mode target firm network.

Moreover, our network, as many empirical ones, is not static, but new relations may be created and others destroyed. Due to the limitations in the available data, only the information on the setting of a new equity deal is recorded. However, the equity investments of SWFs are not speculative ones, but long-term investments, thus we can suppose they remain stable over time (Kogut and Walker, 2001). Therefore, we have constructed the incremental network of SWF target firm relations for each year since 2000 to 2011.

Given this illustrative network, we can introduce network measures, which characterize the target firm position in the SWF-target firm network. In particular, we focus on four main indices of actor centrality.

The *company in-degree* measure is derived from the bipartite SFW-firm network and refers to the number of SWFs which simultaneously hold shares in the focal firm. For example, in Figure 1, a), firm C1 has an in-degree value equal to 2, while C4 to 1. Degree centrality characterizes the involvement of an actor in equity relationships and gives an indication of the firm attractiveness to different SWFs. Since such measures do not need the investigation of the whole network but only the local neighbours of the firm, it is considered a local indicator.

The *company degree* measure originates from the projected target firm network and can be defined as the number of closest firms with which the focal firm is connected. As the company in-degree, this is a local measure. In Figure 1, b), firm C3 has a degree value equal to 4, while C5 is equal to 2. It is a measure of potential relations between firms via the SWF mediation.

The *average path length* is defined as the mean of the distances between a firm and all the others and measures how close firms are in the projected target firm network. The distance between two firms is computed as the number of steps separating them. For instance, in Figure 1, b), firm C1 has a distance of 1 from C3 and C2 and two steps from C4 and C5. The shorter is the average path length, is the faster and more efficient the information or resource flows between two distant parts of the network are.

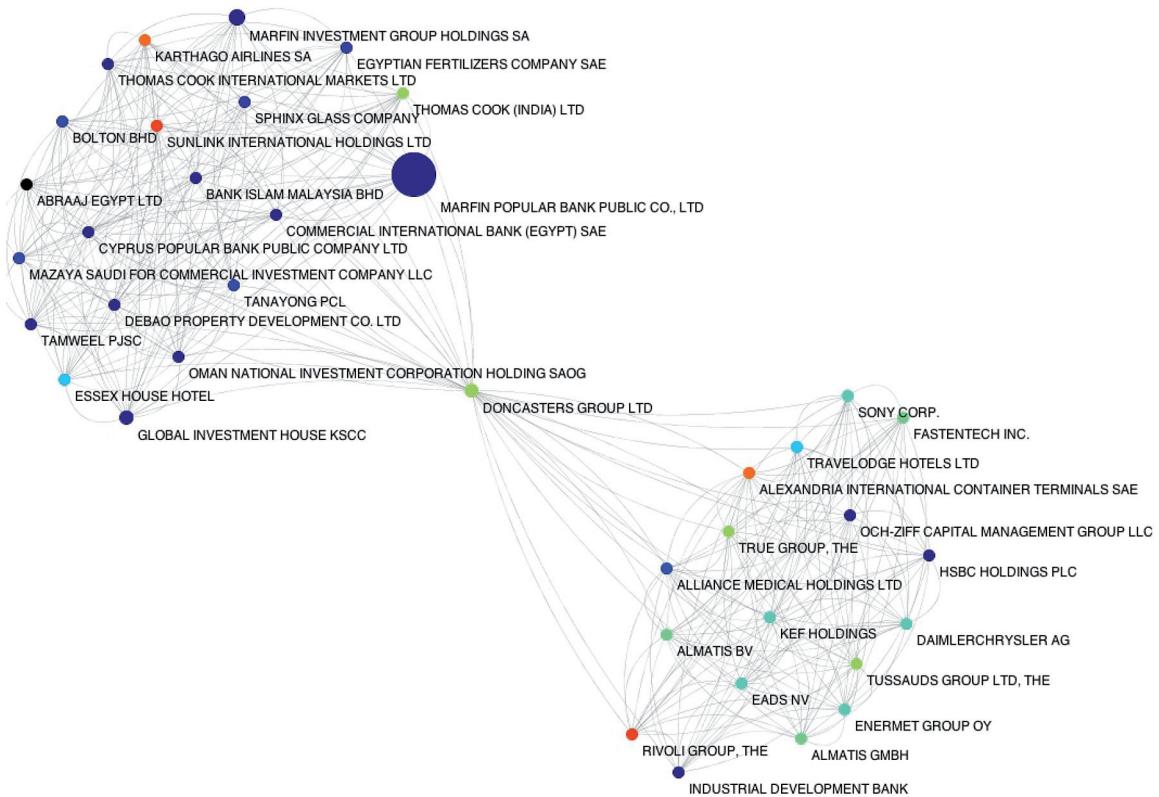
Finally, *betweenness* measures how well a firm is positioned with respect to the control over the flow of information or other resources in the projected target firm network. The betweenness value of firm  $i$  can be defined as the ratio of the shortest paths between all pairs of firms in the network which pass through firm  $i$  (deflated by the number of alternative shortest paths):

