Volume 12, Number 1

Print ISSN 1544-0222
Online ISSN 1544-0230

JOURNAL OF INTERNATIONAL BUSINESS RESEARCH

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INTERNATIONAL BUSINESS CHALLENGE: DOES ADDING SOUTH AFRICA FINALLY MAKE THE BRIC COUNTRIES RELEVANT?

William P. Frank, Barry University

ABSTRACT

Since 2001 when Jim O'Neill coined the acronym BRIC (Brazil, Russia, India, China) countries and his firm Goldman Sachs put forth a report that argued that based on their economic potential they could become the world's most dominant economies by 2050 they have searched for their place on the world geopolitical scene. Over the past 10 years a great deal has been written about them, their economic potential, and their continuing lack of relevancy in the world for various reasons. In what some call a move to fill a major gap in the group South Africa has now joined the group to form the BRICS. The paper will look at whether or not this addition finally makes the BRICS relevant and more capable of living up to the potential that Goldman Sachs projected in 2001.

INTRODUCTION

Beginning in 2001 when Goldman Sachs executive Jim O'Neill coined the acronym BRIC countries for a group consisting of Brazil, Russia, India and China, predictions, projections and estimates have been written about their prodigious economic power. The group itself has begun to believe in the projections and in 2009 started to hold its own summits to counter the G8 and G20 meetings, of which they are members. What they seem to be missing is relevance or to put it another way "Why won't anyone listen to us?"

HISTORY

BRIC was an acronym coined by Jim O'Neil in a 2001 Goldman Sachs's Global Economic Paper No: 66, "Building Better Global Economic Brics". He predicted, soberly, that "over the next 10 years, the weight of the Brics and especially China in the world GDP will grow" - and warned, perhaps a little less soberly, that "in line with these prospects, world policymaking forums should be reorganized" to give more power to the group he had now dubbed Brics (Tett, 2010)

The term caught on not only with Goldman Sachs clients, but with others as well and Briclife as it is known inside Goldman Sachs began. In his initial paper O'Neill and his team projected that based on current statistical evidence "That the BRICs and especially China in the world GDP will grow, raising important issues about the global economic impact of fiscal and monetary policy in the BRICs."(*Goldman Sachs*, 2001)

It was not until October, 2003 that O'Neill and his Goldman Sachs team in their Global Economic Paper No: 99, "Dreaming with BRICs: The Path to 2050" came out with their now often quoted projection about results in 2050. In this paper they point out that over the next 50 years, Brazil, Russia, India and China – the BRIC economies – could become a much larger force in the world economy (*Goldman Sachs*, 2003).

In Global Economic Paper No: 99 Jim O'Neill clearly stated that while the world has changed a lot over the last 50 years the changes over the next 50 years could be just as dramatic. Using a reasonably conservative model he makes some projections which now, ten years later, we can verify or cast aside. We have more historical data now to guide us as we try to decide if the newly expanded BRIC group of nations is becoming more relevant or remaining just an easily remembered acronym.

To establish a historical perspective for the BRIC group we have the following facts. At the end of 2000, GDP in US$ on a PPP basis in Brazil, Russia, India and China (BRIC) was about 23.3% of world GDP (*Goldman Sachs*, 2001).

With the addition of South Africa to the group in 2011 they now represent 40% of the world's population and 25% of the world's GDP (*Globalization,* 2011). This remarkable growth in slightly more than 10 supports the Goldman Sachs projections and reinforces the O'Neill idea that these countries continue to be poised for their predicted long-term growth.

PROJECTIONS/PREDICTIONS

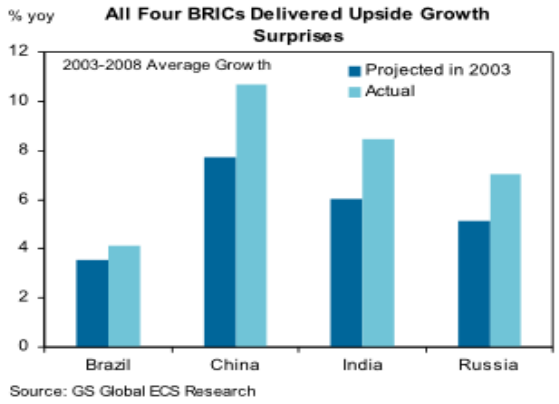
From Jim O'Neill and his team in 2003 came the following projections:

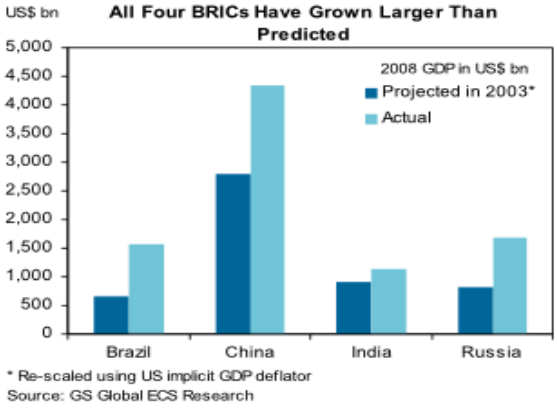
- In less than 40 years the BRICs' economies together could be larger than the G6 in US dollar terms. By 2025 they could account for over half the size of the G6. Currently they are worth less than15%.
- In US dollar terms, China could overtake Germany in the next four years, Japan by 2015 and the US by 2039. India's economy could be larger than all but the US and China in 30 years. Russia would overtake Germany, France, Italy and the UK.
- Of the current G6 (US, Japan, Germany, France, Italy, UK) only the US and Japan may be among the six largest economies in US dollar terms in 2050 (*Goldman Sachs*, 2003).

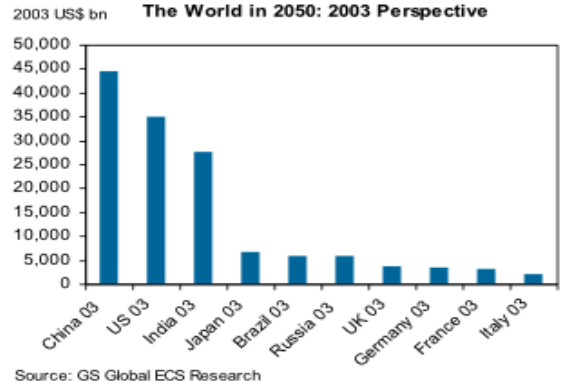
Based on the projections from Goldman Sachs done more than eight years ago, which do not include the recently added nation of South Africa, it is appropriate to review the content of this paper to see how the projections actually track against real performance.

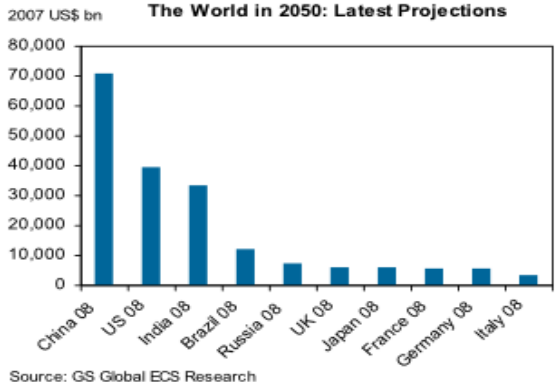
Using information from the Goldman Sachs Global Economic Paper No:192 we can conclude that in the six years since the initial projections were made all four countries have delivered upside surprises. In the 2003 – 2008 time period actual growth turned out to be higher on average than had been predicted, particularly in China and India. In 2008, GDP levels were also higher across all four of the BRIC countries the periods needed to overtake the G6 have

decreased. The following tables from Goldman Sachs Paper No: 192 clearly illustrate the progress of the original BRIC countries compared to the original O'Neill team projections.









Timeline for BRICs to Overtake G6: 2003 vs 2008 Projections

	France	Germany	Italy	Japan	UK	US
Brazil 03	2031	2036	2025	--	2036	--
Brazil 08	2027	2029	2020	2034	2038	--
China 03	2004	2007	2000	2016	2005	2041
China 08	2006	2008	2004	2010	2006	2027
India 03	2019	2023	2016	2032	2022	--
India 08	2021	2024	2017	2027	2023	--
Russia 03	2024	2028	2018	--	2027	--
Russia 08	2024	2029	2017	2037	2027	--

Source: GS Global ECS Research

(*Goldman Sachs,* 2009)

With the projections in the tables above not only holding true, but showing they were pessimistic what can we now project? Will the newly formed BRICS group displace the old order of the G8 and G20 or is there some downside to this projected prosperity? Has the addition of South Africa finally given the organization the relevancy it has been searching for since it was formed? Across the world opinions from many experts are still mixed on the

progress being made, but opinions from those inside the countries themselves and some other serious watchers of the world economic landscape think otherwise.

The BRICS countries, by their very existence, their rapid economic growth and degree of independence from Washington, are contributing to the transformation of today's uni-polar world order, still lead exclusively by the United States, into a multi-polar system where several countries and blocks will share global leadership. This point is a major aim of the BRICS, which recognizes it's a rocky, long road ahead because those who cling to empire are very difficult to dislodge before they swiftly disintegrate (Smith, 2011)

For a small group, though it is symbolic of a larger trend in world affairs, BRICS will have considerable clout this year as members of the UN Security Council, occupying five of the 15 seats on the council. The current makeup includes temporarily seats for Brazil (until the end of 2011), India and South Africa (ending after 2012), and permanently of course for China and Russia (Smith, 2011).

This UN block of five (Brazil, Russia, India, China and South Africa) in the current Security Council gives the United States, reason to further examine relations with the BRICS. On paper all seems well, but geopolitics is a rapidly changing world landscape that the United States must carefully negotiate in the future.

The addition of South Africa was a very deft political move that further enhances the BRICS power and status. The new member possesses Africa's largest economy, but as only number 31 in the list of global GDP's it is far behind its new partners… It's also behind such other emerging countries as Turkey, Mexico and South Korea, for example, but African credentials are important geopolitically because they give the BRICS a four- continent breadth, influence and trade opportunities. China is South Africa's largest trading partner and India is anxious to increase its commercial ties to Africa (Smith, 2011).

Aside from the economic power they appear to wield on paper, does the world take their pronouncements seriously? Large divides and simmering political rivalries, especially between China and India and China and Russia that the world watches warily remain. Unlike other world organizations the BRICS lack any formal organization and remain a very loosely woven alliance who may put more emphasis on their economic power than others do, especially the world's old guard.

Brazil, recognizing that the BRICS, possibly displaying more volatility than viability, announced before the recent summit in Sanya, China, that they plan to seek a strengthened BRICS organization as their importance grows on the international stage (*The Xinhua News,* 2011).

The Brazilian ambassador to China Clodpaldo Hugueney in an interview with Xinhua News Agency stated that "the rise of emerging countries means the global economic center of gravity is moving to the developing countries."(*The Xinhua News*, 2011)

To this end trade between the BRICS themselves first has to be expanded and the five need to further strengthen mutual cooperation on some international issues to help boost their influence, which as yet is collectively quite minimal.

Since all the BRICS are developing countries it is imperative that they work together to develop their bloc into a viable channel for greater cooperation. The entry of South Africa into

the bloc is expected to push the BRICS in that direction. South Africa's entry is expected to build a bridge of cooperation between the blocs other members and African countries. This is important because according to the declaration from the Sanya summit the bloc is committed to helping African countries eradicate poverty and hunger and meet the UN Millennium Development Goals target by 2015 (Wenzhao, 2011).

Stepping onto the world stage with plans and activities outlined in the final declaration from the Sanya summit the BRICS need now to assume more of a decision making role. Today the BRICS often appear to be a passive participant not a decision maker. Also if they hope to see change in the current international monetary, economic and political order they need to step forward and act. They have not acted yet.

The declarations by the BRICS from Sanya and the two previous summits continue to seek relevancy for the bloc and this year might be the opportunity. With the addition of South Africa and their newly expanded continental reach they now have begun to make pronouncements like they are the G8 or G20. Despite these continued pronouncements the rest of the world still waits for some actions to support the words.

In an interview with Sergey Lavov, the Russian Foreign Minister, the future direction of the BRICS bloc becomes apparent. Our association has qualitatively changed over the year since the last BRIC summit in Brasilia. Its international prestige and influence have strengthened. Dialogue has significantly intensified on the pressing problems of the international agenda in relation to the simultaneous participation of all partners in the Security Council of the United Nations. The association has widened upon the admission to its ranks of a leading African state, the Republic of South Africa. Thus, the BRICS has acquired a truly global dimension. By acting together in the Group of Twenty, we have achieved significant progress in the reformation of the international financial and economic architecture during the past year, first of all in World Bank reforms and in the start of the reformation of the International Monetary Fund (*BBC Monitoring*, 2011).

These are very presumptive statements coming from the leadership of possibly the weakest of the BRICS. However, as the organization seeks to become more prominent and relevant in world affairs this is what you would expect from them. As a group they are searching for a way to use their organization for better collaboration on world economic issues. They desire to be relevant in not only solving the global economic crisis but also in creating a new economic system. To do this the BRICS must do what as yet they have been unable to do, and interact better with each other. As evidenced by the statement of the Russian Foreign Minister Sergey Lavov they talk about a unified diplomatic approach. They have talked about this approach since the association was created but they still fall far short in actual performance. When will they finally step forward and act?

World watchers expected action from the meeting in Sanya. World geopolitical dynamics are changing and the stage is set for the BRICS to unleash their action plans. The U.S. is watching. The G8 and G20 are watching and the BRICS once more basically have done nothing. Since the beginning of the global financial crisis and the initial formalization of the BRICS the rest of the world has waited as the alliance spoke loudly of relevancy. Yet what have they actually done?

Since 2005 when China's economic success and the increasing dependency of the U.S. on China, caused new trading and economic relationships to be formed between the BRIC countries. China started investing heavily in African resources, Russia and India traded energy, IT and military hardware, and Brazil exported iron ore, oil, coal and other commodities to China. Suddenly, the BRIC countries were voting as a "bloc" at WTO negotiations in Doha and collaborating on climate change at Kyoto creating significant new problems for the original G7 group of nations, which had become the G8 with the inclusion of Russia in 1994 (Thomas, 2011).

This new trend toward collaboration is the most important influence that the BRICS and other developing countries currently have on world politics. The BRICS membership continues to try form a new international economic and political order. They seek allies who want reasonability and a voice of reform. Is that enough to put them on a par with the G8 and G20 as they go forward?

Analysis done after the summit in Sanya is mixed on whether this is in fact the BRICS direction. The alliance leadership spoke of openness and a desire to not create a club, but rather they were seeking to use "non-confrontational methods" to increase their engagement with non-BRICS countries, especially those in the remaining group of emerging and developing nations.

Working against this idea however, are the facts which show for example that despite its increasing trade links with other developing countries China needs the crucial export markets offered by the U.S. and the major European countries. The developed countries also could offer China much needed technology know-how and foreign direct investment that other BRICS countries might not be able to easily supply.

Other BRICS countries maintain close trade and business relations with various developed countries. Cooperation among the BRICS countries was important. But at the expense of their ties with the U.S. and major European countries? Not likely (*The People's Daily*, 2011).

The five BRICS, despite the publicity of their recent summit meeting, face some unmistakable facts as they push for relevance and a more prominent voice. The combined GDP of the five countries has grown steadily in the past decade, but it is still smaller than the world's largest developed economy. The U.S. economy accounted for some 23 percent of the world economy in 2010, bigger than the 18 percent contributed by the BRICS countries.

The BRICS countries, with their strong future economic outlook might eventually overtake the G7 countries as the largest economies in the world, but the catch-up work seems immense at the moment.

The BRICS all have their own economic vulnerabilities in one way or another. China has been trying to boost domestic demand to reduce it's over reliance on exports as a source of economic growth. Brazil and Russia, two big exporters of energy and other commodities are vulnerable to fluctuations in the prices of crude oil and iron ore. These two countries are trying to further diversify their economies. India needs a more modern infrastructure, while South Africa has to increase its growth rate (*The Peoples' Daily*, 2011).

Despite their publicized positions it is apparent that they do not want to change the world economic structure immediately since at this point they are dependent upon it. The most likely

scenario that we will see moving forward is the BRICS will continue to try to work more closely within the group, continue to complain outwardly to anyone who will listen and continue to parlay their growth into an ability to make the world economic systems better. For all their statements the BRICS still are basically emerging economies that in the near term hope for a more balanced international system that will allow them to continue to share in the resulting growth and give them a more prominent role in the worlds power structure.

All estimates call the BRICS the five fastest growing economies. As a group they are five countries that are slowly gaining a political significance. Have they then begun to reach relevance on the world stage which has always been their goal and has always remained a question?

International opinion has varied in their response to the BRICS. Some acclaim it is the advent of a multi-polarity era and say this forward looking group will have far-reaching consequences, not just for the five countries themselves, but also for the peaceful and orderly transition to a more just and democratic world.

Others are concerned about the challenges it may pose to the WEST-dominated world and argue that as a non-Western grouping, BRICS may push for its own agenda at the expense of the West.

For still others, BRICS is merely an ad hoc group, the countries are not really united, and it is only China that makes it possible. They argue that the BRICS mainly serves China's interests as it seeks to change the West dominated global system through multilateral diplomacy (*The Xinhua News*, 2011).

CONCLUSIONS

Despite all of the predictions and projections appearing in the electronic and print media around the world it is still extremely difficult to take the BRICS seriously. The world geopolitical environment is still made up of the G8, the G20 and numerous other smaller alliances, confederations and handshake agreements. These groups actually control the economic ebb and flow and the worlds trading activity that we see on a daily basis. Where does that leave the BRICS, which was the question that opened this paper?

In 2009 at a Doha Round ministerial meeting held in Cancun, Mexico the BRICS, including South Africa who was not yet a member of the group, joined other developing countries to reject a draft climate change proposal. This was actually the first time the group acted together and tried to use their political influence to take action and seek relevance as a group. Since this activity in 2009 little if anything has been heard from the BRIC countries until the recent news splash they made by adding South Africa.

With the influence of the United States seen to be decreasing as its budget and trade deficits increase, with the European Union struggling to put its own fiscal house in order the time is now for the BRICS to step up and seize the initiative. What is stopping them?

News reports and various lecturers, including a veteran British career diplomat Keith Haskell put it all in perspective. He said that the unique balance of power in the 21st. century offers the BRICS the opportunity to use their potential to fulfill the particular conditions needed

to become dominant superpowers. However those conditions include free elections, freedom of speech for media and individuals, an independent and efficient judiciary, low corruption, access to natural resources, a well-educated population, technologically advanced companies and low degrees of threat from internal or external religious, ethnic or frontier disputes in addition to a low risk for natural disasters.

"You might be surprised to realize that China fails most of these tests," Haskell has commented. "It is undemocratic, hostile to freedom of speech and corrupt. It has relatively few natural resources within its borders. Even water is running short, which is why it has formed alliances with some of the least savory resource-rich regimes in Africa."(Bowen, 2010).

With news stories like this circulating about China, one of the two rocks along with India that are the foundation of the BRICS, credibility and relevance for the alliance continues to be in doubt. We continue to hear and read that this group and many others around the world struggle because above all each country has its own agenda which supersedes anything else the alliance may say in its annual summit pronouncements. After the recent summit Chinese President Hu Jintao said: "The era demands that the BRICS countries strengthen dialogue and co-operation." Yet nothing has happened, just more words which continue to point to the fact that even with the recent addition of South Africa, world perceptions of the alliance have not changed.

The partnership still has potential. Since Jim O'Neill coined the initial description in 2001, they have always had potential, but they have not yet lived up to it. They continue to lack the coherence that is required for more effective actions. China is still looking out for China, India looks out for India and the other BRICS appear to be on their own. The facts are that especially China and India compete more with each other than they do with the U.S. or the EU countries. Since the group formally began to meet in their annual summits they have made noise about many things, most recently the actions of the IMF, but that's all they have done is talk. In order for this alliance to become relevant they must begin to act as a coherent body and overcome their longstanding individual differences.

At this point that is not something that appears to be happening. To have an annual summit alone does not establish the BRICS as a geopolitical force to be reckoned with. Adding South Africa has opened more opportunities for the countries in Africa, but compared to the G8, the G20 or the many other worldwide alliances for trade or defense the BRICS remain on the sidelines. Relevance will remain an elusive goal for the BRICS as long as they continue to only talk about what they plan on doing rather than actually doing what they talk about. The BRICS possess enormous economic potential that can influence the world geopolitical environment if they finally make the commitment to act as one not five.

When that happens, and remember all the original projections for the BRIC countries say they will come into their own and be the dominant world economies by 2050, which is still 38 years from now. Maybe we just have to watch the alliance develop and let the various scenarios play out before we get a final answer to the question of their relevance.

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IMPACT OF THE GREECE CRISIS ON CORPORATE EXPOSURE TO THE EURO

Jeffrey M. Coy, Florida Atlantic University

ABSTRACT

The focus of this study is to examine the shift in sensitivity to the US dollar/euro exchange rate as a result of the crisis in Greece for a sample of 148 US-based firms that have exposure to the euro through operations in euro zone countries. A two-stage least squares regression is conducted to identify the shift in sensitivity to the dollar/euro exchange rate as well as to the domestic market and to identify firm characteristics that may make them more susceptible to these shifts. The sensitivity of the sample firms to the euro more than tripled from the six-month period prior to the Greek crisis to the six-month post-crisis period and was more pronounced for larger firms that have higher growth prospects and higher leverage and liquidity ratios.

INTRODUCTION

It is a common belief that the value of a corporation that has exposure to a particular currency is affected by the exchange rate movements between that currency and the firm's home currency. This exposure gives rise to foreign exchange rate risk. This risk can be categorized as transaction risk and translation risk. Transaction risk arises due to the time difference between the acceptance of a contract and the fulfillment of that project. The revenue (or cost) from that contract has an increased risk associated with it as the time between acceptance and fulfillment gets larger as the currency has more time to fluctuate. Translation risk is an accounting risk that arises as companies deal in the foreign exchange market or list foreign denominated assets and liabilities on their balance sheets. Thus, changes in exchange rates lead to changes in periodic financial statements which can lead to significant changes in reporting figures.

These risks affect both the monetary assets of the firm as well as their real assets. The exposure to monetary assets is limited to those that are denominated in a foreign currency while domestic monetary assets are unaffected. However, both the domestic and foreign real assets of the firm are exposed to exchange rate risk. The exposure of domestic real assets arises from two sources: the change in the costs of foreign inputs and the change in aggregate demand. These assets benefit (lose) from a dollar appreciation (depreciation) with respect to foreign input prices and lose (benefit) from a dollar appreciation (depreciation) with respect to their aggregate foreign demand. Foreign real assets that produce goods for export to the US will benefit (lose) from an appreciation (depreciation) of the dollar (assuming that the sale of these goods is denominated in dollars) while losing (benefiting) from a depreciation (appreciation) in the dollar when translating those foreign revenues back into the home currency.

These differing characteristics of the multinational corporation (MNC) with regard to their foreign operations in a country using a different currency can lead to either a positive or

negative foreign currency exposure to that particular currency. Whether positive or negative, this exposure can be influenced by a number of exogenous variables including crisis shocks. Current research (Melvin & Taylor, 2009) on the recent global financial crisis has employed a "fundamental stress index" made up of four essential characteristics of a financial crisis to prove that these characteristics had a marked effect during a crisis. These characteristics are: large shifts in asset prices, abrupt increases in risk and uncertainty, abrupt shifts in liquidity, and decreases in the health of the banking system. If this is the case, then firms that have direct exposure to the currency of a country in crisis should experience a pronounced shift in sensitivity to that currency.

The purpose of this study is to measure this shift in sensitivity as well as to pinpoint some of the characteristics that make one firm more susceptible to a change in foreign currency risk as a result of a crisis. In particular, I investigate the effects of the Greek crisis (sovereign debt crisis) on the US dollar per euro exchange rate sensitivity of a sample of US firms that have direct exposure to the euro through operations in those countries whose home currency is the euro.

A sovereign default, by definition, is the failure of the government of a sovereign nation to pay back the full amount of its debt. The threat of a sovereign default by some of the European Union members is primarily what led to the sovereign debt crisis in 2010. These fears led to a decrease in confidence of existing and potential European investors as increasing government debt caused a rash of European government debt downgrades. Greece was considered to be "ground zero" for this "crisis in the euro" as the Greek government was able to run huge structural deficits as their economy continued to strengthen. These deficits were run, in large part, to fund many social benefits. Initially, devaluation of their currency was the tool used to finance all of this borrowing. However, when the euro was introduced, Greece had to find some way to keep up with the guidelines of the monetary union. As it turns out, they did so by purposely misrepresenting their economic standing. In January of 2010, it was reported that Greece had been hiding their actual levels of borrowing by engaging in certain transactions with various banks who received millions of dollars in fees for facilitating these transactions. This had been going on since 2001 and allowed the Greek government to continue borrowing (and spending) without the actual deficit coming to light. By May 2010, Greece had the highest government deficit in the world (related to GDP) leading to a junk debt rating by Standard & Poor's with more downgrades to follow.

On May 2, 2010, the International Monetary Fund reached an agreement with Greece and the other euro zone countries to provide €45 billion worth of loans with more to follow. The agreement calls for a total of €110 billion in all and is designed to prevent a default on Greek debt. What is of most concern is that investors around the world will lose faith in the other euro zone countries, some of which have debt issues of their own. It is this concern over the "spread" of the Greek situation to other countries that I believe will lead to a dramatic shift in sensitivity of exposed firms to the euro.

The remainder of this paper is outlined as follows. Section II is a brief literature review followed by an explanation of my hypotheses. Section III is a description of the data selection

process and the methodology used. Section IV is the report of the results. Section V contains the summary and conclusion.

LITERATURE REVIEW & HYPOTHESES

There are both direct and indirect effects of a change in the exchange rate between two currencies on the value of firms that are exposed to those currencies. The most obvious is the immediate direct effect of the currency movement itself that causes a movement in the market price of the firm as the real price to foreign investors fluctuates along with the currency movements. Indirect effects, mentioned briefly above and previously indicated (Benson & Faff, 2003), include changes in export sales, costs of inputs, and the competition that occurs due to the change in currency value. In the face of crisis, I would expect that the sensitivity of firms exposed to a particular currency would shift as a result. This shift in sensitivity should occur quickly on any news relating to the crisis. A recent study on the banking crisis (Degryse, Elahi &Penas, 2010) supports this notion by reporting that the speed of delivery of bad news has increased in recent years thus, increasing exposure.

In examining the effects of the current global crisis on the volatility of over-the-counter currency options, recent work (Chalamandaris & Tsekrekos, 2010) has found that the volatility, persistence, and significance of the factors that influence the correlation between two currencies has changed dramatically over the tempestuous period of the past 18 months. I will present evidence of an extraordinary change in the correlation between the dollar and the euro from the pre-crisis period when compared to the post-crisis period. If a crisis can influence the fundamentals of these correlations, then sensitivity to these exchange rate movements should change as a result of the crisis as well.

It has also been found that large currency swings in the post-Asian crisis period have led to a change in trade and capital flows leading to an increase in vulnerability of US MNCs that are active in these markets (Verschoor & Muller, 2007). All of the inherent factors that are associated with a crisis, coupled with the fact that the Greek situation may be even more severe due to the possible "exporting" of the crisis to euro member countries through an abandonment of faith in their economies, should cause a change in sensitivity to the dollar/euro exchange rate:

H_1 *US firms that have direct exposure to the euro through operations in euro zone countries will experience a shift in their sensitivity to changes in the dollar/euro exchange rate as a result of the Greek crisis.*

As explained previously, there are many factors that can cause the initial sensitivity to be either positive or negative. The sensitivity of these firms as a result of the crisis should become more pronounced regardless of what the initial sensitivity was.

According to existing literature, this change in sensitivity should have a direct hand in changing the market risk (domestic) exposure of these firms as well. Aquino (2005), in examining Philippine stocks after the Asian crisis, found that investors began to expect an added risk premium on their investments for the extra exchange rate risk exposure. Likewise, Chen and

So (2002) found that US MNCs with exposure to Asia during the Asian crisis saw an increased shift in market risk due to the exchange rate volatility and Bartov et al (1996) cite exchange rate volatility for US MNCs as a reason for increases in market risk.

The implications of these shifts toward increased sensitivity to market risks are in the increased cost of equity capital for these firms. For this reason, I also investigate the change in risk of these firms in relation to the US market. That is, I measure the change in the beta of the US MNC in the post-crisis period as compared to the pre-crisis period.

H_2 *US firms that have direct exposure to the euro through operations in euro zone countries will experience a shift in their sensitivity to the domestic market as a result of the Greek crisis.*

After the shift in sensitivity of these firms to the dollar/euro exchange rate as well as to the domestic market has been established, I examine certain firm-specific characteristics to evaluate what might make a firm more susceptible to these shifts as a result of the crisis.

DATA & METHODOLOGY

Sample

In order to create a sample of firms that have direct exposure to the euro, I searched the Securities Data Corporation (SDC) database of mergers and acquisitions for US-based firms that had completed a merger or acquisition of a target that resides in one of the euro zone countries in the five years prior to the onset of the crisis. In order to be included, the following criteria were considered:

1. The acquirer's ultimate parent nation is the US
2. The deal value was greater than $10 million
3. The acquirer ultimate parent had to be a publicly traded company
4. Only completed deals were considered
5. The target country was limited to only those European countries that are part of the euro zone.

After excluding firms that appeared on the list more than once, the sample consisted of 183 firms. Daily stock return data was taken from the Wharton Research Data Services' (WRDS) Center for Research in Security Prices (CRSP). I am interested in the shift in sensitivity from the pre-crisis period to the post-crisis period; therefore, I had to define the period *of* the crisis. There is not a definitive date as to when the crisis began or when it ended. For this reason, I used the dates that correspond to the breaking news as explained in the introduction. The fact that Greece had been hiding their actual levels of borrowing by engaging in certain transactions with various banks, who received millions of dollars in fees for facilitating these transactions, was reported in the very beginning of January 2010. While the agreement reached by the International Monetary

Fund with Greece and the other euro zone countries to provide €45 billion worth of loans, with more to follow, was reported on May 2, 2010. For this reason, I am interested in the six-month period leading up to January 2, 2010 compared to the six-month period from May 2, 2010 on. These are the two periods for which the daily stock return data was pulled from CRSP. Daily exchange rates were also pulled for these dates from Thomson Financials Datastream Advance database as well as the data for the return on the S&P 500 which was used as the proxy for the market returns. For the cross-sectional regression analysis, firm-specific variables were retrieved from the Standard & Poor's Compustat tapes.

Methodology

This investigation is conducted using a two-stage least squares regression with the first stage measuring the sensitivity and the shift in sensitivity of daily firm returns to the dollar/euro exchange rate as well as to the domestic market (proxied by the return on the S&P 500). The second stage incorporates the coefficients for the shifts in sensitivity from the first stage as dependent variables against firm-specific independent variables in order to identify characteristics that may make a firm more susceptible to sensitivity shifts in the face of crisis. In order to evaluate the sensitivity of each firm to the changes in exchange rates between the dollar and the euro as well as to the domestic market, I follow the widely accepted method (Dumas, 1978; Adler & Dumas, 1980; Jorion, 1990; Bodnar & Gentry, 1993) that defines the sensitivity of a firms stock returns as the coefficient from the regression of firm returns on the changes in the exchange rate between the two currencies (for the currency exposure) and the coefficient from the regression of the firm returns on the return of the market (for the market exposure).