$$btwn_i = \frac{2}{(n-1)(n-2)} \sum_{i \neq j \neq z} \frac{d_{jz}(i)}{d_{jz}}$$

where  $d_{jz}$  is the total number of the shortest paths between firm  $j$  and  $z$  and  $d_{jz}(i)$  is the total number of the shortest paths between actors  $j$  and  $z$  passing through  $i$ . A company is central in the network if it is involved in many relationships with other actors. Greater centrality may translate into better access to information, deal flow, deeper pools of capital, expertise, contacts, and so on.

In order to give an idea of our sample, we report a descriptive analysis of both the bipartite SWF-firm and the projected target firm networks together with an illustrative representation (Figure 2). Since we construct a network for each year, we report here only the most significant values relative to the last available year, 2011, in comparison with the first observable one, 2000.

Starting with the bipartite SWF-firm network, the number of SWFs and their vehicles grows from 2 in year 2000 to 53 in year 2011 and the number of firms from 8 to 399. On average, the number of SWF investments has constantly increased from 4 to about 7.5, indicating the growing interest of SWF in the equity market and their propensity



**Figure 2:** Network visualization of Dubai Group, Dubai Holdings, Dubai International Capital target firms, 2011.

This network is the visualization of one of the several networks formed by SWF target firm projection, specifically the one derived from Dubai Group, Dubai Holdings and Dubai International Capital target firms. Circle nodes on the graph represent target firms. The node size scales with the in-degree measure (e.g., the number of funds investing in the firm), while the colours correspond to the sector (dark blue corresponds to banks, blue to construction, azure to hotels and restaurants, sky blue to machinery, equipment, furniture, recycling, green to metal products, orange to transport, dark orange to wholesale and retail).

to diversify their investments in more firms. In 2011, the majority of the funds (38%) belong to the oil sector, while they are quite young, being, on average, founded in 1992. The Government of Singapore Investment Corporation (GIC) is the SWF with the largest portfolio diversification (it has equity investments in 93 different firms), followed by Temasek Holdings (85 different firms held directly, without any vehicle).

With reference to the network projection onto the firm side, it has returned small and fragmented networks of SWF target firms in the first years of our observation, while in 2011 there are 32 networks and the largest one contains 236 firms, followed by a smaller network of 38 firms and many other smaller ones. In Figure 2, we show the target company network of the second largest network, in order to provide a visual representation of how clusters of firms connected by SWF investments appear. Three investment vehicles (Dubai Group, Dubai Holding and Dubai International Capital) allow the 38 firms to be connected<sup>9</sup>. In particular it is possible to recognize two main clusters, each of them formed by investments of a different vehicle, connected via a single target company, Doncasters

<sup>9</sup> Dubai Group, Dubai Holding and Dubai International Capital are three investment vehicles belonging to the Investment Corporation of Dubai.