Because some of the information regarding the change in exchange rates between the two currencies is closely tied to the determinants of the domestic market returns, the problem of collinearity between the independent variables may arise when they are included together in the sensitivity model. Because of this potential collinearity problem, my two-factor sensitivity model is orthogonalized (Allayannis & Ofek, 1997) to capture the effect of the domestic market that is not captured in the exchange rate changes between the dollar and the euro. To accomplish this, the returns on the market are regressed against the exchange rate change as measured by the dollar value per euro. The residuals are collected from this regression and become the independent variable, representing the market, in the sensitivity regression along with the change in exchange rates. In order to measure the shift in sensitivity to these two factors as a result of the crisis, I use a dummy variable that represents the post-crisis period (Martin, Madura & Akhigbe, 1999; Akhigbe, Martin & Newman, 2008):

$$R_{it} = \alpha_0 + \beta_{1i} XR_t + \beta_{2i} XR_t D_t + \beta_{3i} R_{mt} + \beta_{4i} R_{mt} D_t + \varepsilon_{it} \qquad (1)$$

R_{it} = Return on firm i for day t
XR_t = Exchange rate measured as units of US$ per euro
R_{mt} = Error term from the orthogonalized regression of the market against XR

D_t = Binary variable equal to 1 for the post-crisis period (5/2/2010-11/2/2010) and 0 otherwise
β_{1i} & β_{3i} = Regression coefficients for sensitivity to XR and R_{mt}
β_{2i} & β_{4i} = Regression coefficients for the shift in sensitivity to XR and R_{mt}
ε_{it} = Error term

Once the first stage regression is run and the shifts in sensitivity are established, various firm-specific variables are used as explanatory variables in each regression that completes the second stage of the regression analysis with the coefficients from the sensitivity shifts as the dependent variables. Table 1 presents the list of the independent variables and their expected sign.

$$\beta_{2i} = \alpha_0 + \gamma_1 GWTH_i + \gamma_2 LEV_i + \gamma_3 LIQ_i + \gamma_4 OPSTR_i + \gamma_5 SIZE_i + \varepsilon_i \quad (2)$$
$$\beta_{4i} = \alpha_0 + \gamma_1 GWTH_i + \gamma_2 LEV_i + \gamma_3 LIQ_i + \gamma_4 OPSTR_i + \gamma_5 SIZE_i + \varepsilon_i \quad (3)$$

β_{2i} & β_{4i} = Regression coefficients for the shift in sensitivity to XR and R_{mt}
GWTH = Growth prospects of the firm
LEV = Firm leverage
LIQ = Firm liquidity
OPSTR = Operational strength of the firm
SIZE = Measure of firm size
$\gamma_{1\text{-}5}$ = Regression coefficients

Growth prospects of the firm are proxied by the ratio of market-to-book values. When a firm has greater opportunities for growth, they are inherently exposed to more risk because growth requires risk-taking. For this reason, I expect a positive relationship between the growth prospect variable and the increased exchange rate sensitivity of the firm. I measure firms' leverage as the ratio between total debt and total equity. Because long-term debt that is coming due in the next year is relegated to current liabilities on the balance sheet, my measure for total debt in the debt/equity ratio is a combination of long-term debt and debt that is included in current liabilities. Firms with a higher leverage ratio exhibit a higher level of financial risk and therefore, leverage should be positively related to the shift in currency exchange exposure.

Liquidity is measured as the firm's cash ratio because this represents the truest form of liquidity. When engaged in international business, the source of a firm's liquidity depends upon the relationship between the firm's domestic current assets and liabilities or the firm's international current assets and liabilities (in this case European current assets and liabilities). If the source is primarily from the European portion of the balance sheet, the relationship with the exchange rate sensitivity shift should be negative as the liquidity in the euro provides more ability to absorb the currency shock. If the firm's major source of liquidity is from the domestic portion of the balance sheet and the firm employs this liquidity for hedging purposes, higher liquidity should exhibit a negative relationship with the sensitivity shift. However, if the firm does not designate the domestic source of liquidity to hedging prospects, higher levels of

liquidity could have no (or even positive) relationship to the shift. For these reasons, liquidity could have a positive or negative relationship with the shift.

Operational strength of the firm is measured two ways: gross profit margin and return on assets (ROA). A higher profit margin should be associated with a smaller sensitivity shift due to the firm's degree of flexibility in prices that should provide a greater ability to absorb the exchange rate shock. The profitability measure of ROA should have a similar relationship. Size is measured as the logarithm of the market value of the firm. Aggarwal (2010) argues that larger firms have greater ability to compete and have higher levels of diversification and thus, should have a negative relationship to foreign exchange exposure. Bodnar and Wong (2003) found that larger firms had negative exposure to increases in the dollar while smaller firms had positive exposure. El-Masry and Abdel-Salam (2007) offer two competing theories on the relationship between size and foreign exchange exposure. First, larger firms are more exposed due to the prospect that they are expected to have higher levels of international activity. Conversely, larger firms should have the resources and knowledge to effectively hedge their international activity thus, lowering exposure.

Table 1: Independent variables for the cross-sectional regression with expected sign.

GWTH	Growth prospects of the firm are proxied by the ratio of market-to-book values	+
LEV	Leverage is proxied by the ratio between total debt and total equity	+
LIQ	Liquidity is measured as the firm's cash ratio	+/-
OPSTR	Operational strength of the firm is measured as the gross profit margin	-
SIZE	Size is measured as the logarithm of the market value of the firm	+/-
ROA	Return on Assets	-

RESULTS

Table 2 provides summary statistics for the two-stage regression. Panel A contains the statistics for the regression coefficients from the first stage while panel B contains the summary statistics for the independent variables in the two regressions of the second stage. As stated in the introduction, Chalamandaris and Tsekrekos (2010) found that the volatility, persistence, and significance of the factors that influence the correlation between two currencies have changed dramatically during the overall global crisis period. If the fundamentals of the correlation between the two currencies have changed, this could be a warning sign of changes in sensitivity of exposed firms to upcoming changes in exchange rates. Table 3 shows that the correlation between the dollar and the euro has indeed changed dramatically from the pre-crisis period to the post-crisis period.

Table 2: Summary Statistics This table shows the summary statistics for the independent variables for the two-stage regression. Panel A shows the statistics of the regression coefficients from Eq. 1. Panel B shows the statistics for the firm-specific variables in the cross-sectional regression from Eq. 2 and Eq. 3.						
Panel A	Exchange Rate β	Exchange Rate Shift β	Market β	Market Shift β		
Mean	-0.261	-0.629	1.209	0.203		
Median	-0.224	-0.580	1.149	0.154		
Std. Dev.	0.555	1.478	0.528	0.555		
Variance	0.308	2.185	0.528	0.555		
Range	4.392	11.39	0.586	1.173		
Min.	-2.8	-7.894	3.466	4.089		
Max.	1.588	3.495	-0.56	-1.228		
Sample Size	148	148	148	148		
Panel B	GWTH	LEV	LIQ	OPSTR	SIZE	ROA
Mean	1.761	2.141	0.714	-0.03	7.794	0.009
Median	1.483	0.524	0.551	0.04	7.752	0.029
Std. Dev.	0.919	7.948	0.696	0.586	1.75	0.133
Variance	0.844	63.18	0.485	0.344	3.064	0.018
Range	5.391	90.7	5.913	7.051	9.757	1.161
Min.	0.768	-23.35	0.032	-6.76	2.329	-0.89
Max.	6.16	67.35	5.946	0.287	12.09	0.267
Sample Size	148	148	148	148	148	148

Table 3: Correlation between the US$ and the € in the pre-crisis period and the post-crisis period.		
Pre-Crisis Correlation	**$**	**€**
$	1.0	
€	0.4772	1.0
Post-Crisis Correlation	**$**	**€**
$	1.0	
€	-0.2151	1.0

The first stage of the two-stage regression that measures firms' sensitivity to the dollar/euro exchange rate and the sensitivity to the orthogonalized market variable as well as the sensitivity shift to these two variables as a result of the Greek crisis is reported in table 4. The firms in the sample exhibit a negative exposure to the exchange rate as measured by the US dollar value per one unit of the euro. This measure exhibits a depreciation of the dollar as the exchange rate increases. This indicates that the returns of the firms in the sample are negatively affected by a depreciation of the dollar. As hypothesized, the sensitivity of the sample firms' returns to the dollar/euro exchange rate does indeed significantly change in the post-crisis period. In fact, the sensitivity is almost triple what it was originally (from -0.318 to -0.973). The sensitivity to the orthogonalized domestic market variable has also significantly increased consistent with the second hypothesis. However, although significant, this increase is not as dramatic as the currency sensitivity shift (from 1.257 to 1.445).

Table 4 Results of the OLS regression that assess firm return sensitivity to the dollar/euro exchange rate and the orthogonalized market variable as well as the shift in sensitivities post-crisis (Eq. 1). Firm daily returns are the dependent variable. D is a binary variable that equals 1 for the post-crisis period and 0 otherwise. All t-stats are in parentheses and are calculated using White's heteroscedasticity-consistent standard errors. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels respectively.	
Constant	0.002281 (15.81043)***
XR ($/β)	-0.318141 (-7.650377)***
XR*D	-0.654769 (-4.346731)***
MKT RET	1.256698 (74.58135)***
MKT RET*D	0.187987 (3.845811)***
Sample Size	148
R^2	0.275793

Results of the two regressions that comprise the second stage of the overall regression are reported in tables 5 and 6. Table 5 reports the results of the regression with the coefficient for the shift in exchange rate sensitivity as the dependent variable while table 6 reports the results with the coefficient for the shift in market sensitivity as the dependent variable. As can be seen, the only significant determinant in the market sensitivity shift is that of firm size. It is negative and significant at the 1% level indicating that smaller firms with exposure to the euro were better insulated from the shift in market sensitivity than larger firms. On the other hand, the results for the regression of the exchange rate sensitivity provide a much richer story behind its determinants. As expected, increased prospects for growth are positively and significantly related to the shift in exchange rate sensitivity. As firms are open to more and more growth opportunities, they are also open to more and more risks that are associated with future growth. The significantly positive coefficient for leverage would indicate that as the financial risk of the firm increases, so too does its susceptibility to shifts in exchange rate sensitivity in the face of crisis.

I provide an argument for the possibility of both a positive as well as a negative outcome for size and liquidity with respect to the currency sensitivity shift. The liquidity variable (cash ratio) is positive. This may indicate that, in the sample of firms presented here, most of this liquidity comes from the domestic current assets and liabilities on the firms' balance sheet and that this extra liquidity is not being devoted to hedging activities. Size also has a positive relationship with the sensitivity shift indicating that larger firms are associated with a shift in sensitivity that makes them more negatively exposed to the exchange rate. This is consistent with the argument by Bodnar and Wong (2003). This relationship between size and the shift is also consistent with one of the competing hypotheses (El-Masry &Abdel-Salam, 2007) that larger firms are more exposed due their increased likelihood of engaging in international activity.

The surprise comes from the result of operating efficiency. Under both measures (profit margin and ROA), the relationship with the sensitivity shift is positive and significant. This relationship should be negative due to the flexibility of profitable firms with regards to pricing. This flexibility should afford those firms with a greater ability to assimilate themselves to currency shocks.

Table 5
Results of the cross-sectional OLS regression (Eq. 2) with the coefficient for the shift in exchange rate sensitivity as the dependent variable and the firm-specific variables from table 1 as the independent variables. All t-stats are in parentheses and are calculated using White's heteroscedasticity-consistent standard errors. *, **, * indicate statistical significance at the 10%, 5%, and 1% levels respectively.**

	Reg. 1	Reg. 2
Constant	-3.725011	-3.504305
	(-5.667596)***	(-5.336018)***
GWTH	0.260346	0.211335
	(2.022141)**	(1.842382)*
LEV	0.017616	0.016688
	(1.788765)*	(1.744957)*
LIQ	0.358734	0.379894
	(2.261626)**	(2.454111)**
OPSTR	0.252674	
	(2.806098)***	
SIZE	0.301522	0.280091
	(4.378508)***	(4.012690)**
ROA		1.331931
		(0.0143)***
Sample Size	148	148
R^2	0.178187	0.181372

Table 6
Results of cross-sectional OLS regression (Eq. 3) with the coefficient for the shift in market sensitivity as the dependent variable and the firm-specific variables from table 1 as the independent variables. All t-stats are in parentheses and are calculated using White's heteroscedasticity-consistent standard errors. *, **, * indicate statistical significance at the 10%, 5%, and 1% levels respectively.**

	Reg. 1	Reg. 2
Constant	1.122884	1.170427
	(3.584328)***	(3.733859)***
GWTH	-0.063940	-0.048318
	(-1.074078)	(-0.869735)
LEV	-0.007789	-0.006947
	(-1.591253)	(-1.406246)
LIQ	-0.024477	-0.019968
	(-0.396498)	(-0.328700)
OPSTR	-0.063257	
	(-1.399837)	
SIZE	-0.099387	-0.109649
	(-3.007953)***	(-3.348749)***
ROA		0.174070
		(0.410739)
Sample Size	148	148
R^2	0.120141	0.117859

CONCLUSION

This study is an attempt to empirically explain the particular effect of the extraordinarily large sovereign debt troubles in Greece on the exchange rate sensitivity of US-based firms that have direct exposure to the euro through operations in euro zone countries. The sample of firms presented here experienced a very pronounced shift in their sensitivity to the euro as a result of the crisis in Greece. In fact, the measure of sensitivity to the euro of the firms in the sample more than tripled from the six-month period prior to the Greek crisis to the six-month post-crisis period. This sensitivity shift was more pronounced for firms that have higher growth prospects, higher leverage and liquidity ratios, and for larger firms that may have a relatively large amount of international operations. This has implications for the managers of these firms (or any firms that exhibit large amounts of exchange rate exposure) to institute (or increase) their practice of hedging these risks.

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STOCK PRICES AND INFLATION: EVIDENCE FROM JORDAN, SAUDI ARABIA, KUWAIT, AND MOROCCO

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ABSTRACT

This paper attempts to investigate monthly stock price indexes and good price indexes for selected Mashreq and Maghrep countries: Jordan, Saudi Arabia, Morocco, and Kuwait for 2000-2009 using cointegration methods. Our findings support the long-run relationship between stock prices and goods prices. The long-run Fisher elasticities of stock prices with respect to goods prices are in the range of 1.01 to 1.36 across the four countries under study. With the exception of Kuwait, the Fisher effect coefficient estimates are significantly greater than one. In the case of Jordan, Saudi Arabia, and Morocco the empirical results support the Fisher hypothesis, with estimated coefficients near unity.

Keywords: Stock Returns, and Inflation

JEL Classification codes: G12

INTRODUCTION

The relationships between stock returns and inflation rates or stock prices and goods prices have been the subject of numerous research papers during the last five decades. Mixed results were obtained ranging from no relationship, to negative and positive relationships. However, the short–term negative relationship and the Long-term positive relationship seem to be well established in the literature.

Theoretically, stocks are assumed to be inflation neutral for unexpected inflation which should have a negative effect on stock prices. The standard discounted cash flow model calculates stock prices as the present value of future expected cash flows. For stocks to be inflation neutral and represent a good long-term hedge against inflation, firms should pass on any increase in inflation rates on future cash flows. Investors on the other hand should discount the adjusted cash flows by inflation–adjusted rate of return or discount the real cash flows by the same real discount rate.

This argument is now known as the Fisher hypothesis (1930) or Fisher effect. Fisher argues that stocks are claims against real assets therefore they are neutral and uncorrelated with inflation rates. Stock returns are equal to the real rate of return plus an inflation premium. Since this is an equilibrium relationship, it is supposed to hold in the long -run. Hoguet (2009) reports that when

inflation rates were historically high or accelerating in the US, price/earnings ratios were declining, a phenomenon which puzzled researchers and practioners as well.

The literature offers three theories as possible explanations for this relationship . Fisher hypothesis is more applicable in the long –run as an equilibrium relationship. The behavioral hypothesis proposed by (Modigliani & Cohn, 1979) has been used to explain the short – run relationship, or what is known today as the *inflation illusion phenomena*. This hypothesis says that investors mistakenly price future real cash flows by discounting by the nominal rate of return. The proxy hypothesis proposed by Fama (1981) argues that because stock returns are positively related to future real economic growth, as inflation increases, real economic growth declines and become more volatile which pushes investors to require higher risk premiums to cover the additional risk. Stock prices therefore start declining accordingly. This hypothesis is also supported by Sharpe (1999).

The debate is still ongoing although standard investment and finance theory implies that stocks are good hedging instruments at least in the long run. It is however necessary to differentiate between the effect of anticipated inflation and unanticipated inflation. While stocks should be inflation neutral, it is reasonable to assume that their prices react negatively to inflation shocks. New investors require risk premium for any increase in unanticipated inflation, and this implies a decline in stock prices. However, one should admit that investors sometimes do not follow standard investment theory because of behavioral reasons and lack of sophisticated knowledge about finance fundamentals. In markets with more and more institutional investors, the behavioral hypothesis becomes less realistic on the grounds that institutional investors are expected to be sophisticated investors.

Stocks should be good hedging assets against inflation but they are also sensitive to future changes in inflation rates. Investors may have incentives to adjust their valuation of stock piecemeal. That is, every time they are faced with new inflation rate, they make the adjustment instantaneously as if they are dealing with a short-term security with short-term investment horizon.

In this paper, we contribute further evidence on the long-run Fisher effect for stocks by using stock prices and goods prices. Consistent with Engle and Granger (1987), this approach allows us to fully use long-run information contained in the levels of the variables, as opposed to focusing on partial long-run information contained in selected holding periods. Additionally, by using levels rather than first differences, we avoid using data over long historical periods, in which the accuracy and relevance of the data series can be compromised.

We examine monthly time series of stock price indexes and goods price indexes (consumer price indexes) for four Arab countries (Jordan, Saudi Arabia, Kuwait, and Morocco) from January 2000 to December 2009. While the use of cointegration analysis abounds in the empirical literature that previously examined the hypothesis, such as Mishkin (1992), Anari and Kolari (2001) and Shrestha, Chen and Lee (2002), we have found no studies that employed cointegration analysis in testing the hypothesis for these countries. In addition, we are applying a relatively new and powerful methodology, the generalized forecast error variance decomposition components and the generalized impulse response functions computed from estimated unrestricted vector autoregressive (UVAR) models.

Unlike the traditional forecast error variance decomposition and impulse response functions, these approaches do not require orthogonalization of shocks and is invariant to the ordering of the variables in the UVAR model, while the widely used Choleski factorization is known to be sensitive to the ordering of the variables. Finally, the UVAR is employed to avoid using arbitrary choice of the restrictions needed to settle the identification.

Our study provides evidence on the long-term Fisher effect on stocks in four Arab countries markets – Jordan, Saudi Arabia, Kuwait, and Morocco. While we perform the regression analysis with stock return and inflation rates, we use the levels of stock prices and corresponding changes in inflation in our cointegration tests. Evidence has shown that it is impossible to measure fully both contemporaneous and inter-temporal correlations between stock returns in real terms and inflation when variables are evaluated by their first differences (Gallagher, 1986).

As Hendry (1986) and Juselius (1991) observe, when a time series is differenced, long-run information contained in the levels of variables is lost. Consistent with the findings of Granger (1986), Engle and Granger (1987) and Anari and Kolari (2001), the use of levels allows us to fully evaluate long-term information that may be contained in continuous time series variables, as opposed to focusing on the segmented information variables whose values in their first differences are susceptible to different lengths of observation.

The findings of this study support the long-term Fisher effect between stock prices and corresponding changes in the price of goods as measured by the consumer price index; namely, stock prices appear to reflect a time-varying memory associated with inflation shocks that make stock portfolios a reasonably good hedge against inflation over the long run in four Arabic equity markets. This means that the stock markets are relatively efficient in impounding forthcoming inflation from the concurrent changes in stock prices, and investors can adjust their portfolios accordingly.

The organization of the paper is as follows. Section 2 presents the literature review. Section 3 describes the data. Section 4 introduces the VAR model. Section 5 reports evidence from the VAR model. Section 6 concludes.

LITERATURE REVIEW

Traditionally, it was believed that stocks provide a good hedge against inflation given that stocks represent claims on real assets so that stock returns are positively correlated with actual inflation. In recent years, empirical research showed that inflation affects stock returns negatively (Sharpe, 1999). In the United States , high expected inflation and accelerating inflation have been associated with decreasing price/earnings ratios .Stocks seem to be better hedges against inflation in the medium-term and long- term compared to the short-run.

However, Fisher (1930) contends that return on assets move one – for – one with anticipated inflation. That is, stocks should be inflation neutral but stock prices react negatively to high unexpected inflation. Fisher argues that real stock retunes are related to real factors and that stocks should maintain their purchasing power in the long-term. Fama and Schwert (1977) argue that anticipated inflation negatively affected stock returns during the period 1953-1971 and concluded that stocks are not good hedges against inflation. Cohn and Modigliani (1979) argue

that U.S investors undervalued stocks because they discounted (mistakenly) future real cash flows by using nominal rates of return. They use quarterly data over 1953-1977 on price /earnings ratios and inflation rates in their analysis.

Lansing (2004) confirms the behavioral anomaly of investors discounting future real cash flows by nominal rates of return .It is well established in the literature that rising inflation and future real economic growth are negatively correlated. During the 1970s, the U.S. experienced a decline in economic activity when inflation was rising (Hoguet 2009). This view is confirmed by Fama (1981). Fama argues that stock returns are positively related to expected real economic growth. Future real economic growth is, on the other hand, associated with low inflation rates. When future economic growth (in real terms) is expected to decline due to high inflation, investors required higher risk premiums on their stocks.

The negative short-term relationship between stock returns and anticipated and unanticipated inflation is reported by Geske and Roll (1983) and Jaffe and Mandelker (1976) an Wei (2009). Wei found that stock returns' negative reaction to unanticipated inflation is higher during economic contractions than expansions. On the other hand, the long – run positive relationship (Fisher effect) is reported by many authors. Jaffe and Mandelker reported positive relationship over a long period (1875 -1970). Boudoukh and Richardson (1993) confirmed the same result applying one-year and five- year holding period returns during 1802-1990 in both the United Kingdom and the United States.

Anari and Kolari (2001) used stock prices and goods prices instead of the first difference in order to overcome the problem that the first difference eliminates the long – run information. They use monthly stock price indices and goods price indices for Canada, France, Germany, the United kingdom and the United states during 1953- 1998. They employ the co-integration technique developed by Johansen (1988) for those goods prices and stock prices are co-integrated and non-stationary and confirm the long memory Fisher effect which says that stocks are good inflation hedges over a long holding period. However, they also report the negative initial effect in all six countries.

Luintel and Paudyal (2006) support previous results and report the existence of the long – run hedging relationship in the UK stock market. Although the short-run negative effect (the inflation illusion as named by Modigliani and Chon (1979)) and the long – run hedging Fisher effect are well established in empirical research, Ely and Robinson (1997) found no long – run relationship. They apply the Johansen's (1988) method on sixteen countries during 1957-1992.

Aga and Kocaman (2006) tested the impact of price/earnings ratios, industrial price indices (IPI) and the consumer price indices (CPI) on returns of stocks traded in Istanbul stock Exchange. They claim that macroeconomic variables such as inflation rates should have two possible effects.

The direct effect hypothesis implies that stock markets normally react negatively to bad news and positively to good news. The policy signaling hypothesis implies that it is possible for the market to react positively to adverse movements in macroeconomic variables due to anticipated government remedial actions.

Their findings indicate that only the price/earnings ratio appears to be significant in explaining the movements in stock returns, while industrial price indices and consumer price

indices are not. Exponential GARCH model was applied to test the impact of CPI and IPI on stock return and volatility. They also found that there variables are not statistically significant in explaining stock returns and volatility.

AN OVERVIEW OF THE DATA

This study covers four Arab equity markets: Jordan, Saudi Arabia, Kuwait, and Morocco. Monthly consumer price index (CPI) and monthly stock prices are used. Stock price indices from their respective homepages, consumer price indices for all countries are from Monthly Financial Statistics (International Monetary Fund). The sample period begins in January 2000 and ends in December 2009. All variables are transformed into natural logarithms. Using data from different countries enables comparative analysis to check the robustness of the results. In this regard, there is some concern about the power of tests to detect cointegration for different sample sizes. Based on the literature on this subject (e.g., see Hakkio and Rush (1991) and Junttila (2001)), we infer that our sample sizes are sufficiently large to provide reliable cointegration tests. Hakkio and Rush (1991) say that "co-integration is a long run concept and hence requires long span of data to give tests for co-integration much power rather than merely large numbers of observations". Also, testing several models for multiple countries allows the consistency of the estimated test statistics to be observed.

METHODOLOGY

Unit Root Tests

The first step in our statistical analysis is to analyze the stationary properties of the macro time series considered in this study by applying the unit root. Applying the unit root test will do this. Unit root tests are important in examining the stationary of a time series, which is a matter of concern in three important areas. First, a crucial question in the ARIMA modeling of a single time series is the number of times the series needs to be first differenced before an ARMA model is fit. Each unit root requires a first differencing operation. Second, stationary of regressors is assumed in the derivation of standard inference procedures for regression models. Nonstationary regressors invalidate many standard results and require special treatment. Third, in cointegration analysis, an important question is whether the disturbance term in the cointegrating vector has a unit root.

The Augmented Dickey-Fuller Test (ADF) is applied in this paper. The ADF test consists of running a regression of the first difference of the series against the series lagged once, lagged difference terms, and optionally, a constant and a time trend. With two lagged difference terms.

There are three choices in running the ADF test regression: to include a constant term in the regression, to include a linear time trend, or to determine how many lagged differences are to be included in the regression.

In each case the test for a unit root is a test on the coefficient of the regression. If the coefficient is significantly different from zero then the hypothesis that y contains a unit root is rejected and the hypothesis is accepted that y is stationary rather than integrated.

The output of the ADF test consists of the t-statistic on the coefficient of the lagged test variable and critical values for the test of a zero coefficient. A large negative t-statistic rejects the hypothesis of a unit root and suggests that the series is stationary. Under the null hypothesis of a unit root, the reported t-statistic does not have the standard t-distribution. We must refer to the critical values presented in the test output. The reported critical values are chosen on the basis of the number of observations and the estimation option.

After running the ADF test, If the Dickey-Fuller t-statistic is smaller (in absolute value) than the reported critical values, we cannot reject the hypothesis of nonstationarity and the existence of a unit root. We would conclude that our series might not be stationary. We may then wish to test whether the series is I (1) (integrated of order one) or integrated of a higher order. A series is I (1) if its first difference does not contain a unit root.

The VAR Model

This study adopts an unrestricted vector autoregression (UVAR) framework to analyze the dynamic relationship between the variables. The UVAR does not impose arbitrary restrictions of the effects of the endogenous variables. It was common in earlier VAR-type analyses to rely on a Choleski factorization. Unfortunately, the Choleski factorization is known to be sensitive to the ordering of variables when the residual covariance matrix is non-diagonal. This paper employs generalized forecast error variance decomposition developed in Koop, Pesaran and Lee (1996) and Pesaran and Shin (1998) to deal with this problem. Unlike the orthogonalized forecast error variance decomposition, the generalized approach is invariant to the ordering of the variables in the UVAR model. The generalized forecast error variance decomposition from the UVAR model is computed in order to investigate interrelationships within the system. The empirical work undertaken in this study is based on estimating the UVAR on eight definitions of money.

The UVAR approach, introduced by Sims (1980), suggests a standard tool to analyze time series relationships among macroeconomic variables. A VAR is a system in which every equation has the same right hand variables, and those variables include lagged values of all of the endogenous variables. VARs are well suited to forecasting variables where each variable helps forecast other variables.

The mathematical form of a UVAR is

$$\Delta y_t = \beta_1 y_{t-1} + \beta_2 \Delta y_{t-1} + \beta_3 \Delta y_{t-2} + \beta_4 + \beta_5 t \qquad (1)$$

Here y_t is a vector of endogenous variables; m is a vector of constant, N is the vector autoregressive order, A_i are matrices of lag coefficients of y_t up to some lag length N, and ε_t is a vector of innovations. The components of vector are each white noise process with zero mean, constant variance, and are individually serially uncorrelated. However, the components of vector could be contemporaneously correlated.

UVARs have proven successful for forecasting systems of interrelated time series variables. Vector autoregression is also frequently used, although with considerable controversy, for analyzing the dynamic impact of different types of random disturbances on systems of variables. However, the estimated coefficients of UVARs themselves are difficult to interpret. We will look at the generalized forecast error variance decomposition and the generalized impulse response functions of the system to draw conclusions about a UVAR.

The Generalized Forecast Error Variance Decomposition

Innovation accounting analysis refers to two tools used to trace the impact of shocks (innovations) in the VAR system. These tools were introduced by Sims (1980) to measure the dynamic interaction among the variables. The first, the forecast error variance decomposition (FEVD), analyzes the errors the model would tend to make if it is used to forecast its variables. The FEVD shows how much of the average squared forecast error, which the model tends to make, is caused by innovations associated with each of the variables in the model. The FEVD of a variable, thus, can suggest that forces associated with one variable are major influences on the evolution of another variable.

The GFEVD shows how much of the average squared forecast error, which the model tends to make, is caused by innovations associated with each of the variables in the model. The GFEVD of a variable thus can suggest that forces associated with one variable are major influences on the evolution of another variable. In other words, the GFEVD of a VAR provides information about the relative importance of the random innovations. It was common in earlier VAR-type analyses to rely on a Choleski factorization. Unfortunately, the innovation accounting results, based on the Choleski factorization, are sensitive to the ordering of variables in the VAR model. In this paper, we apply generalized forecast error variance decomposition developed by Koop, Pesaran and Lee (1996) and Pesaran and Shin (1998) to deal with this problem. Unlike the orthogonalized method, the generalized approach is invariant to the ordering of the variables and does not impose the constraint that the underlying shocks to the VAR are orthogonalized before decompositions are computed. The generalized approach explicitly takes into account the contemporaneous correlation of the variables in the VAR model. The approach provides meaningful results at all the horizons including initial impact.

We calculate a separate variance decomposition for each endogenous variable. The first column is the forecast error of the variable for different forecast horizons. The source of this forecast error is variation in the current and future values of the innovations. The remaining columns give the percentage of the variance due to specific innovations. One period ahead, all of the variation in a variable comes from its own innovation, so the first number is always 100 percent.

Generalized Impulse Response Function

The other tool, the impulse response function, shows how one variable responds over time to a single innovation in itself or in another variable. Specifically, it traces the effect on current

and future values of the endogenous variable of a one standard deviation shock to one of the innovations. Innovations or surprise movements are jointly summarized by the error terms of the UVAR model.

VAR Specification Issues

The following issues are related to specifying VAR models. Alternative specifications differ with respect to ordering of variables, method of "trend" removal, lag length on the VAR equations, and level of temporal aggregation. These issues must necessarily be addressed beyond the choice of variables to be included.

Lag Length

The empirical evidence from a VAR model is very sensitive to the choice of lag length in the equations of the model. Alternative choices will give different innovations series and, thus, will likely make a difference in the variance decomposition results. The appropriate lag length could be tested using the likelihood ratio test, the Akaike Information Criterion, or the Schwarz Criterion. In this study, the lag length will be specified based on these criteria and the results obtained in each case will be compared. Changing the lag length will also test the robustness of the empirical results.

EMPIRICAL RESULTS

We first test whether the 8 time series are nonstationary. To determine the stationary properties of the series, we use the ADF unit root test and Phillips-Perron (Phillips and Perron, 1990, PP) tests. Table 1 shows that the stock prices (SP) and consumer goods prices (CP) are generally nonstationary in the level. Therefore, the cointegration test will be applied to examine the long-run relationship between stock prices and goods prices. Table 2 represents the result for the first difference of the variables. The results show that the first differences of the series are stationary. In addition, these findings indicate that all variables employed in regressions are stationary and therefore would not cause spurious regression outcomes.