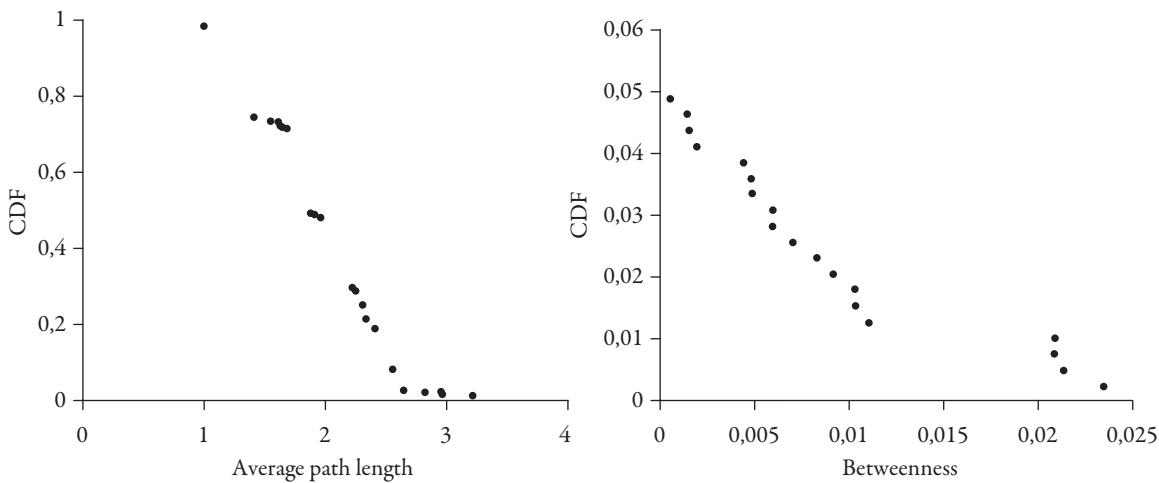
**Table 3:** Descriptive Statistics on Network Measures

	Network Measures	Mean	Std. Dev	Min	Median	Max
2000	In-degree	1.00	0.00	1.00	1.00	1.00
	Degree	3.25	1.04	4.00	2.00	4.00
	Avg. Path Length	1.00	0.00	1.00	1.00	1.00
	Betweenness	0.00	0.00	0.00	0.00	0.00
2005	In-degree	1.15	0.46	1.00	1.00	4.00
	Degree	26.56	19.85	28.00	0.00	73.00
	Avg. Path Length	1.48	0.47	1.49	0.00	2.62
	Betweenness	0.01	0.01	0.00	0.00	0.02
2011	In-degree	1.27	0.96	1.00	1.00	16.00
	Degree	40.89	36.18	22.00	0.00	158.00
	Avg. Path Length	1.73	0.75	1.80	0.00	3.62
	Betweenness	0.01	0.01	0.00	0.00	0.02

*Note:* The Table reports the mean, standard deviation, minimum, median and maximum of *in-degree* (e.g., the number of funds investing in a given firm), *degree* (e.g. the number of firms connected to a given firm), *average path length* (e.g., the number of steps separating two given firms) and *betweenness* (e.g., the centrality level of a firm in relation to the other firm possible connections) network measures in three different years, 2000, 2005, 2011.

Group Ltd; this target firm acts as a bridge because it received equity investment by the third SWF, investing simultaneously in it and in few other firms belonging to the two clusters. Moreover, since each firm node has been colored according to its referring sector, there is also a recognizable sector pattern in these SWF investments. Indeed, while one cluster is mainly dominated by firms operating in the banking sector, the other one is dominated by the metal products sector.

In Table 3, we report descriptive statistics relative to the four network indicators we use in the model. For the purpose of brevity, we compare the target firm average values of *in-degree*, *degree*, *average path length* and *betweenness* only for three years: 2000, 2005 and 2011 that are respectively the first, the middle and the last year in our sample. This way, we may depict the gradual development of each network indicators over time. All the network scores have average values increasing over time; this means that in the time span 2000-2011, the target firm network is becoming more populated and connected. Regarding the *indegree*, on measure average each firm has among its shareholders 1 SWF in 2000 and 1.27 in 2011, suggesting that even if our sample reveals an increased activity of SWFs in equity investments, there is still some dispersion in the firms they invest in. In other words, SWFs usually invest in more than one firm, but they rarely invest in the same target firm. Marfin Popular Bank Public Co Ltd is the firm with the highest number of different SWFs (16) as shareholders. With reference to *degree*, while in the year 2000 firms were linked on average to only 3.25 other firms, in 2011 they are connected on average to approximately 40. Note that the maximum level of *degree* is reached by a firm, China Railway Construction Corp. Ltd, that, via only 2 SWFs and their vehicles, is connected to 158 other target firms. As the network increases in size, the distance among any two firms in the network (*average path length*) increases as well, on average moving from 1 to 1.73, but remaining within the 3 steps, in line with the literature on small world networks (Watts and Strogatz, 1998). From Table 3, we derive that in 2011 one firm had to make a maximum of almost 4 connections for reaching a given target firms. In Figure 3, we also report the inverse cumulative distribution function of the average path length, where it is possible to notice that only a few firms needs more than 2 steps for reaching the others. Finally, *betweenness* has also shown higher values in recent years;