Our next task is to check whether the series are cointegrated. Specifically, having established the presence of a unit root in the first-difference of each variable, we need to test whether the series in each country has different unit roots (non-cointegrated), or shares the same unit root (cointegrated). Cointegrated variables, if disturbed, will not drift apart from each other and thus possess a long-run equilibrium relationship. The existence of cointegration would imply that the two series would not drift too far apart. A non-stationary variable, by definition, tends to wander extensively over time, but a pair of non-stationary variables may have the property that a particular linear combination would keep them together, that is, they do not drift too far apart. Under this scenario, the two variables are said to be cointegrated, or possess a long-run stable relationship.

Table 1: Unit Root Tests						
Country	SPa	SPb	SPc	CPa	CPb	CPc
Jordan						
ADF	-1.584	-1.598	-0.304	0.861	-1.960	3.275
PP	-1.437	-1.367	-0.206	0.557	-1.896	2.710
Saudi						
ADF	-1.343	-1.001	-0.357	1.547	-0.275	1.962
PP	-1.566	-1.392	-0.553	3.487	-1.636	2.736
Morocco						
ADF	-0.285	-1.603	0.991	-.0631	-2.555	3.102
PP	-0.571	-1.846	0.556	0.0949	-3.165	5.216
Kuwait						
ADF	-1.495	-1.445	-0.329	0.667	-1.274	1.931
PP	-1.401	-1.117	-0.252	3.832	-0.309	4.803
Note: *SP* and *CP* denote stock price and consumer price. The ADF and PP are the Augmented Dickey Fuller and Phillips-Perron unit root test with intercept (a), with trend and Intercept (b), and with neither trend nor intercept (c), respectively.						

Table 2: Unit Root Tests						
Country	SPa	SPb	SPc	CPa	CPb	CPc
Jordan						
ADF	-5.207	-5.254	-5.202	-8.710	-8.821	-8.180
PP	-1.437	-1.367	-0.206	0.557	-1.896	2.710
Saudi						
ADF	-9.045	-9.062	-9.071	-2.819	-3.897	-1.246
PP	-1.566	-1.392	-0.553	3.487	-1.636	2.736
Morocco						
ADF	-5.514	-5.499	-5.442	-9.176	-9.146	-8.376
PP	-0.571	-1.846	0.556	0.0949	-3.165	5.216
Kuwait						
ADF	-6.179	-6.233	-6.171	-2.441	-4.701	-1.576
PP	-1.401	-1.117	-0.252	3.832	-0.309	4.803
Note: *SP* and *CP* denote stock price and consumer price. The ADF and PP are the Augmented Dickey Fuller and Phillips-Perron unit root test with intercept (a), with trend and Intercept (b), and with neither trend nor intercept (c), respectively.						

We test the cointegration hypothesis with the methodology suggested by Johansen (1988) and Johansen and Juselius (1990). Because Johansen tests are performed within a VAR framework, and the results from VARs are sensitive to the lag length (Hafer and Sheehan (1991)), attention should be paid to lag length. Because the data are monthly, and based on lag-selection tests using the Sims (1980) criterion, we introduced twelve monthly lags in the Johansen system. Applying the MLE approach, we show in Table 3 results from Johansen's trace

test to determine whether a long-term relation exists between each pair of stock prices and goods prices (CPI).

A brief description of the test is in order. Let

$$\Delta x_t = \sum_{i=1}^{p-1} \Gamma_i \Delta x_{t-1} + \pi x_{t-1} + \varepsilon_t \qquad (2)$$

where x_t and ε_t are (n by 1) vectors and π is an (n by n) matrix of parameters. The Johansen (1988) methodology requires estimating the system of equations in (2) and examining the rank of matrix π. If rank (π)= 0, then there is no stationary linear combination of the $\{x_{it}\}$ process, the variables are not co-integrated. Since the rank of a matrix is the number of non-zero eigenvalues (λ), the number of λ >0 represents the number of co-integrating vectors among the variables. The test for the non-zero eigenvalues is normally conducted using the following two test statistics:

$$\lambda_{trace}\ (r) = -T \sum_{i=r+1}^{n} \ln(1-\hat{\lambda}_i) \qquad (3)$$

$$\lambda_{\max}\ (r, r+1) = -T \ln (1-\hat{\lambda}_{r+1}) \qquad (4)$$

where $\hat{\lambda}_i$ is the estimated eigenvalues, and T is the number of valid observations. Note that λ_{trace} statistic is simply the sum of $\lambda_{\max}$ statistic. In equation (3), λ_{trace} tests the null hypothesis that the number of distinct co-integrating vectors is less than or equal to r against a general alternative. $\lambda_{\max}$ statistic tests the null hypothesis of r co-integrating vectors against r+1 co-integrating vectors. Johansen and Juselius (1990) and Osterwald-Lenum (1992) derive the critical values of λ_{trace} and $\lambda_{\max}$ by simulation method.

Our cointegration tests parallel those made by Anari and Kolari (2001) for their study on European, U.S., and Japanese markets. In testing the long-run relation between each pair of stock prices and goods prices, the null hypothesis states that there is no co-integration relation.

The results of the Johansen trace test are provided in Table 3. These results suggest that one co-integrating vector (or a long-run relation) between goods prices measured by the consumer price index (CPI) and the stock price index exists in each country under study. We conclude from the similarity in results across several countries in this study that it takes stock prices a long time to return to their long run relation when there is unexpected movement in goods prices, and that the co-integrating tests are robust. This is similar to the case with European, U.S., and Japanese markets as reported by Anari and Kolari (2001) and Khil and Lee (2000).

Table 3: Cointegration Tests Based on the Johansen's Trace Test Likelihood Ratio					
Hypnotized No. of Cointegration Vectors	Jordan	Saudi	Morocco	Kuwait	5% critical Value
None	11.267	10.689	23.213	41.909	19.96
At most one	2.362	2.108	3.674	2.296	9.24
Note: The tests show that there is one cointegrating relation between stock price index and CPI in each country.					

Vector Error Correction Model (VEC)

Cointegration exits when a group of nonstationary variables has a linear combination of them that is stationary. Cointegration means that although many developments can cause permanent changes in the individual elements of the group, there is some long-run equilibrium relation tying the individual components together. If the group is cointegrated, then it is not correct to fit a VAR to the differenced data [Hamilton (1994)]. As argued by Engle and Granger (1987), the VAR estimated with cointegrated data (without including the cointegration term) will be misspecified. However, another representation of VAR, the Vector Error Correction model (VEC), can be used. It is a VAR model for data in difference from augmented by the error correction term. In a VEC model the short-run dynamics of the variables in the group are influenced by the deviation from an equilibrium relationship.

As the VEC specification only applies to a cointegrated series, we should run the Johansen cointegration test prior to VEC specification. This test is needed to confirm that the variables are cointegrated and to determine the number of cointegrating equations. Estimation of a VEC model proceeds by first determining one or more cointegrating equations using the Johansen procedure. The first difference of each endogenous variable is then regressed on a one period lag of the cointegrating equation(s) and lagged first differences of all the endogenous variables in the system.

The Johansen efficient maximum likelihood test is used to examine the existence of a long-term relationship between stock prices (SP) and consumer goods prices (CP). It is applied using alternative lag lengths in the VAR. Consider a VAR model of order k:

$$X_t = C + A_1 X_{t-1} + ... + AzX_{t-k} + v_t \qquad (5)$$

where C is a 2 x 1 vector of constants, A_k are 2 x 2 matrices of coefficients to be estimated, and vector vt, represents the unexpected movements in SP and CP.

It should be noted the VAR model provides information about the short-run relation between stock prices and inflation. For the estimation of the long run relation between the two variables, we follow Anari and Kolari (2001) and compare our findings with those reported by Khil and Lee (2000) on Pacific-Basin markets in the short run. Anari and Kolari use the vector error-correction (VEC) model by Johansen (1991). Equation (5) can be written as:

$$\Delta x_t = \delta + \Gamma_1 \Delta x_{t-1} + \Gamma_2 \Delta x_{t-2} + \ldots + \Gamma_{t-k} \Delta x_{t-k+1} + \Pi x_{t-k} + v_t \qquad (6)$$

where Γ_i and Π are 2x2 matrixes, and k is the lag order. The rank of matrix gives the number of cointegrating vectors, which are long run relations between SP and CP. Anari and Kolari show that the term Πx_{t-k} represents the long-term relation between SP and CP, and a long run relation between SP and CP can be evaluated by:

$$\Delta S_t = \sum_{k=1}^{n-1} a_k \Delta S_{t-k} + \sum_{k=1}^{n-1} b_k \Delta C_{t-k} + e(S_{t-1} - c - d\mathrm{P}_{t-1}) \qquad (7)$$

where the summation term represents the short run relation between stock prices and goods prices, and the error correction term e represents the speed of adjustment of stock prices to unexpected changes in inflation. The term, which is the vector of deviations from the long run relation between stock prices and goods prices, can be normalized and its long run equation can be expressed as:

$$S_t = c + dP_t \qquad (8)$$

If the variables are in log terms, the coefficient (d) in this equation is the elasticity of stock prices with respect to goods prices, otherwise known as the Fisher coefficient (Anari and Kolari, 2001).

Using equation (8), the MLE estimates on long run relations between stock prices and the CPI for the sample period are shown in Table 4. It should be noted that the estimated Fisher coefficients (d) are in the range of 1.01 to 1.36. These coefficients are distributed as follows: Jordan = 1.01, Saudi Arabia = 1.20, Morocco = 1.04, and Kuwait = 1.36. In all countries, the long-run Fisher effect is supported because of the positive signs for the estimated (d) coefficient of CPI in equation (8). Since all variables are expressed as logarithms, the CPI's coefficient (d) in each equation shows the elasticity of the changes in stock prices with respect to corresponding changes in inflation. For instance, when the estimated coefficient (d) is 1.01 in Jordan, this means that for every increase of 1% in CPI, the stock index is expected to increase by 1.01% over the sample period. We apply t-tests to examine whether the estimated Fisher coefficient is less than, equal to or greater than unity. The results in Table 4 show that estimates for Jordan, Morocco, and Saudi Arabia are greater than unity, whereas those for Kuwait are less than or equal to unity at a 5% level significance.

In Table 4, the estimates of the speed of adjustment coefficients (e) lie between 0.01 and 0.03, which means that it takes a long time for stock prices to return to their long-run relation following an unexpected movement in goods prices.

Table 4: Long-Run Relations Between Stock Prices and Inflation Based on the Full Information Maximum Likelihood Estimator (MLE)

$$SP_t = c + dCP_t$$

Country	c	d	e
Jordan	-0.16	1.01* (6.55)	-0.01 (4.88)
Saudi	2.34	1.2* (11.23)	-0.04 (3.65)
Morocco	2.45	1.04* (1.02)	-0.03 (5.28)
Kuwait	2.16	1.36 (6.23)	-0.02 (3.4)

Note: * means fail to accept the null hypothesis (at %5) that the Fisher coefficient (*d*) is less than or equal to one and instead accept the alternative hypothesis that it is more than one. *t*-values are in parentheses.
The term *e* is the speed of adjustment whichis the rate of convergence to the long-run equilibrium.

CONCLUSIONS

This paper attempts to examine monthly stock price indexes and goods price indexes for four Arab countries: Jordan, Saudi Arabia, Morocco, and Kuwait for 2000-2009 using cointegration methods. The results of the cointegration test support the long-run relationship between stock prices and goods prices. The long-run Fisher elasticities of stock prices with respect to goods prices are in the range of 1.01 to 1.36 across the four countries under study. With the exception of Kuwait the Fisher effect coefficient estimates are significantly greater than one. In the case of Jordan, Saudi Arabia, and Morocco the empirical results support the Fisher hypothesis, with estimated coefficients near unity. The results also reveal that stock prices in the those four Arab markets have a long memory with respect to inflation shocks that make stocks a reasonably good inflation hedge over a long holding period. In this respect, our findings are similar to the evidence already reported by Anari and Kolari (2001) on American, European and Japanese stock markets.

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AN EMPIRICAL TEST OF PURCHASING POWER PARITY: DOES IT HOLD BETWEEN U.S.A. AND EMERGING ASIAN COUNTRIES

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ABSTRACT

The empirical test shows that Purchasing Power Parity (PPP) does not hold between U.S.A. and emerging Asian countries. Therefore, PPP cannot be used to forecast real exchange rates between U.S.A. and emerging Asian countries.

INTRODUCTION

There are two established theories of exchange rate determination. One is interest rate parity and the other is purchasing power parity (PPP). This paper deals with an empirical test of purchasing power parity. Purchasing power parity states that exchange rates of two currencies will adjust based upon the movement of the consumer price index of the two respective countries. This paper does an empirical test of purchasing power parity between the U.S.A. and some emerging Asian economies which includes India, Korea, Malaysia, Pakistan, Thailand, the Philippines and Singapore. The CPI for each country for the year 2000 was equal to 100 and the CPI for 2007 was chosen to determine if purchasing power parity holds or not. Usually a base year is chosen where the CPI=100 and a future year is chosen and the actual CPI for that year is used to forecast the exchange rate. If the forecasted exchange rate is equal to the actual exchange rate, then we will conclude that purchasing power parity holds between the two countries.

PURPOSE AND METHODOLOGY

There is an abundance of research on purchasing power parity, but very few deal with an empirical test. This study does an empirical test of PPP between the U.S.A. and emerging Asian economies. The countries included are India, Korea, Malaysia, Pakistan, Thailand, the Philippines and Singapore.

HYPOTHESES

H1 *Null hypothesis: PPP holds between the U.S.A. and emerging Asian economies.*

H2 *Alternative hypothesis: PPP does not hold between the U.S.A. and emerging Asian economies. The CPI for 2000 = 100 and the CPI for 2007 was chosen to forecast the exchange rate based on PPP.*

Table 1		
	2000 CPI	2007 CPI
India	100	136.8
Korea	100	123.5
Malaysia	100	136.3
Pakistan	100	158.7
Thailand	100	119.7
Philippines	100	142.0
Singapore	100	106.5
U.S.A.	100	120.4

Table 2		
	Actual Exchange Rate	Forecasted Exchange Rate Based on PPP
India	43.349	46.09
Korea	112.9	134.33
Malaysia	3.4376	4.30
Pakistan	60.739	70.71
Thailand	34.518	39.88

The difference of actual exchange rate and the projected exchange rate were taken and a t-test was done to test the hypothesis.

LITERATURE REVIEW

It is determined that non-stationary real exchange rate in the long run between nominal exchange rate and domestic and foreign prices is almost non-existent, and therefore it is concluded that the theory of Purchasing Power Parity is invalid (Su & Chang, 2011). Therefore, it is concluded that exchange rate cannot be predicted using PPP. PPP states that if the price of a basket of goods is the same in two countries then the exchange rate must be at equilibrium. Given any international goods market arbitrage is traded away, then we must expect exchange rate to be at equilibrium. Given any international goods market arbitrage is traded away, then we must expect exchange rate to be at equilibrium. It is true that empirical evidence on the stationarity of real exchange rates is present, but it remains inconclusive.

Numerous studies have found support for a unit root in real exchange rates but critics contended that such a conclusion is probably attributed to the lower power of the conventional unit root test employed. This is because a growing consensus that conventional unit root tests fail to incorporate structural breaks in the model (Lin & Chang, 2010). Lin and Chang employed a stationarity test with a fourier function which has been recently introduced by Beeker (Beeker, et al, 2006). In their study the empirical results of nine post communist economies in Europe, Lin and Chang concluded that PPP does not hold in those nine post-communist transition economies.

There is an abundance of empirical evidence on the stationarity of the real exchange rates; however, there are none conclusive. The reason for that may be explained as because most of the prior studies implicitly assumed that exchange rate behavior is inherently linear in nature. Taylor and Peel (Taylor & Peel, 2000) have proven that the adoption of linear stationarity test is inappropriate for the detection of mean reversion given that the true process of the data generation of the exchange rate is in fact a stationary non-linear process (Taylor & Peel, 2000).

Lee and Zhu used monthly data covering from 1997 to 2009 in order to apply stationary test with a fourier function which has been proposed by Enders and Lee (Enders & Lee, 2004, 2009) which tests the validity of PPP, covering seven major OPEC countries. Lee and Zhu applied nonlinear threshold unit root test in order to assess non-stationary properties of the real exchange rates for seven major OPEC countries. The test has higher power than linear method if the true DGP of exchange rate is really in fact a stationary nonlinear process. The major implication of the study is the validity of PPP from the nonlinear point of view and concluded in the long run PPP exchange rate adjustment is mean reverting towards PPP equilibrium values in a nonlinear way (Liu & Zhu, 2011).

In the recent past many studies have focused on testing the validity of long run PPP. These studies have unveiled important policy implications in international finance. Long run PPP is an indication of a long run relationship between the nominal exchange rate and the domestic and foreign prices of a certain economy. When PPP holds, it can be used to determine the equilibrium exchange rate. Therefore monetary approach requires that PPP must hold. Although many empirical tests have taken place, none of the results are conclusive. The empirical test undertaken by Lu and Pan employed the monthly bilateral nominal exchange rate relative to the U.S. dollar and CPI based on 2000=100 among G-7 countries over the period January 1980 to January 2009.

The study applied the non-parametric rank test of countegration as proposed by Breitung (Breitung, 2001) in order to test the validity of long run PPP for G-7 countries. They concluded that PPP holds true for all G-7 countries. They also concluded that the nominal exchange rate and the domestic and U.S. CPIs are nonlinearly inter-related with the exception of France and Germany (Lee & Pan, 2011).

The majority of the empirical tests of PPP generally conclude that real exchange rates tend to converge towards the levels predicted by PPP over the long run (Taylor & Taylor, 2004.) The Panel based unit coot test that maintains the null of the unit root in all Panel members is not capable of detecting precisely the stationarity of individual real exchange rates. In an article by Baharunshah and Beko, they tackle this issue by using Panel seemingly unrelated regressions Augmented Dicky-Fuller (SURADF) approach (Baharunshah & Beko, 2011). This is the first study that uses SURADF to study the PPP for the real exchange rates of twelve Central and Eastern European economies with respect to the U.S. dollar and the Euro.

The results reported from the SURADF estimates show that the PPP proposition holds for half of the countries in this analyzed panel with respect to the U.S. dollar and the Euro. They conclude that the concept of PPP is corroborated for some but not for all Central and Eastern European economies. Secondly, the judgment on the validity of parity conditions for individual countries is contingent upon the choice of the numeraire currency (Baharunshah & Beko, 2011).

Several studies have provided empirical evidence on the nonlinear adjustment of exchange rate. This is because of the presence of transaction costs that inhabit international goods arbitrage and also official intervention in the foreign exchange market which may lead to nominal exchange rate movements are asymmetric (Taylor & Peel, 2000; Taylor, 2004). Killian and Taylor (Killian & Taylor, 2003) suggest that nonlinearity may also arise from heterogenecity of opinion in the foreign exchange market pertaining to the equilibrium level of the nominal exchange rate when the nominal exchange rate takes on more extreme values, a degree of consensus develops regarding the appropriate direction of exchange rate moves, and as such trades act accordingly.

Chang, Chang and Su in their empirical study determine whether PPP holds for Germany's real exchange rate relative to a sample of its major trading partner countries and find that the adjustment process towards its equilibrium is nonlinear in a symmetric or asymmetric way, using a simple and powerful nonlinear unit root test. Their study applies a simple and powerful nonlinear unit root test proposed by Sollis in order to test the validity of long run PPP for Germany's real exchange rate vis a vis its five trading partner countries. They conclude that PPP holds for Germany relative to its major trading partners with the exception of Canada and that the adjustment towards PPP is nonlinear and asymmetric (Chang, Chang & Su, 2011).

Chang in his study indicates that a non-stationary real exchange rate is an indication that any long run relationship between the nominal exchange rate and domestic and foreign prices is almost non-existent, suggesting that PPP is not valid. Therefore PPP cannot be used to determine the equilibrium exchange rate. The invalidation of the PPP nullifies its use for monetary approach to determining the exchange rate (Chang, 2011). This study concludes that AESTAR unit root test proposed by Sollis to examine both linearity and stationarity of China's real exchange rate vis a vis her nine trading partner countries over the period January 1980 to October 2009. First, the empirical results uncover that China's real exchange is a nonlinear process. Secondly a unit root in real exchange rate was not found for most of China's trading partner countries (Chang, 2011).

PPP states that exchange rate between currencies are in equilibrium when their purchasing power is the same in each of the two countries. This implies that exchange rate between any two countries should equal the ratio of two currencies price level of a fixed basket of goods and services. A nonstationary real exchange rate indicates that there is no long run relationship between nominal exchange rate and domestic and foreign prices, thereby making PPP invalid. Therefore, PPP cannot be used to determine the equilibrium exchange rate. Lu and Lee applied the ADL test for threshold cointegration to test the validity of long run PPP for a sample of transition countries over January 1995 to December 2008. The empirical results indicate that PPP only holds true for five of the countries undertaken in this study (Lu & Lee, 2011).

Su and Lee in an article indicate that there is a consensus that real exchange rate exhibits nonlinearities and therefore conventional unit root test, such as Augmented Dickey-Fuller (ADF) test, have low power in identifying mean reversion of exchange rate. There is an abundance of empirical evidence on the nonlinear adjustment of exchange rate. This does not imply nonlinear mean reversion. To analyze time series data the exponential smooth transition autoregressive

(ESTAR) time series model has proven to be popular. Lu and Lee applied the nonlinear KSS test with a fourier function (capturing the smooth breaks) to test the validity of long run PPP for the G-7 countries over June 1994 to April 2010. They found that PPP holds for all the G-7 countries. This implies that PPP can be used to determine the equilibrium exchange rate for all the G-7 countries (Lu & Lee, 2011).

Little consensus exists on the validity of PPP in the literature because the results are contingent upon several factors, such as the econometric methodologies used, the assumption on the market structure, the length of data span, numeraire currencies and the coverage of fixed exchange rate periods. For example, Augmented Dickey-Fuller (ADF) unit root test rejects the PPP hypothesis, whereas the Panel unit root test supports the PPP hypothesis (Choi & Kim, 2011).

Choi and Kim conclude that PPP has a special meaning to Southeast Asian countries because the validity of PPP can be employed as a very useful tool to select the optimal common currency for the currency union among Southeast Asian countries. The validity of the PPP of Southeast Asian currencies in terms of U.S. dollar and Japanese yen gave mixed results (Choi & Kim, 2011).

In a market based economic management, the market forces are allowed to prevail based on the principle that most economic variables are self adjusting and outcomes are not influenced by government economic intervention. Most nations have adopted a freely floating exchange rate system that relies upon market mechanism to adjust the value of the currencies. Pinfold and Rose in their study established how freely floating currencies adjust to long term deviations from the values which are predicted by PPP. The deviations and corrections for the 28 possible currency pairings of eight currencies have been analyzed using OLS degressions of monthly data. The results of their study show that PPP has a significant influence in determining exchange rates (Pinfold & Rose, 2010).

Chang and Lee in their study indicate that nonstationary real exchange rate signals that there is no long run relationship between nominal exchange rate and domestic and foreign prices, thereby nullifying the PPP. Therefore, PPP cannot be used to determine the equilibrium exchange rate. Therefore PPP is invalid to be used for monetary approach to determine exchange rate. Empirical evidence of stationarity of real exchange rate are present, but inconclusive.

The empirical results applies the TAR unit root test proposed by Caner and Hansen to test the validity of long-run PPP for mainland China and Taiwan over the period of January 1986 to October 2009. The empirical results indicate that PPP holds true for the two areas studied, and the adjustment toward PPP is nonlinear (Chang & Lee, 2011).

Chang and Su in their empirical study of the Middle Eastern countries using monthly data over January 1980 to August 2008 period using the AESTAR unit root test found that PPP holds true for most of the Middle Eastern countries and that the adjustment towards PPP is nonlinear and in an asymmetric way. This implies that PPP can be used to determine the equilibrium exchange rate for most of the seven Middle Eastern countries under study except Bahrain (Chang & Su, 2011).

There is a growing consensus that real exchange rate exhibits nonlinearities and therefore conventional unit root test such as the ADF test have low power in detecting the mean reversion of exchange rate. Although a number of empirical studies found evidence of nonlinear adjustment of exchange rate this does not necessarily imply mean reversion.

Chang and Liu in their study applied a simple and powerful nonlinear TAR unit root test to test the validity of long-run PPP in a sample of nine East Asian countries over the period January 1986 to October 2009. The results show that PPP holds true for more than half of the East Asian countries studied. They also conclude that adjustment towards PPP is nonlinear (Chang & Liu, 2011).

In a study Doganter (Doganter, et al, 2009) applied cointegration techniques to test the validity of PPP for ten emerging market economies and found that nominal exchange rate and price series are cointegrated only in the cases of Mexico and Peru consistent with the PPP. In their study Guney and Hasanov extended the works of Doganger (Doganter, et al, 2009) and Chang (Chang, et al, 2010) by applying recently developed nonlinear unit root test. Their findings suggest allowing for nonlinearities and structural breaks results in more rejection the null hypothesis unit root which is consistent with PPP proposition (Guney & Hasanov, 2011).

Goluglu and Okat in a study tested the validity of the quasi PPP hypothesis. They used a long span of data, eighteen exchange rate series and a panel unit root test that allows for structural breaks and cross section dependence. Their result supported the validity of PPP (Goluglu & Okat, 2011).

RESULTS

The t-test gives a P-value of .032726 which is relatively low. Therefore, we reject the null hypothesis and accept the alternative.

CONCLUSION

Because of the relatively low P-value we conclude that there is a significant difference between the actual real exchange rates and the real exchange rate projected by PPP. We therefore conclude that Purchasing Power Parity does not hold between U.S.A. and emerging Asian economies. These countries are India, Korea, Malaysia, Pakistan, Thailand, Philippines and Singapore.

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GREEN INNOVATION IN GERMANY: A COMPARISON BY BUSINESS SIZE

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ABSTRACT

Environmental innovation can be instrumental to business growth (Dangelico & Pujari, 2010). In addition to the "feel good" rewards that come from creating environmentally sustainable products, the financial rewards that "going green" can provide contribute to a successful business strategy (Gibbs, 2009; Harvey, 1996; Millard, 2011; Revell & Blackburn, 2007; Schick et al., 2002; Tilley, 1999; von Weltzien Høivik, & Shankar, 2010). Small businesses, which often face challenges in competing with larger businesses, may find environmental innovation to be an effective and sustainable way to provide consumers with products they value. However, larger businesses may be more likely to pursue green innovation given that they often have more capital to invest. This study examines green activities among SMEs and large firms in Germany through analysis of Eurostat (2011) data regarding nine types of environmental innovations. Over 100,000 small, medium-sized and large businesses in Germany participated in a study regarding their involvement in environmental innovation. The results show that the two most commonly cited types of environmental innovation among both SMEs and large businesses were reduced energy use by the company and reduced energy use as a benefit for the end-user. Although large businesses were more likely (in terms of percentage of businesses) to participate in each type of innovative activity, small businesses were much more pervasive in terms of numbers. Helping small businesses become more green and environmentally friendly may provide greater overall benefits than other measures aimed at fewer, but larger, businesses.

INTRODUCTION

Innovation is an important way to mitigate or avoid environmental damage (Bernauer, Engels, Kammerer & Seijas, 2006, p. 2; Day & Schoemaker, 2011; Zee, Fok & Hartman, 2011). Green technologies can have a double benefit for business—the "feel good" rewards that come from creating environmentally sustainable products and the practical financial benefits that can contribute to improved competitiveness and overall business success (Day & Schoemaker, 2011; Gibbs, 2009; Harvey, 1996; Isaak, 2002; Lober, 1998; Millard, 2011; Porter & van der Linde, 1995; Revell & Blackburn, 2007; Schick, Marxen & Freimann, 2002; Tilley, 1999; von Weltzien Høivik & Shankar, 2010). Consumers around the world report that they expect to purchase greater volumes of environmentally friendly products in the coming years (Cohn & Wolfe, 2011). As stated by Volery (2002, p. 110), "Never before has there been such an opportunity and need for innovation that meets the needs of consumers without damaging the planet's natural resource base."

This study compares the relative proportions of small, medium-sized and large businesses involved in nine activities related to environmental innovation. This is an important issue to all of Earth's inhabitants who wish to breathe clean air, drink clean water and live in a sustainable way that will benefit future generations. The following section provides a brief review of the literature regarding entrepreneurs involved in environmental innovation, small business activities in the realm of green innovation and the benefits of innovation to the firm.

IT'S NOT ALWAYS EASY BEING GREEN

"Green" is one of the most important adjectives of the 21st century. Walley and Taylor (2002, p. 36) describe the term 'greening' as meaning "moving towards environmental or ecological sustainability." This can refer to a business that has made efforts to become more environmentally friendly, or a business that is started as a green company. Green technologies, which can pertain to products and/or processes, are used to protect the natural environment by minimizing waste, pollution, and carbon emissions (Day & Schoemaker, 2011; Lober, 1998; Zee, Fok & Hartman, 2011). Reduced energy use, alternative energy sources and products that allow consumers to reduce their own carbon footprints also fall under the green umbrella. The introduction of environmental regulations such as the Kyoto Protocol and Waste Electronics and Electrical Equipment Directive make it wise for companies to think proactively regarding their environmental strategies and ways to improve their products and processes (Chang & Chen, 2012; Environment Agency, 2011; Haden, Oyler & Humphreys, 2009; Pastakia, 2002; Schick, Marxen & Freimann, 2002). The extent to which these regulations have influenced environmental innovation is not crystal clear (Bernauer et al., 2006), but from the demand side, many business buyers and end-consumers are giving consideration to the importance of going green and then making their purchases accordingly (Anderson, 1998; Bansal & Roth, 2000; Cohen & Winn, 2007; Dean & McMullen, 2007; Kirkwood & Walton, 2010; Schaper, 2002; Schaltegger, 2002). All of these factors are contributing to current changes in the rules and patterns of business (Dwyer, 2009; Russo & Fouts, 1997).

Many SMEs are reluctant to engage in eco-efficiency, possibly because they equate "green" with "expensive." There are, however, cost benefits that can be reaped from environmental improvements (Gibbs, 2009; Hajer, 1995; Harvey, 1996; Isaak, 2002; Millard, 2011; Revell & Blackburn, 2007; Schick, Marxen & Freimann, 2002; Tilley, 1999; von Weltzien Høivik & Shankar, 2010). Environmental innovation leading to a more efficient use of resources is especially beneficial because it can improve a firm's overall competitiveness as well as the natural environment (Dangelico & Pujari, 2010; Johnson, 2009; Lober, 1998; Millard, 2011; Kolk, 2000; Porter & van der Linde, 1995; Seiler-Hausmann, Liedtke & von Weizsacher, 2004; von Weltzien Høivik & Shankar, 2010). Proponents of environmental innovation argue that because pollution results from inefficiency, green innovation will improve productivity (Chang & Chen, 2012; Isaak, 2002; Lober, 1998; Porter & van der Linde, 1995). Savings due to improved efficiency can be substantial. The Environmental Protection Agency (EPA) estimates that the cumulative cost savings from the Energy Star conservation initiative totaled $14 billion just in 2006 (Day & Schoemaker, 2011). Similarly, 3M's Pollution Prevention Pays program has saved the company well over $750 million (since 1975) by recycling and reformulating products and processes (Isaak, 2002).

On the other hand, it may be more difficult for SMEs to recognize gains given their smaller size and scale (Millard, 2011). In a study of businesses with more than 500 employees (large) or fewer than 50 (small), Zee and associates (2011) found that the large businesses were more likely to produce green products and services. While large companies may see a greater financial benefit from improved efficiency that leads to reduced costs, small businesses may be more effective at creating sales by carving out a niche for themselves among customers who are environmentally aware and seeking products and services produced in a socially responsible manner (Anderson, 1998; Bansal & Roth, 2000; Cohen & Winn, 2007; Dean & McMullen, 2007; Isaak, 2002; Kirkwood & Walton, 2010; Morsing & Perrini, 2009; Schaper, 2002; Schaltegger, 2002; Schick et al., 2001; von Weltzien Høivik & Shankar, 2010). SMEs are also said to be better able to take advantage of green opportunities due to their flexibility (Jenkins, 2009; von Høivik & Shankar, 2010).

Small businesses in the study by Zee and associates (2011) were more likely to exhibit higher levels of green awareness and belief in the importance of going green. This belief in the green movement was also seen in a study of "ecopreneurs" —entrepreneurs or intrapreneurs who included environmental progress in their core values (Cato, Arthur, Keenoy & Smith, 2008; Linnanen, 2002; Schaltegger, 2002; Schaper, 2002). Among ecopreneurs studied by Cato and associates (2008), independence from the National Grid (electric) and sustainability were more important motivators than financial achievement. Kirkwood and Walton (2010) likewise found that green values were a common motivator for ecopreneurs, but monetary motives were also mentioned by some participants. Entrepreneurs starting their own firms can instill their own personal values into their businesses (Tilley & Young, 2009; von Weltzien Høivik & Shankar, 2010). Large businesses, especially publicly traded ones, are less likely to be able to pursue ideals over profits (von Weltzien Høivik & Shankar, 2010). Many believe that "green-green" firms--start-ups that are founded with the goal of being environmentally and socially responsible as well as being profitable--are more likely to develop a corporate culture that truly supports green initiatives than are companies that attempt to overlay environmental awareness onto an established culture (Anderson & Leal, 1997; Schick et al., 2001). This greening of operations could have a positive impact on small businesses that struggle with the challenges of competing with large companies.

One significant challenge that entrepreneurs usually face is limited resources, especially time. The demands of starting a business require such a significant amount of time and financial resources that entrepreneurs may not be able to give consideration to the environment. Schick and associates (2002, p. 62) interviewed several entrepreneurs in Germany, one of whom explained that entrepreneurs "are simply eaten up by their daily routines and are no longer able to think about strategic planning and orientation for the future." Attempts to integrate ecological issues would be viewed as additional burdens on people who are already in a very demanding position (Lepoutre & Heene, 2006; Morsing & Perrini, 2009; Perera, 2008; Schick et al., 2002; von Weltzien Høivik & Shankar, 2010). Similar findings were obtained by Palmer (2000) and Perera (2008), who determined that a shortage of time and money were the primary obstacles in the pursuit of environmental concerns.

Time and money invested in eco-friendly products can pay off if companies can use them to differentiate themselves from competitors (Isaak, 2002; Morsing & Perrini, 2009; Schick et al., 2001; von Weltzien Høivik & Shankar, 2010). Such value-driven ecopreneurship (in response to consumer demands) and market-driven ecopreneurship (with positive incentives) stand in contrast to compliance-based ecopreneurship that is based on a reaction to government

regulations (Gibbs, 2009; Keough & Polonsky, 1998; Post & Altman, 1994; Taylor & Pandza, 2003; Walley & Taylor, 2002). Change is therefore induced by both "push factors" such as regulations and "pull forces" such as consumer demands (Linnanen, 2002; Pastakia, 2002; von Weltzie Høivik & Shankar, 2010).

To respond to these pull forces and succeed with green technologies, firms need to be able to identify and understand the nature of market opportunities and get ahead of competitors (Day & Schoemaker, 2011). This requires absorptive capacity--the abilities to identify new information and opportunities, assimilate them into the company and exploit them in ways that will be profitable to the company (Cohen & Levinthal, 1990; Gray, 2006; Kemelgor & D'Souza, 2009; Liao, Welsch, & Stoica, 2003; Wu & Young, 2002; Zahra & George, 2002). Lack of absorptive capacity is an important obstacle for SMEs that want to innovate and become environmentally responsible (Lepoutre & Heene, 2006). For example, Schick and associates (2002, p. 67) reported that one start-up business installed solar panels at the company's buildling. The idea was suggested to the founder by a customer. According to the founder, the solar panels would not have even been considered without the customer's suggestion because of a lack of information and knowledge. The identification of such opportunities that can be exploited is a key element of entrepreneurship (Keogh & Polonsky, 1998).

Collaboration with other people within a network, such as customers and suppliers, is well-known as a factor in innovation (Birley, 1985; Bruderl & Preisendorfer, 1998 Farr-Wharton & Brunetto, 2007; Gnyawali & Madhavan, 2001; Gulati, Nohria & Zaheer, 2000; Hoang & Antoncic, 2003; Jenkins, 2009; Robinson & Stubberud, 2012; 2011a; 2011b; Taylor & Thorpe, 2004). Networks that provide additional knowledge and resources to SMEs with limited internal resources can be very important to environmental innovation (Petts, 2000; Ramus, 2002; Tomer, 1999). In his study of pharmacies in Western Australia, Schaper (2002) concluded that time and environmental information were the two most significant variables showing a relationship with environmental performance. As shown in the study of German businesses (Schick et al., 2002), information and knowledge are often provided through networks. The information provided by networks and cooperation contributes to the development of absorptive capacity, which can lead to innovation, and ultimately improved business performance (Akgun, Keskin, Byrne & Aaren, 2007; Atherton, 2003; Business in the Community, 2002; European Expert Group on CSR and SMEs, 2007; Meredith, 2000). Day and Schoemaker (2011, p. 39) state, "Considering the scale, scope and complexity of most green technology markets, experience shows that collaboration can be key to capturing the market opportunity." However, small businesses have been found to be less likely than larger firms to collaborate with partners for innovation purposes (Robinson & Stubberud, 2012; 2011a; 2011b). This can put small businesses at a disadvantage given that networks can help "keep an eye on the periphery of the market, detecting early signs of potential problems or opportunities before their competitors recognize them" (Day & Schoemaker, 2011, p. 43). Given the economic and social structures involved, new alliances that involve start-ups along with established firms may be necessary to take advantage of new systems of technology (Gibbs, 2009; Keijzers, 2002, p. 356).

SMEs face challenges in competing with larger businesses, but may find that green innovations can be an effective way to provide consumers with products they value, and thus create a competitive advantage. This study further explores the greening of businesses by examining the types of green products and processes engaged in or offered by small, medium-sized and large businesses in Germany. The following section presents the methodology and results of the study and analysis of the data.

METHODOLOGY, RESULTS AND ANALYSIS

Data regarding nine types of environmental innovations were obtained from Eurostat's (2011) Community Innovation Survey, which covered innovation activities carried out between 2006 and 2008. The businesses included in this study were at that time (on-going) or a previous time (abandoned project) involved in some type of innovation activity, whether it was marketing, organizational, product or process innovation. A total of 101,953 German businesses participated in this study, 73,694 of which had 10-49 employees, 22,307 had 50-249 employees, and 5,952 had 250 or more employees. Not surprisingly, small businesses far outnumbered medium-sized or large businesses. The number of businesses and relative percentage of businesses (out of all participating businesses of the same size) reporting involvement in each of the nine listed types of environmental innovation are shown in Table 1. Chi-square analysis was conducted to determine if there was a relationship between business size and innovation. A statistically significant relationships was found for each of the nine types of innovation, with the small business category always having the greatest number, but the lowest percentage, of businesses engaged in each type of innovation. Large businesses were always the mostly likely to be involved in each type of environmental innovation.

Environmental innovations that provide practical benefits, namely energy savings, were the most common type of innovation cited among all three types of businesses, ranging from 42.8% of all small businesses in this study to 54.5% of medium-sized businesses and 60.4% of large businesses. This is logical given that reduced energy use per unit of output would lead to cost savings for the firm. The 17.6% spread between the proportion of small and large businesses reporting this type of innovation may be indicative of the greater savings brought about by reduced cost per unit when economies of scale are higher. Reducing energy would be "low-hanging fruit" that would reap significant benefits.

Similarly, the proportions of businesses citing innovation related to reduced energy use for the end-user was only slightly lower (41.4%, 49.3%, 55.9%). Reduced energy use for the consumer also provides practical benefits to the company as cost savings for the consumer translate into valuable selling points in marketing products. Although previous research shows that eco-friendly products are a popular way for small businesses to differentiate themselves from competitors (Morsing & Perrini, 2009; Schick et al., 2001; von Weltzien Høivik & Shankar, 2010), an even higher percentage of large businesses also engaged in this innovation. The spread between the percentage of small and large businesses claiming this innovation was 14.5%--the third highest spread, yet several percentage points lower than the spread for reduced energy use per unit of output. Regardless, small businesses (30,498) providing this feature for consumers outnumbered large businesses (3,327) by more than a 9:1 ratio, confirming the assertion that this marketing tactic is popular among small businesses.

The greatest difference between businesses of different sizes was evident in the use of reduced material per unit of output. This type of innovation ranked third in popularity among large businesses (53.9%), but fifth for medium-size businesses (46.2%) and sixth for small businesses (36.4%), with a total spread of 18.5% between small and large businesses. Again, economies of scale for larger businesses may have made this more immediately profitable for large businesses compared to small or medium-sized businesses. While reduced material use is a benefit to the environment, it is also generally makes good economic sense.

Table 1: Innovation with Environmental Benefits: Germany						
Type of Innovation	Total (% Total)	10-49 Employees (%)	50-249 Employees (%)	250 or More Employees (%)		P<
Reduced energy use per unit of output	47 321 (46.4%)	31 576 (42.8%)	12 148 (54.5%)	3 597 (60.4%)	1427	.001*
End-user benefits: reduced energy use	44 823 (44.0%)	30 498 (41.4%)	10 998 (49.3%)	3 327 (55.9%)	801	.001*
Reduced soil, water, noise or air pollution	42 528 (41.7%)	28 702 (38.9%)	10 737 (48.1%)	3 089 (51.9%)	863	.001*
Recycled water or materials	41 953 (41.1%)	28 609 (38.8%)	10 31 (46.3%)	3 027 (50.9%)	636	.001*
Reduced material use per unit of output	39 579 (38.8%)	26 064 (35.4%)	10 309 (46.2%)	3 206 (53.9%)	1558	.001*
Reduced CO2 footprint by your enterprise	39 226 (38.5%)	26 838 (36.4%)	9 495 (42.6%)	2 893 (48.6%)	547	.001*
End-user benefits: reduced air, water, soil or noise pollution	36 215 (35.5%)	24 547 (33.3%)	9 055 (40.6%)	2 613 (43.9%)	590	.001*
End-user benefits: improved recycling of product after use	31 433 (30.8%)	22 209 (30.1%)	6 945 (31.1%)	2 279 (38.3%)	173	.001*
Replaced materials with less polluting or hazardous substitutes	25 946 (25.4%)	17 162 (23.3%)	6 612 (29.6%)	2 172 (36.5%)	770	.001*

Reduced soil, water, noise or air pollution and recycled water or materials pollution were the third and fourth most popular innovations for overall businesses (41.7% and 41.1%), and among small (38.9% and 38.8%) and medium-sized (48.1% and 46.3%) businesses. While over half (51.9% and 50.9%) of large businesses cited these two innovations, they were not quite as pervasive as reduced material use per unit of output (53.9%). Among small businesses, 35.4% named this innovation, as did 46.2% of medium-sized businesses. These elements of innovation provide triple benefits in that the reduction of materials and pollution not only improves efficiency, but also lowers disposal costs and decreases future liability costs for the clean-up of contaminated sites (Lober, 1998).

A slightly higher percentage of small businesses (36.4%) reduced their CO2 footprint compared to reducing materials (35.4%), giving reduced CO2 a fifth-place ranking for small businesses and sixth place for large (48.6%) and medium-sized businesses (42.6%). The spread between large and small businesses was 12.2% for this innovation.

The smallest spread (8.2%) between the proportion of small and large businesses engaged in an innovation was evident in improved recycling of product after use, which is an end-user benefit. While 38.3% of large businesses provided benefit, 30.1% of small and 31.1% of medium-sized businesses reported this innovation. In this situation, there would likely be fewer economies of scale to be reaped by the larger businesses, with fewer end-user cost savings to promote to customers.

The least popular innovation involved replacing materials with less polluting or less hazardous substitutes. Slightly less than one-quarter of small businesses (23.3%) reported this, with 29.6% of medium-sized businesses and 36.5% of large businesses engaging in this type of innovation. One explanation may be that such changes are not as visible or as highly valued by end consumers and therefore do not lead to distinct marketing advantages. Such changes are also like to increase, rather than decrease, costs. The proportion of companies engaging in this

practice may increase in the future as green values become more pervasive. Over 60% of consumers worldwide have said they want to buy from environmentally responsible companies, with 20% of consumers in the US and the UK claiming they would pay more for green products (Cohn & Wolfe, 2009). This percentages skyrockets in China, where 95% of consumers say they would pay more for green products because of their higher intrinsic value. Giving the sheer size and growing purchasing power of the Chinese market alone, environmentally friendly products are likely to have a bright green future.

CONCLUSIONS

Although large businesses were more likely (in terms of percentage of businesses) to participate in each type of innovative activity, small businesses were much more pervasive in terms of numbers. For example, 60.4% of large businesses, but only 42.8% of small businesses, stated they had reduced their energy use per unit of production. This means 31, 576 small large businesses cited this innovation compared to 3,597 large businesses. Large businesses very likely produce more products per company than small businesses do, meaning the overall energy savings may be greater. However, given the vastly greater number of small businesses, more energy may be saved in smaller, but more numerous, production facilities when taken as a group. This is an issue for future research. If preserving and improving the environment is a major objective to be pursued, efforts should be focused on the areas with the greatest return (low-hanging fruit). Helping small businesses become greener and more environmentally friendly may provide greater overall benefits than other measure aimed at fewer, but larger, businesses.

While this study did not examine the specific reasons for the innovations that were selected, policy-makers wishing to promote the greening of modern society might find it useful to know why and how companies go green and the incentive and motives that guide their actions (Walley & Taylor, 2002). On an individual level, small business owners may be more likely than larger companies to be ecopreneurs driven by personal values with which they guide their firms (Anderson & Leal, 1997; Jenkins, 2009; Schick et al., 2001; von Høivik & Shankar, 2010). Even the least popular innovation included in this study was cited by almost one-quarter of respondents, suggesting environmental innovation and the green concept has at least somewhat of a foot hold among small businesses. Again, assistance in areas important to innovation could therefore reap significant benefits not just for small businesses, but for society.

In general, cleaner technologies that can reduce waste and prevent pollution in the first place are more desirable than processes that rely on recycling (Kolk, 2000; Millard, 2011; Porter & van der Linde, 1995). The most popular types of environmental innovation, reduced energy for the company and for the consumers, similarly reduce and prevent problems before they occur, and contribute directly to the bottom line through cost savings. Effective marketing that highlights the company's products and differentiates them from competitors' offerings is essential because tough economic times will increase the importance of cost savings (Rheem, 2009). As markets such as China grow in size and purchasing power, environmental innovations like this are likely to become increasingly important as these consumers place more value in green products (Cohn & Wolfe, 2009).

Given the importance of networks and absorptive capacity to innovation, and the general trend for small businesses to have less developed networks and absorptive capacity, development in these areas could have significant effects on the greening of businesses and the overall health of the environment (Day & Schoemaker, 2011; Gibbs, 2009; Keijzers, 2002; Robinson, 2012;

2011a, 200b). Isaak (2002, p. 89) suggests that that "stimulation of networking for the sake of sustainability" is an area in which people and organizations wishing to promote environmental innovation could contribute to green practices. Ideas and techniques could be shared and spread, leading to enhanced absorptive capacity. Future research should continue to examine these issues in order to promote green and sustainable activities.

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THE MIGHTY MISSISSIPPI: MOTHER NATURE'S "GREEN" NAFTA HIGHWAY

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ABSTRACT

Some are calling it "a road to ruin." Transportation systems in the United States are experiencing growing pains. Many participants are greatly concerned over rising issues related to safety, congestion, and inadequate system capacity across several of the five transportation modes. Professionals in the industry agree that the U.S. is in need of a far-reaching National Transportation Plan to facilitate both the repair and reinvention of its infrastructure (Bowman, 2007).

In our work, we investigate some of the energy and environmental issues surrounding the proposed NAFTA (North American Free Trade Agreement) Superhighway. In contrast, we focus on the Mississippi River as a more energy efficient and environmentally conscious means of relieving infrastructure capacity problems. In addition, we explore The Jones Act, a major obstacle to commerce in the water transportation industry.

INTRODUCTION

The issue of transportation systems in the United States is one that increases in complexity as the opportunities for trade expand and supply chain activities evolve internationally. Within the basic modes of transportation we explore an increased focus on water transportation options. In particular, we investigate the multitude of opportunities that the Mississippi River offers to relieve rail and highway infrastructure capacity problems which encompass energy and environmental issues. In addition, careful consideration must be given to the impact of the Jones Act restricting maritime commerce in the United States.

Our work begins with a review of the five modes of transportation. From there we discuss how the U.S. is used as a land bridge, and how port berth congestion is delaying freight delivery. We then present major energy and environmental concerns associated with rail and highway congestion, and how the planned NAFTA (North American Free Trade Act) Superhighway stands to further constrain rail and highway infrastructure. Next, we discuss how canal expansion in Panama stands ready to alleviate port congestion by moving cargo more towards the center of the U.S. for dispersion. Such dispersion is more than likely going to take place in the nation's heartland along the Mississippi River. Finally, we explore the Jones Act and its restrictions for water carriers, and discuss further research opportunities. Hopefully, this study will increase the awareness of the viability of water carriers along the U.S.'s major river system.

MODES OF TRANSPORTATION

Transportation infrastructure consists of rights-of-way, vehicles, and carriers that operate within the five basic modes of transportation. Those five basic modes are rail, highway, water, pipeline, and air. Data from the American Transportation Association indicates that the highway share of the domestic freight market far exceeds that of all other modes combined (Bowersox, et al, 2010). However, while all modes are essential to providing a sound national transportation infrastructure, it is clear that U. S. commerce depends heavily on motor carriers. For our work, we concentrate on rail, highway and water modes since those are effected most by NAFTA. A brief discussion of each follows.

Railroads once ranked first among all modes in terms of the number of miles in service. That ranking began to decline after World War II as there were significant shifts around the country in the development of roads and highways to support the growth of motor carriers. However, the capability to efficiently transport large tonnage over long distances is the main reason railroads continue to handle significant city-to-city freight. Rail operations have high fixed costs because of expensive equipment, rights-of-way, tracks, switching yards, and terminals. In contrast, rail enjoys fairly low variable operating costs (Bowersox, et al., 2010).

In comparison to rail, motor carriers have relatively small fixed investment in terminal facilities and operate on publicly financed and maintained roads. Although the cost of license fees, user fees, and tolls is considerable, these expenses are directly related to the number of motor carriers and miles operated. The variable cost per mile for motor carriers is high because a separate power unit and driver are required for each trailer/container. Labor requirements are also high because of driver safety restrictions and dock labor. Overall, motor carrier operations are characterized by low fixed and high variable costs (Bowersox, et al., 2010). However, they are considered an industry workhorse for their speed, efficient handling, and ability to deliver door-to-door.

Water is the oldest mode of transportation in the U.S. The main advantage of water transportation is the capacity to transport very large shipments. Water carriers generally employ two types of vessels for shipping: Deepwater vessels for coastal, ocean, and Great Lakes transport; and towed barges that operate on rivers and canals with greater flexibility. Water transportation ranks between rail and highway in terms of fixed cost. Though water carriers must develop and operate their own terminals, their right-of-way is developed and maintained by the government and results in moderate fixed costs when compared to rail (Bowersox, et al., 2010). The main disadvantages of water transportation are the limited range of operation and slow speed. Unless the origin and destination of freight movement are adjacent to a waterway, supplemental transportation by rail or highway is required.

THE U.S. LAND BRIDGE AND WEST COAST PORT TRAFFIC

European bound cargo from Asia has several options for reaching its destination. One would be to go west over many treacherous mountain ranges and several seas. Customs stops are required by many countries along the route, making the trip quite long and segmented. Another

route would be to go east across the Pacific Ocean, cross the U.S. by rail or highway, then cross the Atlantic Ocean to reach Europe. This path takes the freight through only one country, requiring only one customs check point. To decide, shippers must balance several factors in calculating the best route for individual shipments – fuel costs, type of cargo, time and distance. It is obvious that the second option may be longer in miles, but stands to be shorter in time, prompting those in the global transportation industry to refer to it as a "land bridge" across the U.S. When time is the constraining factor, the U.S. "land bridge" is the option most use. However, there is one bottleneck along the way – the West Coast ports.

The Ports of Los Angeles and Long Beach are the first and second (respectively) busiest container ports in the U.S. The Port of Los Angeles is located just north of the Port of Long Beach on the California coastline. Together, the two ports are known as the San Pedro Bay Ports. These two ports handle more than 40% of the nation's total containerized cargo import traffic and 24% of the nation's total exports (Port of Long Beach, 2007). Combined, the San Pedro ports moved 1.16 million containers in January 2012, up from 1.14 million a year earlier (White, 2012).

In turn, this increased traffic has led to a rise in congestion at the two bustling ports. Deep draft ports experience delays as space for increasing volumes of import and export cargo is limited by factors such as environmental and community concerns. Congestion also occurs when vessels arrive at the same time rather than dispersed throughout the week (U.S. Department of Transportation, 2009). The time lost as a result of this bottleneck can be 3 to 6 days depending on the season (Conway Consulting, 2008). Even when ports can berth and unload a ship quickly, the increasing size of container ships is moving congestion from ports to access roads, rail and highways (U.S. Department of Transportation, 2009). Such delays and congestion at the Long Beach and Los Angeles ports have shippers and receivers looking for more reliable, efficient options for transportation.

CARRIER ENERGY AND ENVIRONMENTAL CONCERNS

The history of transportation in the U.S. has progressed from rivers, to rail, to highway systems. However, some think we may be headed back to using our 25,000 miles of navigable waterways, or maritime highways for energy and environmental reasons. Those major waterways are located along the: U.S. West, Northeast and Gulf coasts, Great Lakes, and Mississippi River.

The major maritime highways of the past could certainly absorb already stressed rail and highway capacity. After noting that a single barge tow can carry as many as 456 twenty-foot-equivalent (TEU) containers, and that currently only 1.4 billion tons (about 2% of U.S. domestic cargo) spends time on any navigable U.S. waterway, Davis (2010) cited the following statistics regarding the underutilization of our maritime highways in an article on *Short Sea Shipping*:

> One gallon of fuel would move one ton of cargo 60 miles by truck, 200 miles by locomotive, or 500 miles by barge – *Port of Oakland*.

> Congestions on our nation's highways caused urban Americans to travel 4.2 billion hours more and to purchase an extra 2.9 billion gallons of fuel for a congestion cost of $78 billion – *Texas Transportation Institute*.

> One barge can replace the use of two stack trains or 350 container trucks. This relates to an annual reduction of about 238,000 tons of carbon dioxide, 2,640 tons of nitrogen oxide, 110 tons of reactive organic gases, and 15 tons of diesel particulate matter – *Eco Transport*.
>
> The cost to add one lane-mile of highway under normal conditions ranges from $2.3 million for a small urbanized artery to $13.4 million on a major interstate. Obviously, building more roadways when waterways are readily available is imprudent – *Federal Highway Administration*.
>
> There are roughly 155 fatalities per million ton-miles by highway transport. If transported on the maritime highway, the number of fatalities could be reduced to one – *Eco Transport*.

Benefits such as these have the capability of reducing our carbon footprint and our use of oil, and should by themselves encourage green-minded shippers to rush to the opportunity to use the maritime highway alternative.

THE NAFTA SUPERHIGHWAY

One significant event that transformed trade in the U.S. was the signing of NAFTA (North American Free Trade Act) into law (NAFTA, 1993). Soon after, discussions regarding the need for a NAFTA Superhighway emerged. The planned superhighway raises potential environmental, security, and trade risks. Although there has been much controversy and debate over the construction of this colossal transportation infrastructure, the U.S. must address these issues which surround its ever-expanding need for increased transportation capacity.

The term "NAFTA Superhighway" refers to the proposed highway system along Interstate 35 connecting Mexico, the U.S., and Canada. Figure 1 illustrates the planned path. In 1992, under the administration of President George H.W. Bush, the project was initiated with an executive order for infrastructure privatization (Niwa, 2007). Systematically, advances have been made toward the development of this infrastructure to meet the requirements of international trade (Corsi, 2006). The proposed U.S. portion of the NAFTA Superhighway would extend from the Mexican border at Laredo, Texas to the Canadian border north of Duluth, Minnesota. The goal is also to connect the main artery to the West Coast, Florida, and the Northeast. Promotion of the NAFTA Superhighway began with the efforts of the Interstate 35 Corridor Coalition which was established in 1994. This organization subsequently became North America's Superhighway Coalition, Inc. (NASCO) in 1997. Several years later, NASCO began using the term "SuperCorridor" in place of "Superhighway" (Niwa, 2007).

Once completed, the highway system will allow containers from Asia to enter the U.S through the Mexican port of Lazaro Cardenas. The Mexican motor carriers would then cross the border in fast lanes and be checked electronically. The first customs stop will be in Kansas City, Missouri at their Smart Port complex (Corsi, 2006). There containers from abroad can be transferred to additional motor carriers traveling east and west. The ultimate goal is an integrated North American Union with a currency and virtually borderless travel within the Union. NAFTA

trade among the three countries is estimated at $1.5 trillion, and 75% of trade between the U.S. and Canada, America's primary trading partner, is by motor carrier (Corsi, 2006).

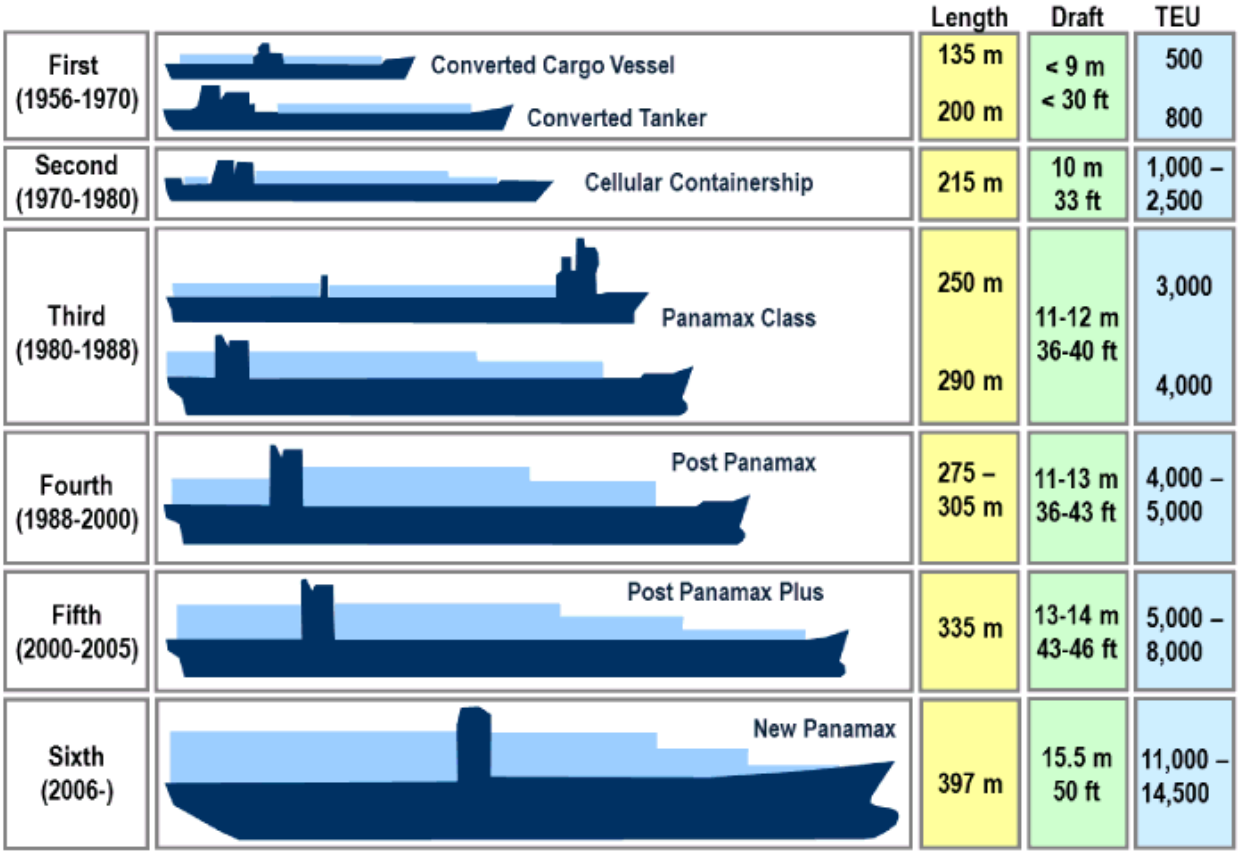
Opposition to the advancement of the NAFTA Superhighway has not ceased. Road blocks have occurred at the state level involving issues of competition, eminent domain, environment, taxes, and tolls among others (Davis, 2008).

Figure 1: Proposed NAFTA SuperCorridor (Corsi, 2006)

PANAMA CANAL EXPANSION

Throughout the NAFTA process, the country of Panama was paying attention. They realized that Panama could help alleviate U.S. West Coast port congestion, and provide another route for cargo vessels. However, canal modifications were needed as global water carriers were developing economies of scale strategies for moving cargo. Such strategies involved the use of bigger and bigger ships – ships that were not envisioned when the canal was first built. Figure 2 illustrates the growth through time of container ships.

Figure 2: Generations of Container Ships (Rodrique et al., 2009)



The Panama Canal opened in 1914 and instantly revolutionized sea transportation. For ships steaming between California and the East Coast of the U.S., the canal turned a 15,000 mile journey around Cape Horn into a relatively swift, 6,000 mile jaunt (Lynch, 2009). The current expansion includes dredging the existing channel to the depths needed for the largest cargo carriers. Table 1 contrasts the lock dimensions of the original canal lanes and the new lane.

The centerpiece of the expansion is the pair of massive new locks at the Pacific and Atlantic canal entrances. Today, the largest ships that can use the canal are the *Panamax* class, capable of carrying about 5,000 standard shipping containers. They squeeze through the waterway's 110-foot-wode locks with just 2 feet to spare on either side (Lynch, 2009). Wider, deeper and longer than the existing portals, the new locks will handle a class of bigger ships known as *New Panamax* vessels, the world's largest cargo carriers, which can haul more than twice as many containers. The canal's third lane is scheduled to open in August 2014.

Table 1: Panama Canal Lock Comparisons (Panama Canal Authority, 2006)

Dimensions	Locks	Panamax	New Locks	New Panamax
Length	320.04 m (1,050 ft)	294.13 m (965 ft)	427 m (1,400 ft)	366 m (1,200 ft)
Width	33.53 m (110 ft)	32.31 m (106 ft)	55 m (180.5 ft)	49 m (160.7 ft)
Draft	12.56 m (41.2 ft)	12.04 m (39.5 ft)	18.3 m (60 ft)	15.2 m (49.9 ft)
TEUs		5,000		12,000

THE MISSISSIPPI RIVER SUPPORTS TRADE TOO

The Mississippi River is one of the world's major river systems in size, habitat diversity and biological productivity. It is the third longest river in North America, flowing 2,350 miles from its source at Lake Itasca through the center of the continental United States to the Gulf of Mexico. Figure 3 illustrates its path. When compared to other world rivers, the Mississippi-Missouri River combination ranks fourth in length (3,710 miles/5,970km) following the Nile (4,160 miles/6,693km), the Amazon (4,000 miles/6,436km), and the Yangtze Rivers (3,964 miles/6,378km) (U.S. Dept. of Interior, 2007).