**Figure 3:** Cumulative Distribution Function of average path length and betweenness.

Inverse cumulative distribution function of the firm *average path length* (e.g., the number of steps separating two given firms) on the left chart and of the firm *betweenness* (e.g., the centrality level of a firm in relation to the other firm possible connections) on the right chart.

however, the relative score is quite low because the network has gained in complexity and few firms have reached a central position in the network structure<sup>10</sup>. Figure 3 also shows that in the sample the majority of the firms have a low value of betweenness, only a few have quite a high value. In our sample the company with the highest *betweenness* value is Kingsoft Corporation Ltd.

Network measure scores exhibit some degree of variation, suggesting that the connection of individual firms varies substantially. Indeed, in many cases, the standard deviation is quite large in relation to the mean value, especially in the last observable year. Thus, connection advantage is quite unequally distributed in our sample, since firms follow different relationship patterns, forming clusters of different sizes, shape and levels of connection.

## 5 The effects of networking on target firm operating performance

Although SWFs can impact target firm operating performance in many ways, our model assumes that network transactions is one of the most important channels of this influence. In order to investigate the relationship between SWF target firm networking and firm operating performance, we compute the difference between the ROA in the first year after the SWFs' deal (+1) and the firm's ROA in the previous year (-1) ( $\Delta\text{ROA}$ ). Specifically, we use an adjusted measure of ROA (*Adj.ROA*) derived by subtracting the change in the median ROA of the firms in the target firm's industry, year and country to  $\Delta\text{ROA}$  (Kaplan, 1989). Indeed, as Guo *et al.* (2011) observe, the unadjusted  $\Delta\text{ROA}$  is not able to distinguish between expected and unexpected changes in performance and needs to be adjusted with respect to a benchmark.

<sup>10</sup> Note that, in general, values referring to *betweenness* centrality usually reach low values. Indeed, they are often rescaled to the maximum value.

To ensure reliable values of firm operating performance, we exclude from the empirical analysis target companies which are not listed. Indeed, their performances are not recorded in publically available databases and cannot be computed in a sufficiently comparable way as for the listed ones. We refer to the remaining 233 acquisition deals relative to 195 listed companies and 20 SWFs as the reference sample for the regression model (131 observations were dropped because of lack of financial data).

We run an OLS regression of  $\text{Adj.ROA}$  changes ( $\Delta \text{Adj.ROA}$ ) on a set of explanatory variables. We group the explanatory variables into three main categories. One category includes network measures we derive from the network analysis. This is aimed at investigating whether target firms extract benefits from the bridging role between target companies played by the SWFs. However, in line with Dewenter *et al.* (2010), we suppose that network connections are solely one possible form of SWF activism in the target firm, even though it is likely to be the most frequent one compared to the others. Accordingly, we add two further groups of explanatory variables that have been shown to be related to a more pronounced active role of SWFs in the target firms after the investment. Overall, our explanatory variables can be classified under the following three categories:

1. deal-related characteristics,
2. fund-related characteristics,
3. network-related characteristics.

#### *Deal-related characteristics*

We consider three aspects related to the deal that might suggest a greater activism of SWFs in the target firm. *Final\_stake* represents the final percentage of the target firm's equity acquired by the SWFs. Following Ryan and Schneider (2002), a greater final stake may be associated with a greater fund activism as a larger equity position facilitates monitoring. However, the impact of final stake on performance is unclear in the literature; contrary to Bortolotti *et al.* (2010), Kotter and Lel (2011) found a positive relation between target firm excess returns and the size of SWF ownership. *Domestic* is a binary variable equal to 1 if the deal is occurred with a firm located in the same country of the SWF and 0 otherwise. The SWF inclination and freedom to monitor or actively influence its target firms could differ depending on whether or not the target is located in or outside the fund home country. Bortolotti *et al.* (2010) suggested that SWFs are more likely to be able to exert influence over a company headquartered in its home country than abroad, as they are less constrained in their active role as shareholder when investing domestically. Moreover, they found that SWFs are significantly more likely to acquire seats in domestic than in foreign companies, thus suggesting that SWFs are more willing to exercise effective corporate governance over their domestic investments. *Direct\_inv* is another dummy variable equal to 1 if SWF is directly engaged in the deal, without the interposition of a subsidiary or vehicle, and 0 when otherwise. Previous studies (Bortolotti *et al.*, 2010) outlined a worse performance when the investment is direct rather than through a vehicle; however, they emphasize the effects on returns, without considering the impact on operating performance. We suppose that greater final stakes, investments in the domestic country and without the interposition of any kind of vehicle may reduce

the distance between the fund and the firm' and may facilitate the active role of the fund, hence, positively contributing to firm operating performance.