We cannot forget that it supports trade too. In measure of tonnage, the largest port district in the world is located along the Mississippi River delta in Louisiana. The Port of South Louisiana is one of the largest volume ports in the U.S. Representing 500 million tons of shipped goods per year, the Mississippi River barge port system is significant to national trade (U.S. Dept. of Interior, 2007). Strangely enough, it has a path that looks very similar to the one that was planned for NAFTA – just on water instead of rail or highway.

Shipping at the lower end of the Mississippi is focused on petroleum and petroleum products, iron and steel, grain, rubber, paper, wood, coffee, coal, chemicals, and edible oils (mostly bulk and break-bulk cargo). To move goods up and down the Mississippi, the U.S. Army Corps of Engineers maintains a 9-foot shipping channel north from Baton Rouge, Louisiana to Minneapolis, Minnesota. South from Baton Rouge past New Orleans to Head of Passes, a 45 foot channel is maintained to allow cargo ships access to ports between New Orleans and Baton Rouge (U.S. Dept. of Interior, 2007).

With all modes of transportation having an equal opportunity to contribute to commerce, one might think that water transportation would be the best choice. However, water transportation in the U.S. is not on equal footing to support trade, and is strictly governed by the Jones Act.

THE JONES ACT

The Merchant Marine Act of 1920, commonly referred to as the Jones Act, is a U.S Federal statute that regulates maritime commerce in U.S. waters and between U.S. ports (Brackins, 2009). Two parts of the Jones Act are of specific importance. The first part heavily supports American built, owned, and staffed ships. This was accomplished by restricting shipping and passenger trade within the U.S. to American-owned or American-flagged ships, and specified that at least 75% of a ship's crew must comprise American citizens. In the second part of the Jones Act, the use of foreign parts and labor in ship construction and repair was also greatly restricted. This section of the Jones Act was created to produce a strong, well staffed merchant marine that could be responsible for efficiently serving the U.S. (Smith, 2010).

Figure 3: The Mississippi River with Major Tributaries (USA River Cruises, 2012)

The intent and purpose of the Jones Act has been specifically outlined in its preamble:

> *It is necessary for the national defense and for the proper growth of its foreign and domestic commerce that the United States shall have a merchant marine of the best equipped and most suitable types of vessels sufficient to carry the greater portion of its commerce and serve as a naval or military auxiliary in time of war or national emergency, ultimately to be owned and operated privately by citizens of the United States; and it is declared to be the policy of the United States to do whatever may be necessary to develop and encourage the maintenance of such a merchant marine (1800JonesAct, 2008).*

It is important to realize that at the time in which the Jones Act was enacted, a strong, resilient merchant fleet was crucial for a country's success. The U.S. was recognizing its great need for a dependable defense fleet, and World War I proved their concerns true. The infant U.S. Navy did not possess the capability of performing this function, and thus relied on the civilian sector for the transport of military cargo to overseas destinations (Brackins, 2009).

Effects of the Jones Act have been felt widely in the shipping industry. In comparison to other nations that lack such cabotage restrictions, there has been a noticeable decline in the U.S. shipping fleet, losing out to the competition of other nations (Brackins, 2009).

Generally, the costs of manning and flagging a vessel have very little impact on the cost compared to the price of building vessels in the U.S. This issue is what puts short sea transportation at a significant disadvantage to motor carriers (Jones Act Hinders, 2010). Motor carriers on U.S. roadways can be built virtually anywhere in the world. These substantial differences in cost have been the source of much resistance to the Jones Act, especially in today's weakened economy.

In June of 2010, Senator John McCain presented an act that would allow for a repeal of the Jones Act. According to McCain, the Jones Act:

> *Hinders free trade and favors labor unions over consumers. Specifically, the Jones Act requires that all goods shipped between waterborne ports of the United States be carried by vessels built in the United States and owned and operated by Americans. This restriction only serves to raise shipping costs, thereby making U.S. farmers less competitive and increasing costs for American consumers (McCain Introduces Legislation, 2010).*

In a 1993 study, the International Trade Commission indicated that the Jones Act costs the U.S. a total of $3.1 billion per year (Boyd, 2010.). If that study were repeated today, the results would be astounding. Likewise, some feel that eliminating only the "built in the United States" requirement, not the entire Jones Act, would align coastwise cabotage laws with similar laws which protect U.S. air and highway industries. Both the motor carrier and the airline industries are somewhat protected from foreign competition but are not required to purchase equipment built exclusively in the U.S. (Jones Act Hinders, 2010). This discrepancy has therefore lead to the overall lessened use and relative unimportance of the water transportation industry in today's economy.

CONCLUSIONS AND FUTURE RESEARCH

After reviewing the history of transportation and its current energy and environmental concerns, we see that the U.S. is poised for a revolution in cargo movement. Congress has approved NAFTA, and plans are underway to piece together miles and miles of rails and highways to disperse freight from the nation's heartland.

In our opinion, this Act places a heavy investment burden on rail and highway infrastructure. Is it wise to invest in more energy and environmentally intense railroad and motor carrier transportation? Or, should we awaken the sleeping giant of water transportation to help alleviate the energy and environmental problems of our highway systems? With the improvements to the Panama Canal, the Mississippi River and its tributaries stand ready to take on this challenge.

Blocking its use are the cabotage and construction restrictions found in The Merchant Marine Act of 1920, better known as the Jones Act. Although originally written for national security reasons, several of the restrictions found in the Act create an unlevel trading field for water carriers as they are not allowed to travel between domestic ports like rail and motor carriers can. Officials are aware of this and are currently at work trying to negotiate a favorable solution for all.

In future research we plan to explore the economics of what a shift from rail and highway to water will do to U.S. commerce. Obviously, the movement of freight will slow down. However, we

expect that in the long run, the change in delivery speed will be worth the savings in energy, infrastructure investment, and the environment.

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THE ALLIANCE STRATEGY AND FIRMS' PERFORMANCE: INSIGHTS FROM RESEARCH ON THE ICT INDUSTRY

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ABSTRACT

The prime objective of this study is to explore the partnering strategies in the context of the global ICT Industry. Currently, cooperation is one of the most effective ways to acquire a broad set of necessary resources. Based on a sample of leading ICT firms and over 10,000 ties, two alliance strategies have been identified: exploration strategy, representing a multiplicity of weak ties and exploitation strategy, representing the traditional meaning of strategic alliances; associated with strong ties. This study shows that currently, in the global ICT Industry, exploration alliances dominate over exploitation alliances. Additionally, the exploration strategy seems to be more effective in this dynamically changing Industry.

INTRODUCTION

The purpose of this paper is to highlight the importance of the partner portfolio building strategy in global industries, as well as to indicate the quality of ties in a firm's alliance portfolio impact on a company's success in a dynamically changing environment. The paper is organized as following. Firstly, a brief overview of the literature in strategic management, alliance portfolio and industry dynamics is presented. Secondly, a theoretical framework of firms' success (market performance) related to partnering strategy is described, and the hypotheses are formulated based on such a framework. Finally, the hypotheses are empirically tested using the sample of alliance portfolios of leading global companies in the Information and Communications Technology (ICT) Industry. This paper discusses the findings and implications for management practice and provides directions for further research.

THEORETICAL BACKGROUND

Fundamental issues have long been discussed in strategic management cover sources of differences between firms, differences among firms' maneuvers, the determinants of firms' scope, behavior and success or failure. However, new discussions have emerged related to these issues due to the changing environment and organizations themselves. One of the most important phenomena is globalization. The concept of "global strategy" refers to a strategy created on a global scale, taking into account the possibilities offered by the processes of globalization as well as global competition (Ghemawat, 1991, Spulber, 2007, Peng, 2009). Firms' maneuvers on a global scale are presented in the literature based on two main research traditions: the first is Resource-Based View (RBV) and the second, Competitive Positioning

School. Research interest according to these traditions has focused on resource creation and innovation (Hamel and Prahalad, 1989; Schumpeter, 1934, 1950; Senge, 1990), competition (Chen, 1996; D'Aveni, 1994; Porter, 1980; Smith, 1992), cooperation (Contractor and Lorange, 1988; Dyer and Singh, 1998; Hamel, Doz and Prahald, 1989) and also "co-opetition"—namely, collaboration with current or potential rivals (Bailey, 1997; Brandenburger and Nalebuff, 1996; Doh, 2000).

Interfirm cooperation - alliances, networks, portfolios

According to Kogut (1988), Hamel (1989), Yan (1998), and Low (2007), one of the most effective ways of building a competitive advantage as well as protecting a firm's position on a global scale is by creating strategic alliances. Currently, alliances are seen as a way to acquire external, "network resources" (Gulati, 1998, 2007). This motive seems to be extremely important in Industries such as the global Information and Communications Industry (ICT), which is one of the fastest growing, dynamically changing, technological and knowledge intense global Industries (Low, 2007). One of the key success factors in such a market is "time to market", which provides complex solutions to the customers faster than the competition (Fine, 1998).

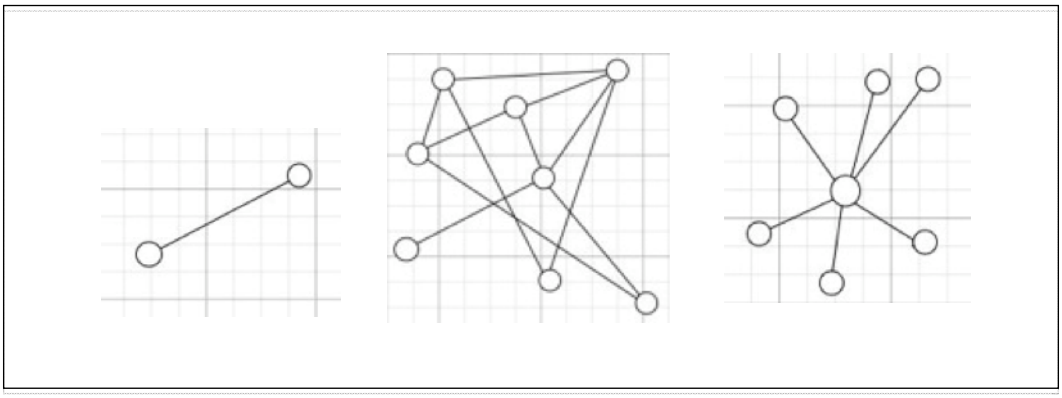
Interfirm cooperation is increasingly being selected as a response to the customers' demand for complex solutions requiring multiple sources of technology, knowledge and innovations (Contractor and Lorange, 2002). Partnering is also a way to share risk and to gather new or develop existing knowledge (Hamel and Prahald, 1989). Cooperation with the partners, including potential competitors, traditionally allows the reduction of uncertainty by establishing a negotiable environment (Cyert and March, 1963, Hirsch, 1975).

Recently, alliances have been considered in the literary texts in three major dimensions. Firstly, direct alliance between two or more firms, having determined the scope, duration, targets, and purpose (Direct Alliance). Secondly, constellations of alliances or networks, including multiplicity of interfirm ties (Networks). Lastly, a special kind of network, namely an egocentric network with the focal firm in a central position (Alliance's Portfolio). Figure 1 presents all of these three perspectives.

Networks.

Research focuses on the patterns of relationships between interacting "social actors" – firms involved in alliances. There are both structural and relational aspects analyzed here. Research on the impact of the number of alliances and network characteristics (embededdnes, structural holes) on the characteristics of firms such as innovation, new product development, revenue growth, market share, profitability, market value, the composition of partners in the network, their innovation and relevance, performance, and more recently, the dynamics of competition in the market sectors (e.g. Gulati, 2007, Farina, 2008, Burt, 1992, Ahuja, 2000, Powell, Koput, Smiss-Doerr i Owen-Smith, 1999).

Figure 1: Direct Alliance, Network, Alliance portfolio.



Direct Alliance

Research in this area focuses on the relational aspects of alliances, such as the dynamics of interfirm ties, learning within a relationship, relationship characteristics and its influence on the characteristics of involved partner firms (e.g. Gulati, 1998, Kogut, 1988, Cyert i March, 1963, Hirsch, 1975, Dyer i Singh 1998, Ahuja, 2000).

Alliance portfolios

Research in this area addresses the impact of alliances on central (focal) firm characteristics. Portfolios differ from networks mainly because they are analyzed from the perspective of a central positioned focal firm (e. g. Lavie, 2006, 2007, Shiplov, 2006, Lee, Lee, Pennings, 2001, Silverman, Baum, 2002). Alliance portfolio approach has been used in this study.

Firms' partnership strategies

Most researchers agree with the fact that the quality of alliances is an important issue. In literature, the quality of alliances is associated with the strength of ties, based on such characteristics as purpose, scope, time horizon, and intensity of ties.

According to Granovetter (1973), the strength of ties is based on a combination of time, emotional intensity, intimacy (mutual trust) that characterizes the relationship. Rowley et al. (2000) characterizes the strength of ties by the frequency of interaction between partners. Types of firms' cooperative strategies associated with alliances are related to the strength and purpose of ties, and the way of knowledge creation or transfer (March, 1991, Dussauge et al., 2000, 2004, Dittrich, 2002, Contractor and Lorange, 1988). In this article, namely, exploration strategy is associated with weak ties while exploitation strategy is associated with strong ties.

The greater the uncertainty in the market environment, the stronger the need for innovation to survive and the more possible it is for that firm to decide on an exploration strategy (March, 1991). This strategy allows for the experimentation of new, uncertain, risky sectors,

testing rules and strategic choices. Exploration alliances do not usually involve joint capital (Koza and Levin, 1998) and are used to access new information, as well as to gather new knowledge from the network, rather than from a particular partner (Granovetter, 1973).

Exploration alliances such as interfirm ties and marketing agreements are weak and less costly (Contractor and Lorange, 1988). Exploitation strategy is associated with exploitation, strong ties (Krackhardt, 1992), social capital (Bordieu, 1986, Portes, 1998) and a high level of network embeddedness (Granovetter, 1985).

Exploration alliances are associated with a deeper understanding of a partner's business, thus, this strategy is used more frequently when specialized knowledge is required. One of the aims of such a strategy is to strengthen existing ties and expand existing knowledge and therefore only particular, valuable partners are selected to form direct partnerships with measurable commitment. Partners are often redundant when it comes to their own connections with other companies. They are focused on strengthening their own knowledge base rather than accessing new ones. The duration of ties is also important in this type of strategy. This strategy is characterized by a greater number of contracts with the same partner, longer relationships and often cooperation.

An important aspect of this situation is the social capital in order to build trust in such a relationship (Knoke and Kukliński, 1982, Wasserman and Faust, 1994). Some researchers argue that both strong and weak ties may provide useful benefits for allies. The adequate balance in a firm's alliance strategy of strong and weak ties is currently being discussed in literature (Dittrich, 2000). It is worth taking into account that the choice of ties types is often related to the environment in which the company operates (Rowley, Behrens, and Krackhardt, 2000).

The more uncertain the environment and dynamically changing Industry, the more possible that firm's decision to explore new possibilities using exploration alliances (Lant, Millken, and Batra, 1992). Hypothesis 1a and 1b have been defined.

H1a The Focal firms' portfolio summary includes more weak ties than strong ties.

H1b In recent years, the average cumulative increase of weak ties is greater than that of strong ties in the focal firms' partners' portfolio.

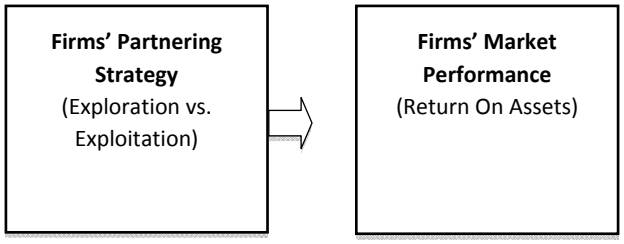
Previous studies have indicated that strategic alliance networks lead to an asymmetric access to resources in the industry, thereby affecting firms' behavior and performance (Granovetter, 1985, Burt, 1992, Nohria, 1992). Farina (2008) developed and tested the idea of the impact of network structure and network embeddedness on firm performance. They treated the network as the external resource that a company can use in strategic maneuvers in order to increase its efficiency. Other studies have shown that the relationships in the network are potential sources of external resources for the company (Langlois, 1992, Nohira, 1991) when their effectiveness depends on the network structure (Burt, 1992) as well as the firm's internal capabilities (McEvily and Zaheer, 1999). Alliances with well-equipped partners (e.g., technology, finances, marketing, human resources) contribute to the growth of the company and

its market performance (Lavie, 2006, 2007). Taking into account the fact that alliances and alliance networks may influence firms' market performance, the impact of this type of partnering strategy on the performance emerges as an additional significant issue. Therefore, Hypothesis 2 has been defined as below.

H2 An exploration strategy in global, knowledge-intense, dynamically changing global industry is more effective than an exploitation strategy alone.

In order to operationalise this hypothesis we can say that the greater share of weak ties in focal firms' portfolios, the better the firms' market performance, while exploitation alliances may decrease the firm's performance. The theoretical framework for this study is summarized in Figure 2.

Figure 2: Theoretical framework.



DATA AND METHODOLOGY

Phenomena related to the global strategy used are clearly evident in the ICT industry. ICT, which includes firms providing both services and products, is one of the fastest-growing sectors (Fine, 1998). Information and communication technologies are becoming increasingly important in the context of all areas of business and social life (Goddard and Richardson, 1996).

Technological development and convergence of services lead to a huge number of alliances, mergers, acquisitions, strategic partnerships and groups of alliances (Varun and Khawaja, 2003).

Data

The data collected for this research covers 30 of the most significant global focal firms in the ICT industry (based on 4 digit SIC codes) that offer, in their business, portfolio solutions, including products as well as services dedicated to telecommunication operators who have had at least five years of experience in financial reporting on Infinancials databases. Focal firms' alliance portfolios data was collected from the SDC Platinum Database, covering alliances from almost a 25-year period: 1985 to 2009. The alliance data for the analysis covering the years from 1990 to 2009 is considered to be both reliable and relevant, due to its data completeness and timelessness. Following Anand and Khana (2000) and Lavie (2007), records of ties formed by each focal firm have been compiled. Subsequently, records have been validated and corrected by

searching publicly announced alliances in press releases and corporate web sites of focal firms. In total, more than 20,000 ties were identified for all focal firms. After cleaning the data and removing terminated alliances, the final sample had 10,247 alliances in the focal firms' portfolios. For each alliance the type of tie was coded, based on the purpose and the scope of alliance.

Measures

Tie strength. Although ties between firms can take many forms, including both strong and weak ties, following Nohira (1991) this study identified ties for each company's portfolio and groups them into two categories. Strong ties (Granovetter, 1985, Uzzi, 1996, Larson, 1992, Krackhardt, 1992) included capital alliances, joint ventures, production joint ventures, R&D alliances and multiple agreements with the same partner. Such relationships are wider and deeper in terms of interactions. Meanwhile, weak ties (Powell, 1990, Koza and Levin, 1998) included marketing agreements, license agreements, selling and service agreements, which are less costly in management and coordination than strong ties.

Firms' performance. Focal firms' performance was measured by Return on Assets (ROS), a commonly used method in literature. Global ICT is a fast growing and dynamically changing environment, which has been created from several different Industries including telecommunication, Internet, IT and media (TBR, 2009). The value of sales seems to be an adequate measure of a firm's performance. Both measures have been used in an initial analysis and it should be mentioned that there was no significant difference in both measures in terms of a coefficient analysis. According to the European Commission of Information Society and Media (The world's economies depend on Information & Communication Technologies (ICT), 2010), a significant difference exists in the meaning and contribution of ICT to productivity before and after 2000. Prior to 2000, the US played a primary role in shaping the global ICT industry. After 2000, the EU as well as the Asian and Pacific region became increasingly important on a global scale. Therefore, the research covers a 10-year time period, from 2000 until 2009.

Controls

In order to control a firm's level variables I focused on leading (in terms of size, significance due to the industry reports, and SIC qualification) global ICT vendor firms.

Firm-level controls included firm size (number of employees, total sales value) and alliance portfolio size (there was no statistically significant correlation between the number of ties and firms' performance in the sample). There was also a controlled multiplicity of ties with the same partner in portfolio (assuming that multiple agreements entail more complex management) and portfolio internationalization (there was no significant difference between the share of foreign partners in the analyzed firms' portfolios). I also controlled the inter-industry variation (by using SIC codes) and the economic downturn effects by analyzing the firms' performance and selecting the years between the decreases of sales, for detailed correlation analysis.

Analysis

In order to ensure the most recent and reliable data, the research covers a 10-year time period, from 2000 until 2009. I calculated the focal firms' market performance and all variables relating to their alliance portfolios in each year. After reviewing the previous research, I confirmed that there is no significant difference between the observations per firm in the assumed period of time. The analysis was conducted using the Person's correlation, regression analysis, coefficient and independent-Samples T test, to analyze the difference between the groups' – share of weak and strong ties in firms' alliance portfolios. Hierarchical *F*-tests revealed that the four theoretical variables are significant.

RESULTS

Regarding Hypothesis 1a, the total share of all weak ties in focal firms' alliance portfolios was 70.2 percent, while the proportion of strong ties was only 29.8 percent. This is a significant reason to regard Hypothesis 1a as being true. Exploration strategy seems to be predominant in the tested sample of focal firms. Moreover, there was also an investigation into the total growth of the total share of weak ties in focal firms' alliance portfolios year 2000 to 2007.

The results confirmed Hypothesis 1b in terms of the partnering strategy development: The total share of weak ties in firms' portfolios increased by 405.99 percent on average, while the share of strong ties increased by only 98.14 percent on average. The analysis using the Pearson's correlation coefficient for Hypothesis 2 indicated a statistically significant relationship between share of ties' type in focal firms' portfolios and their market performance.

The analysis results indicated a significant coefficient ($R = .42$, $p < .018$, adjusted $R^2 = .15$), supporting Hypothesis 2. Firms' performance increased as the share of weak ties in their alliance portfolio increased. Table 1 presents the results for all key variables.

Table 1: Detailed correlation tests results for Hypothesis 2.

	Focal firm's ROS (Return on Assets) [%]
Total share of weak ties in focal firm's alliance portfolio [%]	$R = .42$ $R^2 = .19$ Adjusted $R^2 = .15$ $N=30$ $F(1,28)=6.2$, $p<.01$

DISCUSSION

Currently firms' cooperating strategies are being widely discussed in literature. Due to some research (e.g. Gulati, 2007) in the global market sectors, access to "network resources" is crucial for firms' survival. The findings of this study contribute to the understanding of the link between a firm's performance and partnering strategy. The results show that exploration strategy, based on weak interfirm ties, which are less costly then exploitation and strong alliances, in a

global ICT Industry, seems to be more effective and may lead to strengthening the firm's competitive advantage.

In the ICT Industry fast technological development and increase of customer expectations brings the need for complex, "end to end" solutions, what means that no one has equal, complex resources to meet these requirements. Due to this, cooperation is crucial for firms in this industry. In global, technological and knowledge- intense industries, typically characterized by a high dynamic of changes and industry growth, exploring new options and creating new useful knowledge seems to be more important than enhancing existing knowledge, building long term relationships based on a fixed scope and jointed capital and mutual trust. It is worth considering what the sources of alliance strategy are choosing in relation to global leaders.

Taking into account that focal firms represent different countries from the US, Asia and Europe, the next step should be to investigate the possible reasons of a firm's strategy choices. There is undoubtedly a need for expansion beyond the alliance portfolio area of research, involving both formal—legal, economic, political—and non-formal—institutional factors related to cultures, ethics, and standards existing in different countries. These rules may significantly affect business development, competition and above all the building of alliance, relationships and agreements among partners from different cultures. There are several studies in literature on cultural and organizational differences, geographical distance, communication and learning problems that are typical for cross-border alliances (e.g., Barkema et al., 1997, Parkhe, 1991, Simonin, 1999) and the differences may also impact a global firm's partnering strategy.

CONTRIBUTIONS

The present study contributes to both literature and managerial practice, examining the role of alliance portfolio creation in a global environment by defining and conducting the co-operation strategy. The weak and strong ties shared in alliance portfolio demonstrate the significant interaction effect on the global ICT firms' performance. Research has demonstrated that managers should adapt their strategy to the changing environment and be aware of the importance of decisions concerning alliance creation. In case of global firms, as well as for entrepreneurs, the meaning of co-operation with external partners is one of the most significant factors that shape the venture performance. For this reason, the contribution of this study to managerial practice and the success or failure of multinational ventures is meaningful.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

There are several main limitations of this study. To begin with, the number of ICT firms is limited to 30. In further research it should be extended as the expansion of global players will continue to grow.

Secondly, in this study, Return on Assets was calculated as a firm's performance, which might be seen as a limitation to some extent. In the rapidly growing and changing ICT industry,

sales are the most appropriate measure of indicating market performance. It's quite possible that further studies may be needed to investigate additional financial measures to identify the most affected areas of companies' activities.

Thirdly, as there are correlations between the variables measured, this is the first step to deepen quantitative research. Fourthly, there was only quantitative data on alliances differentiating them between 'weak' and 'strong' ties. It is possible that due to the sector characteristic, a more subtle approach would be recommended.

Prior experience can in fact result in differences in benefits (Gulati, Lavie, Singh, 2009), which in turn can have an impact on market performance, regardless of the type of ties. Considering that the ICT field has an increasing impact on many other industries, further studies may also extend the research in order to compare companies' strategic actions and alliance strategies in other industries.

Further research could extend or modify the current study along several dimensions. For instance, although the sample of focal firms for this study was limited to 30, a larger number of focal firms can be used in further research and the sample could also be extended to smaller ventures. In addition, the chosen time period has not been affected by the world economic crisis, which offers an interesting timeframe for analyzing how economic slowdowns could affect global firms' partnering strategies.

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THE EFFECT OF EUROZONE CRISIS ON EUROZONE ADR PRICING

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ABSTRACT

We study the impact of Eurozone crisis on the return generating process of Eurozone-originated ADRs. Consistent with prior literature, we document increased impact of home factors in determining ADR returns. We further examine countries in deeper trouble (PIIGS country including Greece, Portugal, Ireland, Italy, and Spain) versus the other countries in the Eurozone. We find that Eurozone ADRs are priced similarly before the crisis. However, significant differences emerge after the start of the crisis. Surprisingly, investors seem to rely less on local factor and exchange rates as pricing factors for PIIGS-originated ADRs than non-PIIGS-originated ADRs.

INTRODUCTION

The European sovereign debt crisis, also referred to as the Eurozone crisis or euro crisis, has been ongoing for more than two years, constantly making headlines in major newspapers around the world. A series of events mark the official start of the long-going crisis. In the wake of the Dubai sovereign debt crisis in November 2009, concerns mounted over some euro countries' debt issues. On November 30, 2009, Papandreou, the new prime minister of Greece, admitted that the Greek economy is in "intensive care" (Timeline: Greece's journey to the edge of euro, *The Guardian*, by Graeme Wearden, Tuesday 21 June 2011). On December 8, 2009, Fitch cut Greece's long-term debt from A- to BBB+. Before the EU summit on December 10, Greece government admitted that their debts had mushroomed to 300 billion euros (450 billion dollars), 113 percent of Greek GDP, almost doubling the Eurozone limit of 60 percent. On December 16, Greece suffered another downgrade by Standard & Poor's to BBB+. After more than two years with rounds of bailouts, austerity measures, and debt haircut, the European sovereign debt crisis is still ongoing, severely affecting most of the countries in the euro zone. The five countries of Greece, Portugal, Ireland, Italy, and Spain, often referred to as "PIIGS", took the biggest hit.

This study examines the determinants of Eurozone originated American Depositary Receipts (ADRs) returns during the euro zone crisis. An ADR is a security that represents underlying shares of a foreign company but trades in the U.S market. ADRs provide U.S. investors many advantages over trading directly the underlying foreign stocks. Like U.S. stocks, ADRs are denominated and quoted in U.S. dollars, and dividends are paid in U.S. dollars after the custodian bank collects the foreign dividends and converts them to U.S dollars. The foreign firms are also subject to full regulation and disclosure requirements for their ADRs to be traded on major U.S. exchanges. However, ADRs bear more risks than U.S. stocks. First, unlike U.S.

stocks whose investors face exchange rate risk due to company's operational and financial activities, ADRs has an extra facet of exchange rate risk directly borne by investors. Because ADRs track the shares in the foreign country, if a country's currency value changes, the change will trickle down to ADRs, affecting ADR returns. Furthermore, ADRs are subject to home country risk. In a perfect market that is frictionless and fully integrated, equity returns, including those of ADRs, U.S stocks, and underlying foreign stocks, should be determined solely by their covariance with the world factors, and therefore local risk should not factor in. However, as suggested by prior literature (e.g., Jiang, 1998; Choi and Kim, 2000; and among others), local factors do contribute to ADR pricing. Some studies (e.g., Choi and Kim, 2000; Fang and Loo, 2002) find that local factors may be more important in determining ADR returns than the U.S. Market factors, especially for emerging countries with segmented markets.

Previous literature also studies returns of ADRs during currency and financial crisis (e.g., Bin, Blenman, and Chen, 2004; Pasquariello, 2008). The Eurozone Crisis, however, is different from any prior crisis. First, the Eurozone countries, as an economic and monetary union, share a single currency, the euro, and thus their ADRs are subject to the same exchange rate movement. However, since not all the countries are affected equally by the euro zone crisis, we can still expect to observe heterogeneity in ADRs pricing due to the different country risk at the country of origin. Also, unlike countries in most of the previous crises examined, the Eurozone countries are more developed. The companies that issue ADRs are large and well-established with operations on a global scale. Many ADRs from the Eurozone are household names, such as Unilevel, Nokia, and Daimler Chrysler. An interesting question is whether these ADRs will be subject to increased local pricing as the ADRs in emerging markets (Pasquariello, 2008). Therefore, the Eurozone Crisis provides a unique opportunity to study ADR returns.

We present first evidence of the impact of Eurozone crisis on the return generating process of Eurozone-originated ADRs. Consistent with prior literature, we document increased impact of home factors in determining ADR returns. Although still significant, exchange rate factor becomes less important in pricing during the crisis. We further examine countries in deeper trouble (PIIGS country including Greece, Portugal, Ireland, Italy, and Spain) versus the other countries in the Eurozone. Both groups of countries experience increased home factor pricing following the outbreak of Eurozone crisis. We further document that before the crisis the classification of PIIGS insignificant in determining the sensitively of ADR returns to home country index returns, U.S index returns, and euro exchange rates, indicating that the Eurozone ADRS are priced similarly. However, significant differences emerge after the start of the crisis. Surprisingly, investors seem to rely less on local factor and exchange rates for PIIGS-originated ADR than non-PIIGS-originated ADRs.

The reminder of the paper is organized as follows. Section 2 discusses the background of Eurozone and Eurozone crisis. Section 3 reviews the literature. Section 4 contains hypothesis development, data, and sample statistics. Section 5 presents the main empirical results. Section 6 concludes.

EUROZONE AND EUROZONE CRISIS: BACKGROUND

The Eurozone currently consists of 17 European Union (EU) countries that have adopted the euro (€) as their common currency and sole legal tender. These 17 counties are Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg,

Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain. The Eurozone came into existence with 11 member countries from the EU on January 1, 1999 when the euro was officially launched. Greece joined the Eurozone on January 1, 2001. On January 1, 2002, the member countries replace their national currencies with physical notes and coins of euro. Five other countries then joined the Eurozone between 2007 and 2011. Member countries submit their monetary policy authority to the European Central Bank (ECB). To maintain the stability of euro, member countries practice fiscal coordination and have agreed limits on deficit and national debt.

In the wake of the global finance crisis in 2008-2009 and the Dubai sovereign debt crisis in November 2009, there were concerns over some euro countries' debt issues. In December 2009, Greek government admitted that its debts have reached 300 Billion euros, which is 113 percent of Greek GDP, over the Eurozone limit of 60 percent. The ratings of Greek Bank and government debt were downgraded. In January 2010, Greece's problem was further compounded. Greek budget deficit the previous year was revised from 3.7 percent of GDP to 12.5 percent, far above the Eurozone ceiling of 3 percent. In February 2010, Greece announced a series of austerity measures to curb deficit. In April 2010, the Eurozone and IMF gave Greece the first round of bailout (up to 30 billion euros in emergency loans). Greek borrowing cost skyrocketed, and EU announced that the Greek deficit was 13.6 percent of GDP, even worse than the previously revised 12.5 percent. The second round of bailout came on May 2, 2010, providing Greece a 110 billion euro bailout package. Despite the bailout, Greece was still in trouble and there was talk about Greece being forced to leave the Eurozone. Greece further received a 109 billion euro package in July 2011.

Other Eurozone countries such as Portugal, Ireland, Italy, and Spain were subject to greater scrutiny because they are also heavily indebted. In November 20, 2010, the EU and IMF agreed to an 85 billion euro bailout package to Ireland. In April 2011, Portugal asked the EU for help. In May 2011, it became the third Eurozone country to receive a bailout (78 billion euros). Meanwhile, there was greater concern over Italy and Spain, two larger economies of the Eurozone. The yields on government bonds from Spain and Italy rose sharply, and those from Germany fell to record lows. On August 7, 2011, ECB announced that it will buy Italian and Spanish bonds to pressure down their borrowing costs.

The Eurozone crisis continues to spread. On January 13, 2012, credit rating agency Standard & Poor's downgrades France to AA+. Eight other Eurozone countries are also downgraded, with Italy, Spain, Cyprus, and Portugal cut two notches. Germany kept its AAA rating, and is the only high-rated European country that was not issued a negative outlook.

LITERATURE REVIEW

ADRs are the most popular form of cross-listing in the U.S., and provide an ideal setting to study various issues in finance. Two groups of ADR studies are most relevant to our research. First, there is substantial literature on the price and return behavior of ADRs alone or relative to the price and return behavior of the underlying foreign shares. Second, there is a growing body of research that investigates the impact of currency or financial crisis on ADR returns. In addition, out study is also related to a growing body of literature that examines the Eurozone equity market integration and Eurozone crisis.

First, many prior studies have focused on the price and return behavior of ADRs. These studies yield evidence on how various factors such as U.S. market, home market, and exchange rate movement affect ADR pricing and returns. Jiang (1998) examines 113 firms over the period 1980 to 1994 and finds that changes in the US stock market index, home market index and the changes in foreign exchange rates all contribute to ADR returns. Choi and Kim (2000) examine firm-specific (underlying stock returns), local, US, world, industry, and exchange rate factors in determining ADR returns. They find that the local factor is more important than the world factor in explaining ADR returns over the 1990-1996 period, especially for emerging market originated ADRs. Their finding is consistent with Harvey (1995), who finds that emerging markets are more likely than developed markets to be affected by local information. Fang and Loo (2002) also find that ADR returns are significantly affected by their respective home market factors rather than U.S. market movements. Aquino and Poshakwale (2006) confirm in a panel data setting that home market factors contribute to ADR price discovery, although the impact is not as strong as US market factors. Kim, Szakmary, and Mathur (2000) find that while the price of the underlying shares is the most important pricing factor, the exchange rate and the US market also have an impact. They also find evidence that investors react differently to shocks these pricing factors, overreacting to US market index shocks but underreacting to the underlying share and exchange rate shocks. With a sample 123 ADRs from 16 countries over the period of Aug. 1992 to Aug. 1997, Patro (2000) finds that ADRs returns have significant risk exposures to the returns on both the world market portfolio and the respective home market portfolios, but not to changes in their home currency's exchange rates. However, other studies generally document the exchange rate factor in ADR pricing. For example, Choi and Kim (2000) report that a strong dollar leads to the decline in ADR returns. Also contrary to Patro (2000), Aquino and Poshakwale (2006) find that the change in exchange rates significantly affect ADR returns.

Researchers have also examined the ADR prices relative to the underlying share prices. ADRs provide an ideal setting to study the law of one price in the equity market. Since ADRs are basically shares of foreign securities held in trust by U.S. financial institutions, the prices of ADRs should track the prices of the underlying foreign shares. Otherwise, there will be arbitrage opportunities. Although there are notable cases of significant price discrepancies[1] between the ADR prices and the underlying shares, previous literature generally finds that the price discrepancies are not large enough for arbitrage opportunities. For example, using intra-day prices of an extensive sample of 506 U.S. cross-listed stocks from 35 different countries, Gagnon and Karolyi (2010) document an economically small 4.9-basis- point deviation as a percent of the home share price with a daily standard deviation of 1.4% for a typical stock pair. They further find that price parity deviations and their daily changes are positively related to proxies for holding costs that can impede arbitrage after controlling for transactions costs and foreign investment restrictions. Other consistent evidence can be found in Maldonado and Saunders (1983), Kato, Linn, and Schallheim (1991), Park and Tavakkol (1994), Miller and Morey (1996), and Blouin, Hail, and Yetman (2009), except Wahab, Lashgari, and Cohn (1992) who find some evidence of arbitrage opportunities using the portfolio approach. With 74 European ADRs, Grossmann, Ozuna, and Simpson (2007) examine the sources of ADR mispricing over the period

of 1996-2003. They find that ADR mispricing is positively associated with higher transaction costs ((bid-ask spread), lower dividend payments, and higher T-bill interest rates.

The second group of studies that are closely related to ours focus on the impact of financial and currency crisis on the performance of ADRs. For example, Bailey, Chan and Chung (2000) examine the performance of ADRs during the Peso Crisis. Bin, Blenman, and Chen (2004) examine ADR returns surrounding the outbreak of major currency crisis during the 1990s including the U.K sterling devaluation in 1992, Mexican peso crisis in 1994, the Asian Crisis in 1997, the Rusian ruble crisis in 1998, and the Brazillion real crisis in 1999. They use event study methodology and document significant negative abnormal ADR returns after controlling for variations in exchange rates. Pasquariello (2008) examine the pricing of emerging market ADRs in the setting of financial crisis in Mexico, East Asia, Russia, Brazil, Turkey, and Argentina. He finds that the law of one price is often weakened (by 54% on average) and the market becomes on average less efficient and more segmented during financial crises. He empirically attributes the regime shifts to proxies for investor uncertainty, exchange rate volatility, trade linkage, and liquidity.

Finally, our study is also embedded in the literature on the Eurozone capital market and Eurozone crisis. There is growing evidence of market integration in the European Union. According to Hale (2011), investors in Europe increasingly exhibit a euro-bias rather than a home-bias, and are more likely to view all of the euro area assets as their own. Meanwhile, investors outside the euro area are also more likely to view the euro area market as one integrated market (e.g., Spiegel, 2009). Bekaert, Harvey, Lundblad, and Siegel (2011) examine the cause of integration and find that EU membership reduces market segmentation but the adoption of euro has minimal effect on market integration.

There is also an emerging literature on the ongoing euro crisis. For example, Hui and Chung (2011) study the impact of the creditworthiness of euro zone countries on euro crash risk as embedded in the deep out-of –the-money euro put option prices during 2009-2010. They find consistent evidence for not only the counties with weak fiscal positions but also the countries with sound fiscal positions. Examining sovereign rating downgrading news in the European market during the period 2007-2010, Arezki, Candelon, and Sy (2011) find statistically and economically significant spillover effects both across countries and financial markets. Missio and Watzka (2011) find evidence of contagion within the euro area generated by rating downgrades during the euro crisis. Bartram and Wang (2011) examine the European market integration over the period 1992-2010 including the European sovereign debt crisis, and they find increase in dependence between European countries following the euro introduction, and the dependency is higher during the period around the Lehman collapse. However, the level of integration has reduced since the European sovereign debt crisis, especially for high-risk countries such as Greece.

HYPOTHESIS DEVELOPMENT AND DATA DESCRIPTION

As reviewed in the previous section, there is general consensus that ADRs, as receipts traded in U.S dollar in the U.S. market that represent shares in a foreign country, are affected by the foreign market, U.S. market, and exchange rate factors. The relative influence of these factors may vary across market and over time.

Previous literature also studies returns of ADRs during currency and financial crisis (e.g., Bin, Blenman, and Chen, 2004; Pasquariello, 2008). The Euro Crisis, however, is different from any prior crisis. First, the Eurozone, as an economic and monetary union, do not have all the countries affected equally by the Euro Crisis. Also, unlike countries in most of the previous crises examined, the Eurozone countries are more developed. The companies that issue ADRs are large and well-established with operations on a global scale. Many ADRs from the Eurozone are household names, such as Unilevel, Nokia, and Daimler Chrysler. Therefore, the Euro Crisis creates a unique opportunity to study ADR returns. ADRs with the country of domicile in the Eurozone share the same currency, the euro, for their underlying foreign shares. The risk premium from foreign exchange market should be the same across the euro countries. We would expect the similar degree of impact of the movements in the foreign exchange rates on ADR returns no matter where the ADRs are originated.

However, the euro crisis has different impact on countries in the euro area. Some countries such as Greece, Portugal, Ireland, Italy, and Spain are in deeper trouble than the other countries. Germany, for example, is considered safe, and still maintains its AAA rating. It is therefore interesting to examine how country risk is priced for the euro countries during the euro crisis. We anticipate that local factors will become more prominent as the euro crisis unfolds. We expect that the countries in bigger trouble such as Greece, Italy, Spain, etc. should experience higher country risk premium than France or Germany on ADR pricing.

We obtain the initial sample of 52 ADRs from adrbnymellon.com by BYN Mellon and adr.com by J.P. Morgan. We require the ADRs to be originated from the 17 Euro Zone countries and actively traded at both major U.S exchanges (NASDAQ and NYSE) and their home country exchanges or other major European exchanges. The thinly traded ADRs are deleted. For example, CNH GLOBAL NV is listed in Berlin and Frankfurt, but both have very few trading volume. ICON PLC is traded at the Irish exchange, but the trading value is also very low. Following prior literature, we exclude eight ADRs in the finance sector such as ING Group NV and Bank of Ireland. There are 34 ADRs remaining in the sample. We further require that the ADRs and the underlying shares have price and return information available at lease one year before Dubai sovereign debt crisis in Nov. 2009, when the concern over Eurozone started. Three ADRs (Anheuser-Busch Inbev NV, Grifols SA, and Promotora de Informaciones SA) that started after Nov. 2008 are excluded. Due to data availability issue of home country index returns, we delete two ADRs from Luxemburg, and our final sample includes 29 ADRs (See Table 1 for details).

Table 2 summarizes the country of origin of the sample ADRs. 10 countries in the Eurozone have ADRs in our sample. These 10 countries are the most politically and economically important countries in the euro zone, representing 94 percent of the population as of 2011 and 95 percent of GDP as of 2010.[2] The countries in bold face are the five most troubled countries (PIIGS), including Italy and Spain, two of the larger economies in the Eurozone. These countries have an average public debt as 102 percent of GDP, an average deficit as 13.16 percent of GDP, and an average unemployment rate of 16.4 percent, whereas the Eurozone averages are 80 percent, 6.4 percent, and 10.1 percent, correspondingly. Of the 29 ADRs in the sample, there are 10 ADRs originated from the five most troubled countries in the Eurozone, including four from Italy, three from Ireland and one each from Greece, Portugal, and Spain. The other 19

ADRs from the other countries include six each from Netherland and France, five from Germany, and one each from Belgium and Finland.

Table 1: Sample Companies

This table presents the ADRs in the sample. We obtain the initial sample of 52 ADRs from adrbnymellon.com by BYN Mellon and adr.com by J.P. Morgan. We require the ADRs to be originated from the 17 Euro Zone countries and actively traded at both major U.S exchanges (NASDAQ and NYSE) and their home country exchanges or other major European exchanges. Following prior literature, we exclude eight ADRs in the finance sector such as ING Group NV and Bank of Ireland. There are 34 ADRs remaining in the sample. We further require that the ADRs and the underlying shares have price and return information available at lease one year before Dubai sovereign debt crisis in Nov. 2009, when the concern over Eurozone started. Three ADRs that started after Nov. 2008 are excluded. Due to data availability issue of home country index returns, we delete two ADRs from Luxemburg, and our final sample includes 29 ADR.

	Company Name	ADR Symbol	Exchange	Sector	Country	Depositary
1	AIXTRON SE	AIXG	NASDAQ	Electronic Technology	Germany	BNY
2	ALCATEL-LUCENT	ALU	NYSE	Electronic Technology	France	BNY
3	ASM INTERNATIONAL NV	ASM.NL	NASDAQ	Electronic Technology	Netherlands	CITI
4	ASML HOLDING NV	ASML	NASDAQ	Electronic Technology	Netherlands	JPM
5	COCA COLA HELLENIC BOTTLING CO SA	CCH	NYSE	Consumer Non-Durables	Greece	CITI
6	CIE GENERALE DE GEOPHYSIQUE-VERITAS	CGV	NYSE	Industrial Services	France	BNY
7	CRH PLC	CRH	NYSE	Non-Energy Minerals	Ireland	BNY
8	DAIMLER CHRYSLER AG	DCX	NYSE	Consumer Durables	Germany	Global Share
9	DELHAIZE GROUP	DEG	NYSE	Retail Trade	Belgium	CITI
10	ENI SPA	E	NYSE	Energy Minerals	Italy	BNY
11	ELAN CORP PLC	ELN	NYSE	Health Technology	Ireland	BNY
12	REED ELSEVIER NV	ENL	NYSE	Consumer Services	Netherlands	BNY
13	FRESENIUS MEDICAL CARE AG & CO KGAA	FMS	NYSE	Health Services	Germany	BNY
14	FRANCE TELECOM	FTE	NYSE	Communications	France	BNY
15	LUXOTTICA GROUP SPA	LUX	NYSE	Consumer Non-Durables	Italy	DB
16	NOKIA OYJ	NOK	NYSE	Electronic Technology	Finland	CITI
17	KONINKLIJKE PHILIPS ELECTRONICS NV	PHG	NYSE	Producer Manufacturing	Netherlands	CITI
18	PORTUGAL TELECOM SGPS SA	PT	NYSE	Communications	Portugal	BNY
19	RYANAIR HOLDINGS PLC	RYAAY	NASDAQ	Transportation	Ireland	BNY
20	SAP AG	SAP	NYSE	Technology Services	Germany	DB
21	SIEMENS AG	SI	NYSE	Producer Manufacturing	Germany	JPM
22	SANOFI	SNY	NYSE	Health Technology	France	JPM
23	STMICROELECTRONICS NV	STM	NYSE	Electronic Technology	Netherlands	BNY
24	TELEFONICA SA	TEF	NYSE	Communications	Spain	CITI
25	TELECOM ITALIA SPA	TI	NYSE	Communications	Italy	JPM
26	TELECOM ITALIA SPA	TI A	NYSE	Communications	Italy	JPM
27	TOTAL SA	TOT	NYSE	Energy Minerals	France	BNY
28	UNILEVER NV	UN	NYSE	Consumer Non-Durables	Netherlands	CITI
29	VEOLIA ENVIRONNEMENT	VE	NYSE	Utilities	France	BNY

Table 2: Summary of Eurozone countries in the sample

This table illustrates Eurozone countries represented in the sample. The countries in bold face are the PIIGS countries that are in deeper trouble during the Eurozone Crisis. The sources of the population and economics data are from http://en.wikipedia.org/wiki/Eurozone and http://en.wikipedia.org/wiki/Economy_of_the_European_Union.

	Country	# of ADR	Population (2011)	% of euro zone	GDP ($billions. 2010)	% of euro zone	Public debt (% of GDP; 2010)	Deficit (% of GDP; 2010)	Unemp. (%; 2012 M1)
1	Belgium	1	10,918,405	3%	468	4%	96.2	-4.1	7.4
2	Finland	1	5,375,276	2%	239	2%	48.2	-2.5	7.5
3	France	6	65,075,373	20%	2,809	23%	82.3	-7	10
4	Germany	5	81,751,602	25%	3,287	26%	83.2	-3.3	5.8
5	**Greece**	**1**	**11,325,897**	**3%**	**305**	**2%**	**144.9**	**-10.5**	**19.9**
6	**Ireland**	**3**	**4,480,858**	**1%**	**207**	**2%**	**92.5**	**-32.4**	**14.8**
7	**Italy**	**4**	**60,626,442**	**18%**	**2,055**	**17%**	**118.4**	**-4.6**	**9.2**
8	Netherlands	6	16,655,799	5%	781	6%	62.9	-5.4	5
9	**Portugal**	**1**	**10,636,979**	**3%**	**229**	**2%**	**93.3**	**-9.1**	**14.8**
10	**Spain**	**1**	**46,152,926**	**14%**	**1,410**	**11%**	**61**	**-9.2**	**23.3**
	Eurozone		331,963,357	94%	12,408	95%	80.1	-6.4	10.1

Table 3: Summary Statistics

This Table present the summary statistics of the following variables: ADR_Ret is the log weekly country portfolio ADR returns. Home_Ret is the log weekly return of home country's stock market index return in ADR's home country. US_Ret is the log weekly return of U.S. index return and Euro_Ret is the log weekly change in value of euro relative to U.S. Dollar. Our sample contains 1,590 weekly observations for the 10 countries over the sample period from the week of November 12, 2008 to January 25, 2012.

	ADR_Ret	Home_Ret	US_Ret	Euro_Ret
Combined				
mean	0.001219	-0.00146	0.002032	0.000154
median	0.002815	0.002036	0.005466	0.000573
min	-0.25326	-0.17872	-0.11737	-0.03535
max	0.194879	0.119979	0.096386	0.062476
Std. Dev.	0.050343	0.03878	0.031364	0.016086
n	1590	1590	1590	1590
PIIGS=0; Crisis=0				
mean	0.005579	0.00037	0.002296	0.00347
median	0.004967	0.003552	0.003077	0.006438
min	-0.23653	-0.11284	-0.11144	-0.02804
max	0.162843	0.091343	0.096386	0.062476
Std. Dev.	0.062478	0.044271	0.041776	0.016831
n	180	180	180	180
PIIGS=0; Crisis=1				
mean	-0.00217	7.74E-05	0.001928	-0.00116
median	0.001952	0.00366	0.005554	-0.00114
min	-0.25326	-0.16804	-0.11737	-0.03535
max	0.194879	0.113535	0.070747	0.015619
Std. Dev.	0.046983	0.033133	0.026221	0.031452
n	456	456	456	456
PIIGS=1; Crisis=0				
mean	0.008964	0.000823	0.002296	0.00347
median	0.008273	0.004931	0.003077	0.006438
min	-0.24886	-0.12964	-0.11144	-0.02804
max	0.170695	0.119979	0.096386	0.062476
Std. Dev.	0.058007	0.045956	0.041737	0.016831
n	270	270	270	270
PIIGS=1; Crisis=1				
mean	-0.00072	-0.00387	0.001928	-0.00116
median	0.00227	-0.00148	0.005554	-0.00114
min	-0.17489	-0.17872	-0.11737	-0.03535
max	0.159865	0.114694	0.070747	0.015619
Std. Dev.	0.045138	0.037571	0.026221	0.031452
n	684	684	684	684

To study the effect of the Euro Crisis on ADRs from different countries, we create equally-weighted country portfolios for each country and calculate the weekly return of the portfolios. Following Bae, Kwon, and Li (2008), we estimate ADR returns using the following variables. *ADR_Ret* is the log weekly country portfolio ADR returns. *Home_Ret* is the log weekly return of home country's stock market index return in ADR's home country. *US_Ret* is the log weekly return of U.S. index return and *Euro_Ret* is the log weekly change in value of euro relative to U.S. Dollar. Our sample contains 1,590 weekly observations for the 10 countries over the sample period from the week of November 12, 2008 to January 25, 2012. To study the effect of the crisis on PIIGS and non-PIIGS countries, we introduce two dummy variables. PIIGS

equals one for countries Greece, Portugal, Ireland, Italy, and Spain, and zero otherwise. Crisis takes the value one for observation after and including November 2009, and zero otherwise. Table 3 presents the summary statistics of the main variables for the entire sample, and by PIIGS and Crisis. Intuitively, ADR and stock index returns have dropped during the Eurozone crisis. However, PIIGS do not have lower returns during the crisis period.

Table 4 presents the mean returns of home country stock market index (Home_Ret) and the ADRs (ADR_Ret) by country. For each return column, we include the returns over entire sample period, and the periods 'Before' and 'After' the outbreak of Eurozone Crisis. We conduct the mean difference tests between 'Before' and 'After' for each country and the statistically significance is denoted in the 'After' column. Home_Ret are negative for all the countries over the entire sample period except for Finland, Germany, and Netherlands. We do not find that the home market index returns are significantly different after the euro crisis starts. Regarding ADRs, they perform better than their home market indexes over the entire sample period for most the countries, with positive log ADR returns for most countries except Finland. Comparing "Before" with "After", ADR returns are lower in the "After" period for all the countries. However, only Portugal and Spain have significantly lower ADR returns.

Table 4: Summary Statistics by country: Before and after the Eurozone Crisis

Table 4 presents the mean returns by country. *ADR_Ret* is the log country portfolio ADR returns, and *Home_Ret* is the log weekly return of home country's stock index in the ADR's home country. All return columns include the return over entire sample period, and the periods 'Before' and 'After' Eurozone crisis started. We conduct the mean difference test between 'Before' and 'After' for each country and the statistically significance is denoted in the 'After' column. ('*': 5% level).

		Home_Ret			ADR_Ret		
Country	# of ADRs	Overall	Before	After	Overall	Before	After
Belgium	1	-0.045%	0.018%	-0.067%	0.070%	0.641%	-0.135%
Finland	1	0.050%	-0.094%	0.101%	-0.599%	-0.074%	-0.788%
France	6	-0.070%	-0.029%	-0.084%	0.142%	0.785%	-0.088%
Germany	5	0.129%	0.031%	0.164%	0.395%	1.020%	0.170%
Greece	**1**	**-0.942%**	**-0.043%**	**-1.265%**	**0.143%**	**1.114%**	**-0.205%**
Ireland	**3**	**-0.040%**	**-0.070%**	**-0.029%**	**0.219%**	**0.505%**	**0.116%**
Italy	**4**	**-0.295%**	**-0.322%**	**-0.285%**	**0.227%**	**0.445%**	**0.148%**
Netherlands	6	0.042%	-0.029%	0.067%	0.373%	0.675%	0.265%
Portugal	**1**	**-0.186%**	**0.313%**	**-0.366%**	**0.070%**	**1.139%**	**-0.31%***
Spain	**1**	**-0.106%**	**0.261%**	**-0.237%**	**0.180%**	**1.217%**	**-0.19%****

EMPIRICAL EVIDENCE

To examine the return generation of Eurozone ADRs, we first estimate the following model over the entire sample period.

$$ADR\_Ret = \alpha + \beta_1 Home\_Ret + \beta_2\ US\_Ret + \beta_3\ Euro\_Ret + \varepsilon \qquad (1)$$

We report the estimation results in Table 5. Column (1) contains the estimation results for the entire sample. Consistent with previous literature, home country index return, U.S. index return, and euro return are all significantly positively related to ADR returns.

Next, we examine how the crisis affects Eurozone ADR pricing. We first estimate model (1) for the two subperiods separately and report the results in Column (2) and (3) of Table 5. The estimated coefficients of all the returns are significantly positive for both subperiods. We then introduce the interaction terms between the independent return variables and *Crisis*. The results are reported in Column (4). When Crisis=1, ADR returns are significantly more sensitive to home country index returns. However, the impact of euro returns is significantly reduced during the crisis. We do not find significant change in U.S index returns. Overall, our result of local factors as a more prominent pricing factor during the crisis is consistent with our hypothesis and prior literature (Pasquariello, 2008).

Our next task is to examine whether the crisis exert different impact on PIIGS countries versus non-PIIGS countries in the Eurozone. We first repeat the estimation in Table 5 Column (4) for PIIGS countries and non-PIIGS countries separately. That is, we run the regression in (1) including additional interactive variables between the returns variables and Crisis. The results are reported in Table 6. For both groups, local factor, US factor, exchange rates all contribute to ADR pricing. Regarding the impact of the crisis, both groups experience increase local impact in ADR pricing. Strangely, PIIGS country ADRs are affected less by exchange rates following the outbreak of the crisis. We also document a decrease in U.S factor for non-PIIGS countries, but no change for PIIGS countries. ADR investors seem to rely less on U.S market return as a pricing factor for the relatively healthy countries in the Eurozone.

Table 5: Determinants of ADR returns before and after the Eurozone Crisis

We estimate the following model: $ADR\_Ret = \alpha + \beta_1 Home\_Ret + \beta_2 US\_Ret + \beta_3 Euro\_Ret + \varepsilon$ and report the coefficients and t-statistics from the OLS regression. '*' denotes significance at 10% confidence level; '**' denotes significance at 5% confidence level; '***' denotes significance at 1% confidence level. Robust t statistics in parentheses.

y=ADR_ret	(1) Overall	(2) Before	(3) After	(4) Overall, Crisis
Home_Ret	0.51	0.38	0.59	0.38
	(12.10)***	(5.32)***	(10.85)***	(5.33)***
US_Ret	0.57	0.59	0.56	0.59
	(10.80)***	(7.14)***	(8.18)***	(7.15)***
Euro_ret	0.59	0.76	0.47	0.76
	(9.79)***	(5.64)***	(8.17)***	(5.65)***
Crisis				-0.004
				(1.94)*
Crisis*Home_Ret				0.21
				(2.34)**
Crisis*US_Ret				-0.04
				(0.33)
Crisis*Euro_Ret				-0.29
				(1.97)**
Constant	0.001	0.003	0.00	0.003
	(0.91)	(1.85)*	(0.59)	(1.86)*
Obs.	1590	450	1140	1590
R-squared	0.61	0.59	0.64	0.62

We conduct another set of regressions to further examine the difference in pricing between PIIGS and non-PIIGS country ADRs. Specifically, we add interactive terms between PIIGS and the explanatory return variables to Model (1). Table 6 shows the results. Before the

crisis, all the coefficients of the interactive terms are insignificant, indicating similar return generation process for PIIGS and non-PIIGS countries. However, after the crisis started, ADR investors seem to rely less on local factor but more on U.S. market return for PIIGS countries than for non-PIIGS countries.

Table 6: Determinants of ADR returns: PIIGS versus non-PIIGS before and after the Eurozone Crisis
We examine whether the crisis exert different impact on PIIGS countries versus non-PIIGS countries in the Eurozone. In Panel A, we run the regression in model (1), ADR_Ret =α+ β_1Home_Ret+ β_2 US_Ret + β_3 Euro_Ret +ε, including additional interactive variables between the returns variables and Crisis for PIIGS countries and non-PIIGS countries. In Panel B, we conduct another set of regressions to further examine the difference in pricing between PIIGS and non-PIIGS country ADRs. Specifically, we add interactive terms between PIIGS and the explanatory return variables to Model (1). '*' denotes significance at 10% confidence level; '**' denotes significance at 5% confidence level; '***' denotes significance at 1% confidence level. Robust t statistics in parentheses.

Panel A: y=ADR_Ret	Non-PIIGS countries	PIIGS countries	**Panel B:** y=ADR_Ret	Before Crisis	After Crisis
Home_Ret	0.34	0.39	Home_Ret	0.34	0.8
	(2.78)***	(4.55)***		(2.78)***	(7.41)***
US_Ret	0.69	0.54	US_Ret	0.69	0.31
	(4.45)***	(5.74)***		(4.44)***	(2.33)**
Euro_Ret	0.55	0.9	Euro_ret	0.55	0.42
	(2.18)**	(5.99)***		(2.17)**	(4.45)***
Crisis	-0.004	-0.004	PIIGS	0.002	0.003
	(1.27)	(1.46)		(0.61)	(1.86)**
Crisis*Home_Ret	0.45	0.15	PIIGS*Home_Ret	0.05	-0.26
	(2.77)***	(1.40)		(0.32)	(2.08)**
Crisis*US_Ret	-0.38	0.08	PIIGS*US_Ret	-0.15	0.3
	(1.84)*	(0.62)		(0.84)	(1.93)*
Crisis*Euro_Ret	-0.13	-0.37	PIIGS*Euro_Ret	0.35	0.1
	(0.47)	(2.24)**		(1.18)	(0.85)
Constant	0.002	0.004	Constant	0.002	-0.002
	(0.63)	(1.96)**		(0.63)	(1.70)*
Obs.	636	954	Obs.	450	1140
R-squared	0.58	0.66	R-squared	0.59	0.64

Finally, we conduct regression for each country, regressing log return of each country portfolio on the three variables in Model (1). We separate the sample into 2 periods, 'Before' and 'After' according to the outbreak of the crisis. Table 7 presents the results. For the largest two economies, France and Germany, the ADR returns are determined by all three variables regardless the outbreak of the euro crisis. All variables are statistically significant at the 1% (5%) level. For some countries such as Belgium, Greece, Italy, and Spain, interestingly, in the 'Before' period, the ADR returns are not determined by their own country's market returns but on either U.S. market or Euro rate or both. That is, U.S. investors price ADR based on U.S. market and euro rates. However, in the 'After' period, U.S. investors added home market return into ADR pricing for these countries. For all countries, when we compare the size of coefficients of local market return in the "Before" and "After" periods, the coefficients in the 'After' period are all economically larger than in 'Before' period. Therefore, after the outbreak of euro debt crisis, U.S. investors place more weight of each country's market performance in ADR pricing.

Table 7: Determinants of ADR returns by country, before and after the Eurozone Crisis

We conduct regression for each country, regressing log return of each country portfolio on the three variables in Model (1): ADR_Ret =α+ β_1Home_Ret+ β_2 US_Ret + β_3 Euro_Ret +ε. We separate the sample into 2 periods, 'Before' and 'After' according to the outbreak of the crisis. '*' denotes significance at 10% confidence level; '**' denotes significance at 5% confidence level; '***' denotes significance at 1% confidence level. Robust t statistics in parentheses.