#### *Fund-related characteristics*

Another channel through which SWFs may actively influence firms is their valuable political connections. These connections in turn may help target companies to boost trade and expand their product market, in their home country or overseas, by influencing government decisions or, in general, creating advantageous situations in favour of their invested companies. Dewenter *et al.* (2010) found that in 14% of the deals reported in their sample, there was a favourable government decision affecting the target firm after the transaction took place<sup>11</sup>; in the same vein, Soji and Tham (2010) found evidence that target firms substantially increase their number of government contracts after a SWF investment. Broadly speaking, it is reasonable to assume that the political influences of SWFs are mostly effective when the fund is run by a politician. Hence, we add a new variable SWF *Ceo\_Politic* which has a value of 1 if the SWF is run by a politician and 0 if the SWF is run by a business manager. We expect a positive effect with regard to this variable on firm operating performance, according to previous findings (Fisman, 2001; Boubakri *et al.*, 2009; Goldman *et al.*, 2008).

#### *Network-related characteristics*

Dewenter *et al.* (2010) found that network transactions (for instance, setting a new business agreement with another firm that is partly or wholly owned by the same SWF) occur in 35.3% of the target firms recorded; in their sample, this is the most frequent form of SWF activism in the target firm. They also found that these network transactions positively affect target firm's long-term returns. Accordingly, we suppose that better-networked target firms experience significantly better operating performances. We derive empirical measures of the target firm network connectivity by the use of the four indicators implemented in the network analysis of target firms; for the purpose of clarity, they are: *company in-degree (tind)*; *company degree measure (td\_tm)*; *average path length (avg\_ltn)*; *betweenness (tbetw)*. Each of these captures a specific aspect of the firm position in the target firm network, as outlined in detail in Section III.

Table 4 reports the results of the OLS regression with *Adj.ΔROA* as a dependent variable. We test for collinearity among variables by calculating the variance inflation factor (VIF) for each of the regression coefficients, where the upper limit generally recommended is 10 (Neter *et al.*, 1985). All VIF estimates are below the cut off figures recommended. We address heteroskedasticity by using heteroskedasticity-consistent standard errors.

Firstly, in *Model 1* we compute a regression of *Adj.ΔROA* on traditional variables supposed to be related with a greater activism (deal and fund-related characteristics). As far as deal-related characteristics, a domestic deal (*domestic*) and a direct investment (*direct\_inv*) are associated with significant higher operating performance. Moreover,

<sup>11</sup> An example is the case of the Bank of East Asia credit card business documented by Dewenter *et al.* (2010). After the China Investment Corporation acquired a 4.9% stake of Bank of Asia's equity in 2007, the bank won approval from the People's Bank of China to become the first foreign bank to issue debit cards in China.