Panel A: Non-PIIGS										
	Belgium		**Finland**		**France**		**Germany**		**Netherlands**	
	Before	After	Before	After	Before	After	Before	After	Before	After
Home Ret	-0.179	0.405	0.4	1.037	0.281	0.658	0.588	0.67	0.305	0.602
	(1.04)	(2.91)***	(1.64)	(3.25)***	(2.42)**	(9.15)***	(4.18)***	(8.21)***	(2.10)**	(5.81)***
US Ret	0.701	0.373	1.125	0.151	0.475	0.626	0.559	0.475	0.797	0.661
	(2.57)**	(2.30)**	(3.59)***	(0.37)	(3.99)***	(5.54)***	(3.10)***	(4.30)***	(5.42)***	(4.49)***
Euro Ret	0.524	0.36	-0.092	0.387	1.125	0.527	0.605	0.463	0.49	0.452
	(1.31)	(2.20)**	(0.11)	(1.25)	(3.27)***	(6.57)***	(2.24)**	(4.16)***	(1.10)	(3.85)***
Cons.	0.004	-0.002	-0.005	-0.008	0.003	-0.001	0.007	0	0.004	0.001
	(0.59)	(0.65)	(0.57)	(1.76)*	(0.95)	(0.83)	(2.36)**	(0.12)	(1.24)	(0.75)
R-sq.	0.43	0.43	0.5	0.44	0.82	0.91	0.87	0.84	0.84	0.83
Panel B: PIIGS										
	Greece		**Ireland**		**Italy**		**Portugal**		**Spain**	
	Before	After	Before	After	Before	After	Before	After	Before	After
Home Ret	0.246	0.351	0.606	0.987	0.187	0.408	0.568	1.07	0.213	0.728
	(1.29)	(4.13)***	(2.59)**	(6.44)***	(1.50)	(5.06)***	(2.58)**	(5.59)***	(0.98)	(9.65)***
US Ret	0.846	0.652	0.327	0.369	0.821	0.762	0.366	0.105	0.339	0.363
	(4.61)***	(3.36)***	(0.95)	(2.27)**	(4.91)***	(6.11)***	(2.63)**	(0.57)	(1.27)	(3.59)***
Euro Ret	1.071	0.583	0.803	0.548	0.814	0.441	0.965	0.541	1.203	0.593
	(2.03)**	(2.12)**	(1.73)*	(3.98)***	(3.52)***	(4.54)***	(2.67)**	(2.02)**	(5.83)***	(5.25)***
Cons.	0.005	0.002	0.002	0.001	0.001	0.002	0.007	0.001	0.006	0
	(0.59)	(0.52)	(0.33)	(0.61)	(0.26)	(1.06)	(1.44)	(0.16)	(1.59)	(0.21)
R-sq.	0.55	0.47	0.59	0.82	0.85	0.86	0.62	0.6	0.66	0.82

CONCLUSION

This paper presents first evidence of the impact of Eurozone crisis on the return generating process of Eurozone-originated ADRs. Consistent with our hypothesis, we document increased impact of home factor in determining ADR returns. Although still significant, exchange rate factor becomes less important in pricing during the crisis. We further examine countries in deeper trouble (PIIGS country including Greece, Portugal, Ireland, Italy, and Spain) versus the other countries in the Eurozone. We document that the classification of PIIGS insignificant in determining the sensitively of ADR returns to home country index returns, U.S. index returns, and euro exchange rates, indicating that the Eurozone ADRS are priced similarly. However, significant differences emerge after the start of the crisis. Surprisingly, ADR investors seem to rely less on local factor and exchange rates for PIIGS countries than for non-PIIGS countries.

ENDNOTES

1 For example, Lamont and Thaler (2003) discusses the case of Infosys, an Indian information technology company, whose ADRs were once trading at a 136 percent premium to the underlying Bombay-listed shares listed in 2000. Puthenpurackal (2006) finds that the significant premium can be partly explained by

several factors including a limited supply of ADR and a downward-sloping demand curve, significant transaction costs associated with directly purchasing the home share, and trend chasing by smaller and potentially uninformed investors.

2 Source: The sources of the population and economics data are from http://en.wikipedia.org/wiki/Eurozone and http://en.wikipedia.org/wiki/Economy_of_the_European_Union.

3 As a robustness test, we adopt orthogonal variable for the local market. Since euro exchange rates can potentially affect the economy and the stock markets in Eurozone, we need to separate the effects of exchange rate and home market return on ADR returns. To obtain the orthogonal variable for the local market, we regress home market return on euro rate and replace the home market return with the residual from the regression. Our results are similar with the orthogonal variable.

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CROSS-CULTURAL INDUSTRIAL RELATIONS IN THE CONTEXT OF SOCIOECONOMIC CHANGES: THE WEST, THE EAST, AND THE EMERGING MARKETS

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ABSTRACT

This study takes a comparative approach to identify and address some current trends in unionization and cross-cultural variation in collective bargaining, with special attention to socioeconomic changes and their impacts on union density rates in different economic sectors, societal norms about organized labor, and emerging shifts in collective bargaining coverage and grassroots tactics. Key issues examined include cultural values, different concepts and ideologies about the labor movement, and unions' responses to economic globalization, privatization, and market liberalization, which tend to undermine their bargaining power and recruitment. International labor statistics indicate that trade unions have been declining in most industrial societies, largely due to the economic shift from manufacturing-oriented to the traditionally non-unionized service sectors, coupled with the relocation of numerous blue-collar jobs to overseas operations. In contrast, globalization and rapid industrialization have led to the growth of trade unions in some emerging markets, particularly expanding into the private and foreign-owned sectors. Unions' adaptation in fast growing economies such as China presents an unprecedented opportunity to establish collective bargaining as an effective tool of labor market governance and for organizational justice. Implications for future research are discussed and suggestions for effective conflict resolution are provided.

Keywords: culture, institutional context, emerging labor markets, unionization trends, collective bargaining, international labor relations

INTRODUCTION

The field of comparative industrial relations seeks to understand, describe, and analyze labor relations systems in different countries. In the face of enhanced global competition, firms are increasingly going international to seek new business opportunities in more cost-efficient ways. This may be achieved through outsourcing or relocation of jobs and capital to overseas operations. Coupled with this trend is the challenge to effectively manage cross-cultural labor relations, particularly between the organized labor and management. While national differences in wages, skills, technology advancement, infrastructures, and proximity to natural resources offer potential comparative advantages to the business organizations, the transfer of competence across borders has to be accomplished through people, including both blue-collar and white-collar employees whether in a unionized or union-free work environment. In any event, international industrial relations present a key strategic issue to both cross-border business

managers and local trade unions because the nature of management-labor relationship can greatly impact an organization's workforce stability, public image, productivity, and global competitiveness (Yang, 2008).

The purpose of the present study is to examine some important factors surrounding international industrial relations. It takes a comparative approach to highlight and analyze current trends in unionization and variations in collective bargaining across borders, with special attention to cultural traditions, institutional conditions, and ongoing socioeconomic changes that interact to impact the union density rates and collective bargaining coverage in different economic sectors. The study also offers international data, both quantitative and qualitative, to contrast societal norms about organized labor and emerging shifts in collective bargaining coverage and grassroots tactics, particularly in the emerging labor market such as China. Through this endeavor, multinationals' adaptations in the host-country context and responses from the local trade unions are examined to generate specific implications for the practical field. Based on recent international labor statics and country-firm specific cases, a comparative framework of key factors influencing international industrial relations is formulated to provide suggestions for future research.

SOCIOECONOMIC CHANGES AND UNION DENSITY TRENDS

Historically, trade unions have played a critical role in the early phase of industrialization of many developed countries today to end child labor practices, improve workplace safety, and increase wages and welfare for the workers and the working class families. Recent international labor statistics (e.g., Eurofound, 2004; ILO, 2006; OECD, 2008; USBLS, 2006; ACFTU, 2007), however, indicate that organized labor has been declining in most industrial nations with a few exceptions like in Finland and Sweden. In contrast, trade liberalization and rapid industrialization in some Asian societies have led to the growth of trade unions, such as in Cambodia, Indonesia, South Korea, and China, particularly expanding into the private and foreign owned sectors. By mid 2006, for example, about 30% of foreign companies in China had set up unions, including the world largest retailer Wal-Mart, known for its anti-union stance, and its direct rival the French retailer Carrefour SA. By September 2008, most fortune 500 multinationals doing business in China had allowed unionization. The All-China Federation of Trade Unions (ACFTU) is aiming at 60%-80% of the foreign companies and Chinese local firms to allow the workforce unionization. The emerging divergence and convergence in unionization trends across borders can be attributed to their differing cultural, economic, political, and legal environments.

Union Density Trends and Variations in Western Industrial Societies

The strength of trade unions are often measured by union density rates, union membership as a proportion of wage and salary earners in the workforce. The membership of trade unions in absolute terms or as a proportion of their potential eligible workers has always been an issue of major interest to industrial relations practitioners and researchers. The size and representativeness of the trade unions are key factors in understanding national industrial

relations systems (Carley, 2004). A series of studies have shown that sound labor relations can provide a competitive advantage for an organization through improved productivity, labor stability, due process, and adaptability in the host-country context (e.g., Fatehi, 2008; *Fashoyin; 1998;* Fong & Zimmerman, 2006; Silva, 1996; Yang, 2008). Conversely, labor dissatisfaction can lead to union strikes and social unrest, detrimental to an organization's operations and public image. Trade unions may constrain multinationals' strategic alternatives in at least three ways: cost structure (e.g., wage levels and benefits), employment levels (e.g., organizational restructure and retrenchment), and global integration of operations (e.g., geographical expansion and coordination). However, the size of the trade unions based on their total membership per se is not an accurate reflection of the unions' power and influence in the labor market. In other words low union density rates do not necessarily mean weak union impacts and vice versa. As illustrated in Table 1, among Western industrial nations, collective bargaining coverage in the United States (13.8% of the labor force) is only slightly above the national union membership (12.5%); whereas in France, despite the lowest union density rate (8.2%) in the Western industrial world, collective bargaining agreements cover as much as about 95% of the labor force in the country.

Table 1: Union Density and Bargaining Coverage by Percentage

Country	Union Density	Coverage	Percentage Change 1970-2003
U.S. 2004	12.5	13.8	-11.1
Canada 2004	30.3	32.4	-6.5
France 2003	8.3	95.0	-13.4
Netherlands 2003	22.3	82.0	-14.2
Germany 2003	22.6	63.0	-9.5
U.K. 2004	28.8	35.0	-15.5
Austria 2002	35.4	99.0	-27.3
Norway 2003	53.3	77.0	-3.5
Finland 2003	74.1	95.0	22.8
Sweden 2003	78.0	92.0	10.3
EU Average 2008	25.0	66.0	-11.5
Japan 2003	19.6	23.5	-15.4

Sources: Data adapted from Eurofound, 2004; OECD, 2008.

Overall, union density rates and the collective bargaining coverage are higher among developed countries in Europe than in North America and Japan. However, there is a striking degree of variations both between countries and within-country in different economic sectors. While the trends appear convergent toward the decline of the organized labor with a few exceptions like in Finland and Sweden (Table 1), unionization rates in the public or government sectors have remained high in most Western industrial societies (Table 2).

Table 2: Union Density Rates in the Face of Socioeconomic Changes

Country	Private	Public	Male	Female
U.S. 2004	7.9	46.4	13.8	11.1
Canada 2004	17.8	72.3	30.6	30.3
U.K. 2004	17.2	58.8	28.5	29.1
Austria 1998	29.8	68.5	44.0	26.8
France 2003	5.2	15.3	9.0	7.5
Germany 1997	21.9	56.3	29.8	17.0

Table 2: Union Density Rates in the Face of Socioeconomic Changes				
Country	**Private**	**Public**	**Male**	**Female**
Netherlands 2001	22.4	38.8	29.0	19.0
Norway 1998	43.0	83.0	55.0	60.0
Sweden 1997	77.0	93.4	83.2	89.5
Finland 2001	55.3	86.3	66.8	75.6
Sources: Data adapted from Eurofound 2004.				

Another notable shift among the Western industrial societies is the increased female participation in unionization. As shown in Table 2, Canada and the United Kingdom have reached equal rates of unionization by gender and a number of countries have revealed even higher rates of female unionization than their male counterparts, like in Norway, Sweden, and Finland. According to a regional study involving 23 EU member nations, two candidate nations, and Norway (Carley, 2004), women's average share of union membership rose from around 39% in 1993 to 41.5% (with men's share averaged around 58.5%) in 2003. Women have made up a growing portion of union members in most trade union confederations, federations, and alliances among the 26 surveyed European nations, with the upward trend particularly prominent among the Nordic countries. The trend of union membership by gender, however, is not universal. Exceptions to the overall upward female unionization are almost among the central and eastern European countries, where economic and political changes have led to the massive unemployment, with significant gender bias in the organizational decisions to keep, fire, or recruit staff in both private and public sectors. Among Nordic countries, a strong cultural orientation on femininity values and statutory provisions requiring more female representation in political and economic forums have led to remarkable upward female unionization.

Union Membership Trends and Key Factors

The overall decline of union densities within the industrial world can be attributed to a number of factors. First of all, the shift from manufacturing-oriented to service-oriented economies has significantly reduced the size of traditional unions. In the face of enhanced global competition, many organizations have outsourced or moved their manufacturing jobs and assembly lines to developing countries. Organized labor by tradition had a stronghold among blue-collar employees in the manufacturing sectors but had little appeal in the service sectors. The loss of numerous blue-collar jobs to foreign locations has undermined the union power and union recruitment.

Second, capital is more mobile than labor. Whereas economic globalization and worldwide variations in wages, benefits, tax obligations, and natural resources provide multinational firms with more business opportunities and compelling incentives to relocate jobs or to close domestic plants, labor unions remain separated and constrained by the national borders. National differences in labor costs, working hours, job security, health care and pension plans, to mention a few, make it very difficult for trade unions to agree on priority goals of many work-related issues. In addition, unions based at the multinationals' foreign subsidiaries are geographically remote from the corporate headquarters where important decisions such as restructuring, relocation of operations, and flows of foreign direct investment (FDI) are being

made with little or no involvement of the organized labor. It is hence difficult for the local unions to be adequately aware of the corporate global strategies. It is subsequently uneasy to coordinate union responses across national boundaries. Multinationals' ability to relocate capital, downsize, and temporarily or permanently replace striking employees poses a big challenge to trade unions, threatening unions' bargaining power and also significantly diminishing the impact of union strikes.

Third, in most countries, union contracts with employers are applied to non-union members of the bargaining unit. Non-union members gain the same wage increases, benefits and other entitlements as members do although the percentage of the total workforce covered by the negotiated agreements may vary depending on whether the collective bargaining is conducted at the enterprise level, industry level, regional or national level (to be discussed later). This creates a tendency among eligible employees to take a free-ride without an equal share of union dues or behavioral commitments.

Some key factors help further explain the convergence and divergence in union density trends in different economic sectors, including rapid socioeconomic changes (e.g., economic globalization, privatization, growth of service sectors, more women entering the workforce, alternative ways of employment such as self-employed and part-timers), equal employment opportunity legislations and labor law enforcement to protect workers' rights, different cultural values and ideologies pertaining to the labor movement, and trade unions' effort to adapt and recruit in the public and service sectors. The following examines those key factors in the cross-cultural context.

DIVERSE SYSTEMS IN ORGANIZED LABOR AND COLLECTIVE BARGAINING

Labor unions, commonly called trade unions, negotiate labor contracts with employers through a collective bargaining process on behalf of union members. This may include the negotiation of wages, benefits, rights and responsibilities of both parties, grievance procedures, rules and criteria governing hiring, firing and promotion of workers, workplace safety issues and many other policies and programs. Collective bargaining agreements are binding on the employer and the rank and file union members (as opposed to officers or managers), in most cases also covering non-member workers of the entire bargaining unit. When employees are unionized, management-labor relationship becomes more formal through a union contract and is subject to country-specific social expectations, economic conditions, labor law, and government regulations.

Collective Bargaining and Coverage

Collective bargaining is consisted of the process and activities of negotiation between a union and an employer represented by management. Bargaining levels vary across borders. It may take place at the national, regional, industry or enterprise level. Although in no countries collective bargaining operates solely at one level, in Canada and the United States collective bargaining is largely conducted at the firm level (single-employer bargaining), other than

involving specific industrial sectors such as coal, steel, trucking and construction industries. In some European countries, such as Germany and the United Kingdom, collective bargaining normally takes place at the industry level (multi-employers bargaining) by region. Those levels of labor-management negotiation are not necessarily mutually exclusive, but rather different issues may be taken up at different levels. In many continental European countries, like Austria, the Netherlands, Finland, and Sweden, collective bargaining over wages is conducted at the national level between national federations of labor unions and employers' associations.

National differences in collective bargaining levels are reflected in the coverage rates, the percentage of employed wage and salary earners whose terms of employment are affected by the collective bargaining agreements reached between unions and employers. Multi-employers bargaining practices and public policies extending the negotiated contract to non-unionized organizations have led to very high coverage rates in most industrial European countries, far exceeding their respective national union density rates (Visser, 2006). In contrast, on a decentralized basis, such as collective bargaining at the firm level, negotiated contract coverage rates are much lower and only slightly above the national union membership as in the case of the United States, Canada, and Japan (Table 1).

Culture and Labor Relations in the West

It is important to realize the difficulty in comparing cross-cultural differences in managing industrial relations. To begin with, the concept and ideology about organized labor vary across borders. For example, trade unions in many Western European countries view the collective bargaining as an ongoing class struggle between labor and capital, whereas in the United States unions tend to take a more pragmatic approach rather than an ideological view (Dowling & Welch, 2005). While organized labor is an integral part of the U.S. business society, they are not as politically powerful or socially influential as do their counterparts in Germany, France, the United Kingdom, Sweden, and some other European countries. There is no American equivalence of the British Labor Party. In the United States, the union turfs are primarily concentrated on the workplace related issues. Collective bargaining between labor and management is by and large decentralized, mostly conducted at the firm level. In contrast, collective bargaining practices at the industry and national levels have resulted in highly centralized labor relations systems in many European industrial societies.

National Culture

Culture values significantly influence the labor movement and management attitudes towards the organized labor in different societies. In comparison with other industrial countries, employers in the United States have generally opposed unions (Kleiman, 2004), and the industrial relations are more adversarial (Fatehi, 2008). Employers have advocated "rugged individualism" as a traditional American value in opposition to "foreign" or "subversive" principles espoused by the unions (Kleiman, 2004: 378). The legal status of a trade union to represent workers is bestowed only if it gains the majority support of the workers. Even when a

workforce is unionized, the union can be removed through a decertification election. In the face of global competition and economic downturns, responsive organizational actions, such as restructuring, forced unpaid vacations, plant closures and layoff scales, are largely determined by the market conditions for the focal firm, typically with minimum government intervention.

In contrast, in collectivism-oriented cultures, such as Japan, labor unions take a less adversarial posture against the firms and vice versa. In Japan, labor unions are not viewed as a separate entity independent of the business enterprise, but rather as an extension of the business enterprise. In some large plants, supervisors are often elected as union representatives (Takahashi, 1990). As well, management often appoints union leaders (Hodgetts & Luthans, 1994). A distinct feature of the Japanese management practices is lifetime employment and no-layoff policies. Although global competition and economic downturns are eroding the foundation of lifetime employment in Japan, most large Japanese organizations still follow this tradition (Fatehi, 2008). Lifetime employment and a seniority-based system foster a corporate culture of paternalism and an attitude of cooperation between management and labor. The paternalistic role of top managers to protect and improve the welfare of the subordinates, as caring parents being supposed to know better than their subordinates what should be done and what is good for them in a long run, and subordinates' absolute respect for the seniors as parental figures within a corporate family are strongly rooted in the Japanese business culture. Lifetime employment and a seniority-based organizational system also give workers a high degree of certainty in the workplace regarding how they will advance in jobs, wages, career aspirations, and other amenities. Those practices have created the "enterprise unions" in the Japanese culture of commerce, with a much lower frequency of labor strikes than most of the Western industrial countries. Japanese enterprise unionism reflects Japan's traditional low turnover of labor and seniority-based organizational culture, whereby workers tend to identify commonly with the company rather than with the enterprise union, and union strikes are rare, prescheduled, and short.

Institutional Context

Industrial relations in different countries cannot be understood without an appreciation of their historical origin and an understanding of the normative ways in which rules are established and implemented and decisions are made in a society (Schregle, 1981). For example, the United States has been a fertile ground for human relations theories, job redesign models, employee empowerment, and participative management, but there is no legal-formal instrument for joint decision making by management and labor, like the codetermination (*Mitbestimmung*) system in Germany where companies with more than 500 employees are governed by two boards: the supervisory board (*Aufsichtsrat*) and the management board (*Vorstand*). The supervisory board is an equivalence of the board of directors in a typical American corporation and is a policy making body. However, with the German model, shareholders and unions elect the supervisory board in equal number, except that under the codetermination law the head of the supervisory board is a shareholder representative. The supervisory board appoints the management board and its content is required on matters such as mergers and acquisitions, new plant locations, and

important foreign investment decisions. Although not gaining complete parity, there has been solid political consensus, laying the foundation for decades of labor stability. The German model of equal power distribution between labor and management reflects both a post World War II (WWII) institutional choice and a strong cultural value orientation on egalitarianism.

The German model of codetermination was originated after the WWII as a national desire to democratize the workplace and to jointly rebuild the shattered economy. It was also driven by the policy of the Allied forces, particularly the British, to strengthen the labor movement in the post-WWII Western Germany (Ewing & Hibbard, 2005; Fatehi, 2008). In Germany, the Codetermination Act (1951), amended in 1956, and the Codetermination Law (1976) granted labor 50% of the seats on the corporate supervisory board and management board. Thus the top executives do not have as much power as their U.S. counterparts, and have to obtain consensus on matters such as the purchase of land and property, buying or selling stocks of other companies, long-term loans, mergers and acquisitions, new plant locations, and important investment decisions (Fatehi, 2008).

In comparison, the U.S. model of participative management is a voluntary organizational behavioral approach advocated by management for informal sharing of decision making with workers at the workplace. Important organizational decisions such as restructuring, retrenchment, outsourcing, and relocation of jobs and capital are normally determined by the top executives, with a strong emphasis on the market forces. The Works Council, a commonly practiced structural approach in many European countries, such as Germany, the Netherlands, Belgium, France, and Italy, is totally absent in the U.S. model of managing industrial relations. As an American resemblance to the European rooted Works Council, “company unions” were once established by employers, which met with management to discuss working conditions, but which were outlawed by the National Labor Relations Act (1935), also known as the *Wagner Act*. Historically the organized labor in the United States fought against the “company unions” as a management gimmick to replace independent labor unions or to curb the union power.

In Europe, the Works Council is a "shop-floor" organization representing workers, which functions as a local and firm-level complement to national labor negotiations. Within highly centralized collective bargaining systems, local plants and firms work with the Works Councils to adjust the national agreements to their respective local circumstances. The emphasis is on industrial democracy and power equalization between labor and management, particularly by the German model of codetermination.

It is important to note that the concept of industrial democracy is implemented in different forms in Europe, but the German model of codetermination has exerted a powerful influence on the labor movement elsewhere. For example, the Works Councils exist with different names in a variety of related forms in a number of European countries, like in Germany (*Betriebsrat*), the Netherlands (*Ondernemingsraad*), France (*Comité d'Entreprise*), Belgium (*Conseil d'Entreprise*) and Spain (*Comité de empresa*). In the face of the enlarged regional economic integration, eastern European countries are also increasingly influenced by the German model (Fatehi, 2008). In a nutshell, the European approach to industrial democracy is a formal, usually legally sanctioned arrangement of workers’ representation at various levels of management decision making, as compared to the informal voluntary style in the United States.

Although regional economic integration has enhanced labor mobility and the European Works Council has been established to coordinate collective relationships between multinationals and employees in the region, ideological divisions persist within the labor movement. In Germany, for example, unions are viewed as business partners and labor stability is achieved through a national model of consensus. There is a greater reluctance among employees in the public sectors to challenge the law, or to be on edge. A basic assumption is that a civil servant has to be loyal to the state. In contrast, the French are more used to social conflict as a means to express the labors' rights and defend their interests (Pommereau, 2007). French unions are highly political and ideologically oriented, and have held on to a society-changing agenda. Despite a very low union density rate in France, unions enjoy strong public support. Even non-union members fully support the unions in a crisis or when they are called on to strike.

Union Density Trends and Labor Relations in the East

Overall, unionization rates in many Asian countries are relatively low, and collective bargaining at the enterprise level has been more common rather than at the industry or regional level. This accounts for the relative non-involvement of employers' associations in collective bargaining. Large numbers of small and family owned businesses also contribute to low unionization in Asia. In the face of rapid socioeconomic changes and significant advances in technology, trade unions in Asia's fast growing economies have experienced mixed fortunes.

On one hand, recent statistics (e.g., ILO, 2006) indicate a notable growth of trade unions in some Asian countries such as revealed in Cambodia, Indonesia, South Korea, and China, particularly expanding into the private and foreign owned sectors. While the trend has been driven by rapid industrialization and trade liberalization, union density rates vary across different industries. For example, Cambodia has reported a high union density rate of 43.1% in the garment industry, the largest sector of formal employment in the country. Sri Lanka has shown a union density rate of 30% in the country's highly organized plantation sector. Industry-wide collective bargaining in the plantation sector is practiced in several South Asian countries. On the other hand, market liberalization, economic restructuring, and government deregulation have driven an overall decline of union density rates in many private sectors. Where data exist, collective bargaining coverage has fallen below 5% in some countries like in India, Malaysia, the Philippines, and Thailand. The following will focus on the changing role of the trade unions in China, a fast-growing economy as well as a culturally distinct society, and their impacts on both the local private firms and foreign invested firms.

Socioeconomic Changes and Grassroots Approaches in the Emerging Labor Market

Founded in May 1925, the All-China Federation of Trade Unions (ACFTU) is the official trade union in the People's Republic of China. Its membership totals 169.94 million, of which women account for 36.4%, and migrant workers make up 24.1%. The union density rate is 73.6% (ACFTU, 2006). Although to outsiders, the ACFTU appears to be monolithic, in practice

it functions very differently in different workplaces and across different levels. Table 3 summarizes the trade union structures and primary functions in China.

Table 3: Trade Union Structures and Primary Functions in China

Trade Unions Structures	Primary Tasks	Working Priorities	Special Topics and Social Functions
▪ Chinese Educational, Scientific, Cultural, Health and Sports Workers' Union ▪ Chinese Seamen and Construction Workers' Union ▪ Chinese Energy and Chemical Workers' Union ▪ Chinese Machinery, Metallurgical and Building Materials Workers' Union ▪ Chinese Defense Industry, Postal and Telecommunications Workers' Union ▪ Chinese Financial, Commercial, Light Industry, Textile and Tobacco Workers' Union ▪ Chinese Agricultural, Forestry and Water Conservancy Workers' Union ▪ All-China Federation of Railway Workers' Unions ▪ Chinese Aviation Workers' Union ▪ Chinese Financial Workers' Union	▪ Protect the overall interests of the whole people ▪ Protect workers' specific interests ▪ Organize workers and fight for labor rights ▪ Better voice workers' concerns ▪ Fulfill social functions of protection, construction, participation and education in an all-round way ▪ Unite to strive for the realization of the country's socialist modernization ▪ Adjust labor relations and improve the trade union protection mechanism ▪ Promote economic and social development ▪ Actively participate in national decision-making and help poverty-stricken workers tide over their difficulties ▪ Ensure good performance ▪ Unite and mobilize the workers to contribute their share to the fulfillment of the country's economic and social development programs	▪ Protect workers' rights at source ▪ Coordinate labor relations ▪ **Promote employment** ▪ **Care for the well-being and health of workers** ▪ Build trade unionism ▪ Enhance the quality of workers ▪ Protect migrant workers' rights and interests ▪ Develop international exchanges and cooperation	▪ Participation in legislation ▪ Legal supervision ▪ Legal aid ▪ Collective contract ▪ Labor contract ▪ Labor protection ▪ Organizing drive ▪ Wage distribution ▪ Social security ▪ Democratic management ▪ Employment protection ▪ Labor disputes ▪ Migrant workers ▪ Work related to women ▪ Labor insurance ▪ Model workers ▪ Worker competition ▪ Worker education ▪ Workers sanatorium ▪ Cultural and sports activities ▪ Unions in private sectors ▪ Unions in foreign enterprises ▪ Poverty relief

As illustrated in Table 3, there is a variety of union structures, such as enterprise unions, white-collar unions, craft unions, industrial unions, regional federations, etc. The Trade Union Law (1992), the Labor Contract Law (2008), and the Constitution of the Chinese Trade Unions (1998) and Amendments (2009) provide the legal protection and fundamental principles for workers' rights, including the freedom of unionization and unions' right to negotiate collective agreements. The basic duty of the Chinese trade unions is to protect and strengthen the legitimate rights and interests of workers in accordance with the law.

By tradition the function of the trade unions in China is primarily to advocate workers' participation in the workplace activities, care about their wellbeing and family needs such as housing, childcare and eldercare concerns, and organize social and recreational activities, including organization-sponsored entertainment arrangements, holiday celebrations, sports events, retirement parties, and periodical home visits and reunions with the retired and senior workers. Such practices reflect the Chinese cultural tradition that values social harmony, respect for age and seniority, and work-family integration. Deeply rooted with the collectivistic cultural

values, organizations are often seen as a big family (*da-jia*: 大家) as opposed to one's own family (*xiao-jia*: 小家). Workplace is often regarded as a small society, where labor unions are an integral part of the collective, as a member unit within an organization rather than a separate entity independent of the business enterprise. Most employees in the state-owned enterprises automatically join a union. Unions have by and large maintained a close relationship with management, and union strikes are rare despite of the workers' right to strike bestowed by the Chinese constitution. Those practices and historical developments have created the labor relations that are uniquely Chinese. This traditional role of the Chinese trade unions persists in today's most state-owned enterprises, whereas the union activists strive to penetrate and adapt in the private and foreign-invested sectors, thereby getting increasingly engaged in unionization and recruiting, collective bargaining, and informal grassroots tactics.

In the Maoist China, workers were viewed as the vanguard of society and worked together with cadres at various levels to create a socialist system. Most enterprises were state-owned with lifetime employment and seniority-based policies. Job security was taken for granted, often referred to as an "iron rice bowl" system. In the post-Mao era, however, the "iron rice bowl" has been crumbled for millions of the employees. Through rapid socioeconomic changes and business privatization, the number and size of the state-owned enterprises have drastically dropped. Mergers, acquisitions, retrenchment and layoffs, and profit-driven management styles have become more commonly seen in the country. More than 70% of the Chinese economy is now in the private sector, more than some European countries (Walker, 2008). Working for private or foreign-invested companies usually means working very hard, working overtime, and working with no job security. China's fast-growing economy and open-up policy in the era of globalization have significantly improved the standard of living for many ordinary working class people such as workers, shopkeepers, and even peasants. To the laid-off workers and peasants who are displaced from their land, however, the gap between rich and poor has economically and socially deteriorated.

China's entry into the World Trade Organization (WTO) in 2001 and further opening up to the outside world have made the Chinese economy one of the fastest growing in the world as well as an investment heaven for many multinational and international firms. At the same time, the image that China has become a big sweatshop for the worldwide manufacturing has been disturbing to both the Chinese government and the union leaders. In the face of recent economic downturns, forced low wages, often unpaid overtime and unsafe working conditions have increased workers grievances as well as wildcat strikes. Unsurprisingly, unfair labor practices and workers protests over wages have become more common in the news. For example, a strike over wages and working conditions crippled the Japanese automaker Honda Motor's car production in late May 2010, one of the biggest and longest stoppages in foreign-invested enterprises in China. The strike by 1,900 workers broke out at Honda's transmission factory at Foshan, southeast China, and forced the temporary closure of four Honda's car-assembly plants in the mainland. Honda workers fought back after years of being pushed to work 12-hour days, six days a week on monotonous low-wage assembly line tasks, with an average pay around $150 monthly (Bradsher & Barboza, 2010). The strike cost Honda thousands of units in lost production in the world's biggest auto market. Honda management offered a 24% pay raise in

exchange for workers to end the strike. The settlement of the strike included a pay raise of about 34%, regular cash bonuses, and other concessions that would bring the base pay for many workers at the plant to about $300 a month (Barboza, 2010).

Unfair labor practices and strikes over wages and poor working conditions in the news have caused elevated public attention, leading to a growing awareness of workers' rights and the need to establish trade unions in private and foreign-owned sectors. Unionization and collective bargaining has become an important instrument for social justice. To that end, the All-China Federation of Trade Unions (ACFTU) has turned to some Western unions for advice on collective bargaining and other labor movement tactics.

It is often misguidedly believed that there is no collective bargaining in China. Such bargaining does occur in both large joint ventures and smaller firms, although the practices are not as sophisticated, with clear-cut statutory terms, or as adversarial as seen in some Western countries. Among recent examples, in March 2008, a salary negotiation in Hua Yue, an adhesive tape producer in Hebei Province with more than 700 employees, lifted workers' annual minimum salary by 1,800 Yuan (about $165). Experienced workers enjoyed a higher increase (Xinhua Agency, 2008). In July 2008, the world largest retailer Wal-Mart signed a collective bargaining contract with the shop-floor union of its Shenzhen based supercenters, covering over 8,000 employees. The new contract included a 9% annual pay increase for the following two years (Baokan Wenzhai, 2008). In China's Hunan Province, presently 27,000 companies have agreed to collective contracts addressing essential issues such as wage and hour, working conditions, rest and vacations, workers' health and safety, insurance programs, etc. (Wal-Mart Watch Research Team, 2008).