**Table 4:** OLS regression for target firm operating performance

	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>
<i>const</i>	-0.0528** [0.0231]	-0.0544* [0.0284]	-0.1114*** [0.0377]	-0.1263*** [0.0354]	-0.1274*** [0.0354]
<i>domestic</i>	0.0218** [0.0104]	0.0172* [0.0010]	0.0166* [0.0100]	0.0174* [0.0102]	0.0154 [0.0101]
<i>final_stake</i>	7.141e-06 [9.849e-05]	-3.313e-06 [0.0001]	-1.004e-05 [0.0001]	-6.414e-05 [0.0001]	-7.103 e-05 [0.0001]
<i>ceo_politic</i>	0.0242* [0.0132]	0.0302** [0.0141]	0.0267* [0.0136]	0.0256** [0.0122]	0.0244** [0.0120]
<i>direct_inv</i>	0.0219* [0.0125]	0.0242* [0.0128]	0.0258** [0.0128]	0.0309** [0.0135]	0.0306** [0.0134]
<i>avg_ltn</i>		0.0112 [0.0071]	0.0091 [0.0069]	0.0130 [0.0085]	0.0125 [0.0085]
<i>td_tn</i>		-0.0002 [0.0002]	2.348e-05 [0.0002]	-8.536e-05 [0.0002]	-2.457e-06 [0.0002]
<i>tbtw</i>		0.5727** [0.2240]	0.6687*** [0.2486]	0.7651*** [0.2664]	
<i>tbtw_comp</i>					0.5710*** [0.1502]
<i>tind</i>		-0.0090* [0.0049]	0.0600*** [0.0188]	0.0601*** [0.0205]	0.0634*** [0.0195]
<i>tind^2</i>			-0.0156*** [0.0042]	-0.0160** [0.0046]	-0.0165*** [0.0044]
<i>Year fixed effect</i>				Yes	Yes
<i>R</i> <sup>2</sup>	0.0937	0.1207	0.1601	0.2113	0.2069
<i>Adj. R</i> <sup>2</sup>	0.0651	0.0635	0.0981	0.0775	0.0724

Note: The Table reports OLS regression estimates in which the dependent variable is *Adj.ΔROA*. *Adj.ΔROA* is calculated as:  $\text{Adj.ΔROAt}_{t+1} - \text{Adj.ΔROAt}_{t-1}$ , where (t+1) represents the year after SWFs deal and (t-1) represents the year before the SWFs deal. *Adj.ΔROA* is computed as ROA minus the median change in yearly ROA in the firm's industry and country. *Domestic* is a dummy variable equal to 1 if the target firm is located in the same country of SWF. *Final\_stake* is the percentage of target firm capital acquired by SWF. *Ceo\_politic* is a dummy variable that takes a value of 1 for those SWFs whose Ceo is a politician. *Direct\_inv* is a dummy variable equal to 1 for direct investment by the fund, without the interposition of any vehicle. *Avg\_lnt* measures how close firms are in the projected target firm network. *Td\_tn* indicates the number of closest firms with which the focal firm is directly connected. *Tbtw* measures how well a firm is positioned with respect to the control over the flow of information or other resources in the projected target firm network; the variable is rescaled to the maximum value in the whole sample, whereas *tbtw\_comp* is rescaled to the maximum value in each component of the network. *Tind* represents the number of SWFs which simultaneously hold shares in the firm. *p*-Values based on heteroskedasticity-consistent standard errors. \*, \*\*, \*\*\* indicate coefficients significance at the 1%, 5%, 10% levels respectively. Standard errors are presented below the coefficients. After excluding missing observations due to a lack of financial characteristics, we use a final sample of 132 acquisition deals relative to target firms.

benefits are also related to those firms targeted by SWFs with a politician as CEO: the coefficient of the fund-related characteristic (*CEO\_politic*) is significant and positively associated to target firm operating performance.

We then add our four innovative indicators to these variables for target firm network positioning (network-related characteristics). The regression on *Adj.ΔROA* reported in Table 4 (*Model 2*) indicates that network-related characteristics exert an influence on the operating performance of target firms. Specifically, target firm network centrality (*tbtw*) is associated with significantly higher operating performance. This result is coherent with Dewenter *et al.* (2010), as the more a firm is central in the target firm network, the more it is likely to be involved in different relationships with other firms of the same network. This may result in better access to information, deal flow, expertise, contacts, and so on. Also in our regression, the number of SWFs investing in a firm (*tind*) is associated with significantly lower operating performance. Our interpretation of the negative coefficient is that poor performance and need of capital infusion have often prompted multiple SWF interventions. This is especially true in cross-border investments and most of all during

the recent financial turmoil. The most visible evidence for the role of SWFs as «corporate saviors» is the massive capital injection provided to Western banks during the global financial crises. As Pistor (2009) outlined, several global banks raised capital from more than one SWF as SWFs have become the only and the largest providers of capital, apart from domestic governments. We further check the role of *tind* on operating performance by testing the non linear relationship between company in-degree and the dependent variable by adding the squared value of *tind* (*tind*<sup>2</sup>) in our regression (*Model 3*). Indeed, we may suppose that a greater number of investing SWFs may positively influence operating performance at first, as it implies a greater and stable capital injection. However, when the number of investing SWFs increased a lot, then the effectiveness of SWF activism is reduced, hence producing a negative impact on operating performance. This interpretation is in line with Winton (1993), Noe (2002), Edmans and Manso (2011) who find that the number of blockholders affects the strength of voice by impacting block size. In line with this hypothesis, we find a positive relationship between operating performance and *tind*, while the sign is negative and significant for the squared variable *tind*<sup>2</sup>. In our regression, the remaining two networking coefficient estimates (*avg\_ltn*, *td\_tn*) are not statistically different from zero.

We further perform a robustness check of the relationship between network-related characteristics and target firm operating performance, by testing the null hypothesis of a value of zero for all the network coefficients; the null hypothesis cannot be strongly accepted<sup>12</sup>.

A possible additional concern with our results is the effect of year. To account for cyclical effects, we estimate the model adding a series of dummies for each year of observation (the reference year is 2001). The relationships between our explanatory variables and operating performance remain unchanged in terms of significance and coefficient sign (*Model 4*).

Finally, since the projected network of target firms is fragmented, it would be useful to perform the network measures by considering each connected component at a time. The in-degree and degree are local measures and, thus, are not affected by the network fragmentation. The average path length, instead, is a global measure, hence, it is affected by the size of each component; however, its computation takes into account the network division in more detail. Conversely, the betweenness, global measure as well, analyses the centrality of the whole network, independently by the component each node belongs to. Hence, as a further robustness check, we repeat the analysis by normalizing the betweenness values by the maximum in each component (*Model 5*). The overall results confirm previous findings.

We should also acknowledge some important caveats to the interpretations of our results. First, different funds can have different objectives, or the same fund can pursue different goals at different times; hence, our analysis allows to observe which strategies and impact predominate, on average. Additionally, our list of SWF target firms are necessarily incomplete, since in the regression we examine only SWF investments in listed stocks, which represent a fraction of most funds' portfolio. Hence, our sample allows us

<sup>12</sup> Results of the omission test are not reported, but they may be provided upon request.

to draw conclusions about the impact of SWF investments on listed companies all over the world. Finally, we include only equity assets in the analysis which are purchased by SWFs from year 2000 due to a limitation in the available data. However, we believe that this is not a relevant limitation as it has been well proven that the equity investments of SWFs and the subsequent network become very important only after 2000 (see Table 2 of the paper and Pistor, 2009; Bortolotti *et al.*, 2010; Kotter and Lel, 2011).

## 6 Conclusions

Despite the rapid growth of SWF investments in recent years, there has been very little academic research on the effects of their activity. This may be mainly due to the paucity of publicly available information on SWF investments and their strategies. In this study, we attempt to shed some light on the effects of SWF investment activities on target firm operating performance.

An ongoing controversy about SWF activity concerns SWFs activism as shareholders and their impact on target firms. So far, the discussion has been mainly based on the monitoring role SWFs may exert on target firm management. In this sense, SWFs are typically considered passive investors unable to create value for target firms in the long run. However, as Dewenter *et al.* (2010) documented, monitoring is just one way SWFs exert their active role of shareholder and contribute to creating shareholder value in target firms. SWFs may exert influence also by «government actions» and most of all by «network transactions». We use network analysis in order to investigate if target firms that are better networked thanks to the connections created by SWFs may extract benefits from these relations in terms of higher operating performance. To the best of our knowledge, this is the first study to derive objective indicators for measuring the position of each target firm in the SWF-target firm network.

We find that highly central firms in the target firm network enjoy higher operating performance. Indeed, firm centrality in the network may result in better access to information, deal flow, expertise, contacts, and so on. In addition, our analysis points out that some characteristics of SWFs and deals are also significant in explaining target firm results: operating performance is higher the larger the stake acquired, if the investment is direct, rather than through subsidiaries or investment vehicles, in the domestic country and if the SWF is run by a politician. Finally, we find a concave relationship between the number of SWFs investing in the firm and target firm operating performance. We interpret this result as a consequence of the greater capital injection that comes with multiple SWF investments in the same firm, but also with the «corporate savior» role and reducing strength of intervention underlying the financial intervention of too many SWFs.

Overall, our results broaden previous predictions about the role of SWFs activism and specifically about the resulting network transactions on target firm performance. Our findings add to previous studies that being a SWF target does not completely result in better operating performance. Only when a target firm can benefit from the network of both political and commercial connections created by the fund, does the target firm enjoys these benefits and gains better operating performance.

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