China's labor law dictates that the basic duty of the union is to protect workers' legitimate rights and interests. It requires a minimum of 25 signatures for an application to establish a union branch. Union membership is open to all manual and mental workers in enterprises, institutions, and government departments within China, who rely on wages or salaries as their main source of income, irrespective of nationality, gender, race, sex, occupation, religion, or educational background as long as they accept the Constitution of the Chinese Trade Unions (China Information Center, 2002). Table 4 shows the distribution of the trade union membership in various industries across the country.

Table 4: Distribution of the Trade Union Membership in Various Industries across China

Sectors	Number of Trade Union Members	Proportion %
Manufacturing Industry	57,753,209	34.1
Public Administration and Social Organizations	18,119,037	10.7
Education	14,053,468	8.3
Building Industry	9,982,244	5.9
Farming, Forestry, Animal Husbandry and Fishery	9,907,543	5.8
Household Service and Other Services	9,660,866	5.7
Communication and Transportation, Warehousing and Postal Service	8,577,915	5.1
Mining Industry	8,284,536	4.9
Wholesale and Retail	8,123,056	4.8

Table 4: Distribution of the Trade Union Membership in Various Industries across China		
Sectors	**Number of Trade Union Members**	**Proportion %**
Public Health, Social Security and Social Welfare	4,968,305	2.9
Production and Supply of Electric Power, Fuel Gas and Water	4,401,358	2.6
Leasing and Commercial Service	3,381,678	2.0
Financial Industry	2,640,041	1.6
Accommodation, Food and Drinks	2,452,557	1.4
Water Conservancy, Environmental and Public Facilities Management	1,742,389	1.0
Scientific Research, Technical Service and Geological Prospecting	1,450,247	0.9
Information Transmission, Computer Service and Software Industry	1,442,613	0.9
Culture, Sports and Entertainment	1,367,889	0.8
Real Estate Industry	1,149,963	0.7
International Organizations	12,828	0.0
Total	**169,942,111**	**100**
Sources: Data adapted from ACFTU, 2007.		

Determined to expand union membership in foreign-owned sectors, the ACFTU has made it clear that it would publicly indentify and take legal actions against any foreign companies that refuse to allow employee unionization. The Federation's target is to unionize 80% of the workers in foreign-funded and private enterprises. This shift has significant implications for both foreign and indigenous companies in China that the government is no longer to tolerate anyone to ignore the law allowing workers' unionization. Trade unions are actively engaged with the Chinese Labor Ministry in crafting a series of new regulations that would give unions more power and influence.

As the role of the state has changed through China's economic reforms, so should be the unions' role and objectives. There are at least three major emerging labor responses to fight back: institutional approaches (e.g., collective bargaining through the trade unions, active involvement in drafting new legislations pertaining to workers' rights and organizational justice), informal actions (e.g., labor unrest or open protests over unfair labor practices, voice complaints and raise public opinions through the mass media and the Internet, individual case settlement through various courts and administrative agencies), and various labor elected workers' committees at the workplace (e.g., participation in decision-making, representation of workers' rights and interests at the shop-floor level). Under the Chinese labor law, unions have the authority to investigate layoff decisions and raise complaints. Union dues are accounted for 2% of an employer's total payroll and the workers pay 0.5%, of which 60% return to employees in bonuses and 40% is budgeted for daily activities of the trade union.

Clearly, China is eager to put global norms in place in several aspects of its economy and society, including unionization, collective bargaining, and fair labor standards, among others. To that end, Chinese unions and their operations are likely to become more sophisticated and attain norms and grassroots techniques more in line with their Western counterparts. Indeed, many

Chinese see unionization into private and foreign-owned sectors as an indispensable component and an irreversible trend in the country's movement toward greater globalization.

It is important to bear in mind that collectivism and a traditional emphasis on social harmony are among key values of the Chinese culture. In keeping with the Chinese cultural values, the ACFTU defines itself as a mediator promoting harmonious relationship between labor and management. While the ACFTU has maintained the traditional role to provide community services for workers, such as social, recreational, and organizational activities, unions have been in recent years playing a more active role in helping workers negotiate contracts collectively. Along with the working priorities and social functions (see more in Table 3), unions are also actively engaged in legal aid, legal supervision, workers' education, poverty relief, and international exchange and cooperation. Meanwhile, the ACFTU has made it clear that the Federation's goal is to work with employers, "not to promote confrontation". It should be noted that "building a harmonious society" is also a main public policy supported by the current Chinese government. Having sound industrial relations is of course an important component of a harmonious society that both the Chinese government and the organized labor advocate.

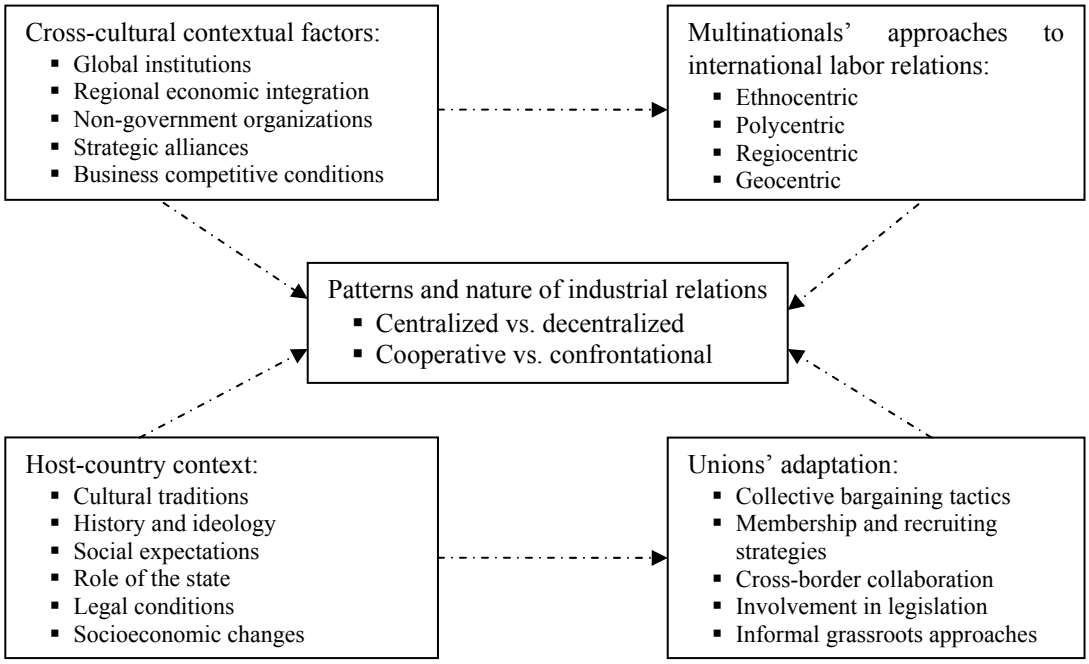
THE CHALLENGE OF CROSS-CULTURAL ADAPTATION

When doing business in culturally distinct societies, organizations frequently face a dilemma between standardization and local responsiveness. As shown in this comparative research, an organization's labor relations policies and practices are deeply rooted in its national culture and institutional environment. When expanding business across borders, multinational corporations (MNCs) must be flexible enough to adapt and stay responsive to local requirements. This is vital even for firms that follow a non-union labor relations strategy. A broader strategic view is required to better understand the complexity and challenges of managing international industrial relations. Figure 1 draws together a number of key factors derived from the above cross-cultural comparisons of industrial relations and labor market governance. It depicts a dynamic cross-cultural context, in which both organizations and unions operate, interact, and adapt to rising opportunities and challenges.

Lessons from General Motors' Retrenchment in Europe

In 2004, General Motors, a U.S. headquartered leading car maker, wanted to cut about 12,000 jobs across Europe, beginning with a plant in Bochum, Germany. GM noted that Poland's far lower labor costs gave it a compelling economic incentive to shift some production to Gliwice, Poland. This type of corporate restructuring and plant relocation is by no means strange in the United States, but in Germany, the move was described as the "Wild West" methods and soon caused a wildcat strike for six days (Landler, 2004). The GM plant in Bochum had altogether some 7,600 manufacturing workers, but the strike gained a strong public support with over 20,000 protesters waving red union flags as they marched to Ruesselsheim, home to the GM subsidiary Adam Opel AG. What went wrong?

Figure 1: A Comparative Framework of Key Factors Influencing International Industrial Relations



As discussed earlier, Germany has an institutionalized model of consensus building and power equalization between labor and management, which has been maintained through the systems of codetermination and collective bargaining at the industry level. Car makers, like Volkswagen and DaimlerChrysler, had resisted deep cuts in their payrolls. Management-labor talks followed time-honored rituals. Under the German law, GM must reach an agreement with its joint venture Opel's workers before making its cost-cutting plan into effect. GM, however, ignored those rules and their sociopolitical implications, which compounded its problems. Rather than resolving the job cuts in advance with Opel's union and the Works Council, as is the custom in German companies, GM announced them directly to the employees and the news media. The strike generated negative chain effects on other GM plants because the Bochum factory in Germany produces components that are used throughout Europe, such as Belgium, Britain, Portugal, Spain and Sweden, causing shares of GM to fall on the New York Stock Exchange (Lange, 2004).

Implications of Wal-Mart Unionization in China

Wal-Mart is well known in the United States and elsewhere for its staunch opposition to unions. The AFL-CIO, America's largest federation of unions has tried many times but so far failed to set up unions at Wal-Mart stores in the United States. In Canada, the United Food and

Commerce Workers (UTCW) once organized a branch in Wal-Mart's Jonquière store, Québec, the first of Wal-Mart's North American stores to unionize. Wal-Mart shut down the store in the following year, claiming that it was losing money and the union demands prevented it from being profitable (Devoir, 2005). The closure of its first unionized store in North America and the firing of almost 200 workers have set back the UFCW union drive in Canada.

Wal-Mart entered Germany in 1997 but made a total retreat in 2006. Among a number of reasons, Wal-Mart blamed German unions and higher wages for significantly reducing its ability to expand quickly. From the German perspective, Wal-Mart's total retreat was largely due to its failure to understand the German custom and business culture. Wal-Mart took an ethnocentric approach by relocating its well established American model, including imposing the company policies for service with a smile, banning interoffice romance, employees chanting Wal-Mart to raise morale, and bagging groceries for the customers. Much of such practices were intrusive to German employees and customers. Unsurprisingly Wal-Mart had repeated clashes with the local unions and eventually quit the market (Norton, 2006).

In August 2006, however, Wal-Mart surprised the world by announcing that it would work closely with Chinese officials to establish unions in all its Chinese outlets. The announcement came shortly after Wal-Mart employees established their first union in China. Within a month of the announcement, 22 unions were set up all over the country. What have pressed the multinational retailer to change its long-standing antiunion stance?

Wal-Mart's decision to allow employee unionization in China came after years of pressure from the All China Federation of Trade Unions (ACFTU). Wal-Mart was at the start hostile toward the Federation and repeatedly denied meetings with the ACFTU activists. For instance, a local union in Nanjing went to a Wal-Mart superstore 26 times in two years but was not granted a meeting with the store manager. This humiliating experience was repeated many times over in Wal-Mart stores in other cities (Chan, 2006). Hence the ACFTU resorted to grassroots techniques behind the management. Wal-Mart initially threatened not to renew the contracts of pro-union employees, but later relented and signed a memorandum with the ACFTU. Under the Memorandum, a local union can enter Wal-Mart stores to propagate Chinese labor laws, hold multi-candidate elections for union chiefs and other executive committee members, and represent workers in collective bargaining (Gross, 2007).

The size of China's consumer market and fast growing economy serve as motivational factors for the global retailing giant to adapt. Wal-Mart has long resisted unions in the 27 countries in which it operates, but it cannot afford to stumble in the world's most populous nation. China is vitally important to the world largest retailer. Its former Chief Executive Lee Scott, Jr. (2000-2009) has repeatedly said that China is the only country where Wal-Mart can feasibly duplicate the size and success it has achieved in the United States. Wal-Mart entered China and opened its first Supercenter and Sam's Club in Shenzhen in 1996. Today it has 370 units in 140 cities over 21 provinces and in four municipalities, including 172 Supercenters, four Sam's Clubs, two Neighborhood Markets, and over 87,000 associates (Wal-Mart China, 2012). The retailing giant has also established local partnerships with nearly 20,000 suppliers in China. Over 95% of the merchandise in Wal-Mart stores in China is sourced locally. Additionally, Wal-Mart directly exports about US$9 billion from China every year (Wal-Mart China, 2007). Cross-

cultural learning and adaptation, cooperative labor relations, and corporate citizenship programs in the local communities have played a key role in Wal-Mart's growth and success in China.

Strategic Implications for Multinationals and Local Trade Unions

In the era of economic globalization and given the complexity of cross-cultural management, it is imperative for multinational enterprise managers to develop a global mindset in order to successfully coordinate international industrial relations across borders. The challenge is to develop an international human resource strategy that is flexible enough to accommodate a balance between standardization and adaptation according to the local institutional conditions, social expectations, and the organizational strategic goals. It is also pivotal for trade union activists to gain adequate knowledge about the organizational culture and global strategies in order to make effective responses as they strive to voice the workers' concerns and fight for their basic rights and specific interests. In the context of rapid socioeconomic changes, especially in the emerging economies such as China, learning and effective role adaptation is essential for developing sound industrial relations. Based on cross-cultural comparisons, international labor statistics, and firm-country specific cases contrasted in the current study, several propositions can be made in this regard.

> ***Proposition 1.*** *While headquarters practices may be used as the first reference for a firm's global business expansion, caution must be taken that an ethnocentric predisposition is likely to be associate with various forms of confrontational labor relations and social unrest in the host country context.*
>
> ***Proposition 2.*** *In member countries of the European Union, where regional integration has brought significant impacts on industrial relations practices, a more coordinated regiocentric approach to international industrial relations may work more effectively than an ethnocentric approach.*
>
> ***Proposition 3.*** *In the emerging markets, such as China, where rapid socioeconomic changes drive ongoing institutional reforms and growing demand for organizational justice, a decentralized polycentric approach to industrial relations may offer a higher degree of flexibility and local responsiveness than a centralized regiocentric or geocentric approach.*
>
> ***Proposition 4.*** *In the face of economic globalization and an overall decline of the organized labor in its traditional economic sectors, information exchange and moral support across borders will become more critical for trade unions' timely role adaptation to the changing social, political, economic, and legal environment.*

In a nutshell, as business organizations continue to expand across borders or push into the emerging economies, such as China, where the cultural values, institutional conditions, and

economic development differ significantly from their home countries, reluctance to allow unions into its subsidiaries or failure to foster harmonious international labor relations may move the companies toward a potential showdown with the local government and trade union groups. To sustain the growth and the market entry niche, MNCs and international firms must strive to adapt and be a good corporate citizen wherever they operate.

CONCLUSION AND DISCUSSIONS

The above cross-cultural analysis and historical review have demonstrated substantial convergence and divergence in the labor movement and collective bargaining practices. International labor statistics and country-firm specific cases examined through this research offer important practical implications and suggestions for future research.

First of all, trade unions have been declining in most Western industrial societies including the industrial European countries in general, the United States, Canada, and Japan. The overall fall of the union density in the West is largely due to the economic shifts from manufacturing-oriented to the traditionally non-unionized service sectors, and the massive relocation of numerous blue-collar jobs to overseas operations. At the same time, union density rates remain high in the public sectors. With more women entering the workforce, there has been an upward trend of female unionization. In contrast, globalization and rapid socioeconomic changes have led to the growth of trade unions in some Asian societies, particularly expanding into the private and foreign owned sectors. The rapid business privatization, enhanced global competition, and government deregulation in some fast growing emerging economies such as China present an unprecedented opportunity to establish collective bargaining as an effective tool of labor market governance. At the same time, it is important to note that there are still considerable deficiency in the knowledge base about the labors' rights, collective bargaining tactics, objectives and coverage, and their social and economic impacts. It is imperative for both management and union leaders to keep well informed through global networking, coordination, and information exchange in order to build trust, benchmark culturally appropriate practices, and stay flexible and adaptive to the emerging trends and changes in their surrounding business environment.

Second, while nations differ in the range from a voluntary approach to more legally sanctioned practices in managing industrial relations, the role of the state and the role of the labor administration in particular should not be underestimated. The link between social dialogue, collective bargaining, and a decent work environment is not solely economic in nature. At the macro level, sound labor relations can contribute to industrial democracy, social stability, equity, and more effective and smoother adjustment to the socioeconomic changes and emerging challenges. At the micro level, collective bargaining or industrial democracy through formal and informal grassroots tactics provides firms with a mechanism to enhance workers' participation at the workplace, promote trust and organizational justice, and thus enhance moral standards, productivity, job satisfaction, and organizational competitiveness.

Third, with economic globalization there come increased cultural contacts and rapid socioeconomic changes both within and across national boundaries, including shifts and trends in

the labor movement and new legislations governing international industrial relations practices. Multinational and international firms have to continuously update their knowledge and seek an appropriate balance between standardization and local responsiveness. As well, it is imperative that the trade unions make timely and effective adaptations to the fast changing social, political, economic, and legal environment. All these areas call for more in-depth future research and country-firm specific case studies.

Forth, cultural traditions and the emerging unionization trends examined in this study offer a valuable addition for academics seeking to develop new research on comparative industrial relations. It extends prior work in the field by developing a comprehensive cross-cultural contextual framework. When expanding across borders, multinational and international firms are increasingly faced with different cultural traditions, social expectations, and legal requirements pertaining to labor relations in the host-country context. Cross-cultural industrial relations pose challenges to both labor and management. To demonstrate the complexity of cross-cultural industrial relations, the present study takes a comparative approach to analyze some marked differences in the concepts and ideologies about labor-management relations across borders. Key factors addressed in the study include cross-cultural differences in social, economic, political, and legal conditions that tend to create diverse systems of industrial relations and multiple approaches to the workplace grassroots democracy as practical as culturally bound. Propositions derived from the study provide some guiding principles for managing international industrial relations. In short, an ethnocentric predisposition is likely to be associated with various forms of confrontational labor relations and social unrest. Conversely, a polycentric or a more geocentric approach with cultural sensitivity tends to bear more influence on nurturing sound labor relations and organizational adaptation in the host country context. Those specific areas of concern for both management and labor raise strategic questions and call for more in-depth cross-cultural studies.

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INTERNATIONAL COPPER FUTURES MARKET PRICE LINKAGE AND INFORMATION TRANSMISSION: EMPIRICAL EVIDENCE FROM THE PRIMARY WORLD COPPER MARKETS

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ABSTACT

This paper analyzes the 5-year daily closing prices of copper futures contract data from the London Metals Exchange (LME), Shanghai Futures Exchange (SHFE), and the New York Mercantile Exchange's Commodity Exchange division (COMEX) markets. The analysis provides a broad view of the international copper futures markets price linkage and information transmission mechanism. The study's methodology includes cointegration tests and a vector error correction model (VECM), followed by tests for Granger causality.

The results indicate a strong correlation across markets. The three markets maintained a long-term equilibrium relationship with few arbitrage opportunities. Efficient cross-market information flow is identified. Each market impacts foreign returns with lagged information. The LME and COMEX markets positively influenced each other while their impact on the SHFE market was reversed in direction. The most significant integration is between the SHFE and LME (in both directions). Lastly, a significant bidirectional Granger cause is demonstrated across the three markets. The results suggest that the three primary world copper markets can be regarded as one continuous trading market with the same level of market efficiency. The information transmission mechanism is efficient and effective. Several practical economic applications are suggested that can assist investors and Chinese policy makers.

Key Words: Copper futures, price linkage, information transmission

INTRODUCTION

China is currently the world's largest consumer of copper due to its massive infrastructure demand. China accounted for nearly half of the world's total copper consumption in 2010 (China Iron and Steel Association (CISA), 2010), and is expected to have a 15% percent growth in copper consumption by 2015. Although China is the world's biggest copper user, it is not the biggest copper market maker. Copper price is greatly influenced by other world counterparts, particularly in the copper futures market. There are three primary markets for copper futures trading. The London metal exchange (LME) is currently the largest copper futures

market. The Shanghai Metal Exchange (SHFE) and New York Mercantile Exchange's Commodity Exchange (COMEX) follow.

The emerging SHFE copper futures market has recently surpassed the COMEX to become the world's second largest market (Fung et al., 2010). For China to position itself in copper trading and strengthen its global influence in copper futures pricing, it is essential for them to understand the cross-market interaction and price linkage between the three major copper markets. A significant body of recent research has focused on this topic (e.g., Fung et al., 2010; Li & Zhang, 2009; Lein & Yang, 2009).

Li and Zhang (2009) found a strong connection in the price discovery process linkage between the LME and SHFE copper futures markets, with the LME market having a larger impact on its SHFE counterpart. Fung et al. (2010) examined the COMEX and SHFE aluminum and copper future markets price linkage and information transmission efficiency and discovered the same level of information transmission efficiency in both markets. A similar study by Lein and Yang (2009) confirms international copper futures markets integration as well as the price transmission mechanism playing a vital role in return and volatility during the last half of 2005.

This study provides a broad and integrated view of the global copper futures market. There are a number of reasons for studying cross market price linkage and transmission mechanism for copper futures market. First, correlations between the world's copper futures markets affects the volatility of portfolios, and therefore, understanding such relationships can assist investors and portfolio managers in formulating better trading and asset allocation strategies. Second, information transmission mechanisms reveal the level of market efficiency, which allows investors to discover arbitrage opportunities, if any, between markets.

Third, copper futures contracts capture the entire market dynamics so that study results may be generalized to copper spot market and other related markets. The results may provide input for both copper producers and users in the development of better risk hedging or purchasing strategies. Finally, the cross-market analysis reveals a long-term price relationship with all its participants which may have implications for each country to argue for more power over the price discovering process for copper contracts, particularly for China with its significant consumption of copper resources.

The main purpose of this study is to investigate the relationship across world's three leading copper futures markets. It sheds light on cross-market correlation, information transmission mechanisms, and identifies the price discovering market. The long-term price relationship among three markets is analyzed. We examine the extent each market is influenced by the others, and which market is most efficient. Additionally, we examine the issue of which market is the price determining market (i.e., the market that has the most power over the others in the price discovery process).

The current study extends the existing body of knowledge by providing a broader view and an improved understanding of the cross-market interaction for the copper futures markets. It provides a more integrative perspective by simultaneously considering all three major copper futures markets, and using the latest available data.

The study attempts to answer three specific research questions:

RQ1 - What is the relationship between the LME, SHFE, and COMEX copper futures markets?, This question is asked in order to reveal the international copper futures market price linkage, and the price volatility relationship between the markets,

RQ2 - What is the cross market information transmission mechanism?, This question is asked in order to determine how well information is delivered and received between markets, and to take a glimpse at the level of global futures market efficiency through copper contracts.

RQ3 - Which market is the price determining market? The purpose of this question is to provide implications for investors, portfolio managers and even policy makers on the price discovering process of the copper futures market, as well as the information transmission mechanism.

The results show a significant correlation between each of the three markets' price data. However, the overnight returns correlation between the SHFE and LME, and between the SHFE and COMEX are low. Next, we find the three copper futures markets are highly cointegrated, suggesting a long-term equilibrium relationship between the markets. Also, we find significant results from running a VECM providing strong evidence of cross-market information transmission efficiency. Lastly, we find significant Granger causality suggesting bi-directional information flows between each of the three major copper futures markets.

The remainder of this study is organized as follows: Section II provides a review of the relevant literature including information on copper futures markets, and literature related to the three research questions. Section III discusses the research methodology used in this study, including the data collection, research design, and model specifications. This is followed by Section IV where the results of the data analysis and statistical tests are reported. Lastly, Section V concludes the study with a summary of the findings related to the three research questions, and implications for futures investors, policy makers, and regulators. Potential extensions of the study are also discussed.

BACKGROUND AND LITERATURE REVIEW

Copper Futures Markets Background Information

The three major world markets for copper futures trading are the London Metal Exchange (LME), New York Mercantile Exchange's Commodities Exchange (COMEX), and the Shanghai Futures Exchange (SHFE). These markets are different in size, history, system applied, and trading time.

London Metal Exchange (LME)

The LME, founded in 1877, is the oldest and largest market for copper futures trading (The London Metal Exchange Limited, 2012). All contracts are traded in a 24-hour environment using three different systems including inter-office telephone trading, ring (or outcry) trading, and LME select trading. Inter-office telephone trading is available 24 hours per day. All transactions follow the procedure of matching, clearing and settlement with brokers quoting prices for their clients.

Ring trading is conducted by face-to-face verbal bids and offers by "ring dealing members" (traders) seated in a six meter diameter ring. Ring trading occurs in various five-minute trading periods between 12:00 and 16:55 GMT (Monday through Friday). The newest LME trading system, known as LME select, began operating in February 2001. LME select is an electronic member-to-member order matching system that currently has trading times for copper futures from 1:00 to 19:00 GMT (http://www.lme.com/6448.asp).

Shanghai Futures Exchange (SHFE)

The Shanghai Futures Exchange (SHFE) is newest futures market and started trading in China during 1991. The Shanghai Futures Exchange (SHFE) has recently replaced COMEX to became the second largest copper futures market in the world (Fung et al., 2010). The SHFE only uses an online electronic trading system. It operates from 1:00 GMT to 3:30 GMT, and 5:30 GMT to 7:00 GMT.

Commodity Exchange Incorporation (COMEX)

Commodity Exchange, Incorporated (COMEX) is a division of the New York Mercantile Exchange (NYMEX). COMEX offers two systems for trading contracts which are traditional outcry trading using face-to-face verbal bids and offers (similar to CME's ring trading), and an online electronic trading system. COMEX Copper futures contracts are traded on the open outcry trading system from 12:10 GMT to 17:00 GMT, and on the electronic trading system from 23:00 GMT to 22:15 GMT the next day (Sunday through Friday).

LITERATURE REVIEW

Cross-Market Information Transmission

Cross-market information transmission relates to the manner in which price volatility, and overnight return information is transmitted from one market to another. This has been the subject of significant research over the past few decades. Much of the early research examines information transmission between various international stock markets; particularly the Japanese, US, and UK markets due to their market size. (c.f., Koutmos & Booth, 1995; Hamao et al., 1990; Kato, 1990; and Eun & Shim, 1989).

Studies began to look at financial derivatives markets as futures markets began to emerge. Becker et al. (1993) examined correlations between US, UK and Japanese stock index futures returns. They find that the daily US performance has a large impact on the overnight returns in Japan and the UK, however, the UK does not have a significant response to Japanese price changes. Research by Booth et al. (1996) investigates the UK, US and Japanese stock index futures market to identify the volatility generator factor. They find a common factor generating volatility exists in the US, UK and Japanese stock index futures markets. Further, rapid transmission of return information between these markets is found, but the US market is the dominant market for determining returns for the other markets. These two studies were good examples for later studies of the futures markets.

Subsequently, studies focused on the information transmission for the same futures contracts traded in different international markets (c.f., Booth & Ciner, 1997; Dhillon et al., 1997; Tse et al., 1996; Shyy & Lee, 1995; and Bacha & Fremault-Vila, 1994). Shyy and Lee (1995) study the London (LIFFE) & German (DTB) Bund futures markets, and find that the German market unidirectionally leads the London market in price transmission.

Tse et al. (1996) study information transmission in three Eurodollar futures markets (IMM, SIMEX and LIFFE). Their results suggest that each of the three markets impounds all information transmitted from the previous market in the 24-hour trading sequence, and thus the three markets are essentially one continuous trading market. Booth and Ciner (1997) examine information transmission between the Tokyo (TGE) and Chicago (CBT) markets for corn futures. They find the Tokyo futures market is dependent on the Chicago market for information generation, and this information is reflected in the Tokyo market's opening prices.

More recent research has concentrated on the copper futures market information transmission. Fung et al. (2003) investigate the information flow relative to the three primary commodities that trade between US and China including copper, soybeans and wheat. They find that the US market has a bigger impact on the Chinese market, and a stronger volatility spillover to China in terms of copper futures. Lien and Yang (2009) demonstrate significant bi-directional returns and volatility spillovers between London and Shanghai markets, and a unidirectional volatility spillover from the Shanghai market to the New York market. A strong integration relationship between the Shanghai and London markets is documented. Similar results are found by Li and Zhang (2009). They study the informative linkage between the LME and SHFE, and find that the LME has more power to influence the Shanghai market than vice versa. Recent research by Fung et al. (2010) test the information flow for copper and aluminum futures contracts traded in Shanghai and Chicago markets. They find that the two futures markets are highly cointegrated and efficient on a daily basis, and that the US market is no more superior to China futures market in information efficiency.

Market Efficiency and Arbitrage Opportunities

Futures markets should be efficient in providing forecasts for future spot prices in order to fulfill their price discovery function for spot markets. However, Fama (1991) suggests that market efficiency is difficult to test unless it can be done with the use of proper pricing models.

For futures markets, futures prices should be an unbiased estimation of future spot prices, and this relationship is a proper framework for testing market efficiency.

Early studies employed a conventional Fama (1970) approach for testing the efficiency of futures markets (e.g., Tse, 1999, and Cargill & Rausser, 1975). Weak form of market efficiency relies on historical prices of futures contracts and spot price. The market is regarded as efficient if a linear regression has a zero intercept coefficient, and one as a slope coefficient. The futures price then can be expected to be an unbiased predictor for spot commodity price. However, this test for efficiency is no longer considered valid because the regression is based on *ex post* data, and cannot be generalized as a prediction for an *ex ante* forecast.

Market efficiency can also be tested by considering the presence of arbitrage opportunities and trading profits. Efficient markets are assumed to have no significant profits on arbitrage opportunities. That is, abnormal profits are not available through exploiting trading opportunities in price related products or markets because all markets remain in long-term equilibrium and any short-term divergence is temporary.

Many prior studies use simulated trading to find arbitrage opportunities and test market efficiency. For example, Johnson et al. (1991) apply profit margin trading rule to investigate the market efficiency of soybean, soybean oil, and soybean meal futures. Significant arbitrage profits for soy futures market spreads are not found for shorter-term trade lengths (1.5 and 3.5 months). However, such markets are not efficient and allowed for arbitrage profits over 5.5 month trade lengths. Shyy and Lee (1995) study the London (LIFFE) & German (DTB) Bund futures markets. They find very few opportunities exist for arbitrage with no significant gains for intermarket trading between the German and London Bund futures markets

McKenzie and Holt (2002) in study the market efficiency of cattle, hog, corn, and soybean futures markets result indicated that all market demonstrated some level of price efficiency in the long term with some short-term divergence of price biases. Fung et al. (2008) investigate linkages between the DJIA index, futures, and exchange-traded funds (ETF). They find that the DJIA futures leads the DJIA index and exchange traded funds in price discovery. Evidence of market inefficiency was found for 1998 data where trading strategies are able to generate statistically significant arbitrage profits, but not for the 2004 data. These results provide evidence of improved market efficiency over the period.

More recent studies of information transmission and market efficiency in futures markets rely on cointegration tests and a vector error correction model (VECM) (c.f., Fung et al., 2010; Li & Zhang, 2009, 2008; Tse, 1999; and Booth & Ciner, 1997). Cointegration and a VECM approach to studying information transmission and market efficiency are used by Tse (1999) to examine the Japanese government bond futures, and Booth and Cinner (1997) investigate the corn futures markets. A similar methodology is used in Li and Zhang's (2009, 2008) studies of price discovery and information linkage for copper futures, and the study by Fung et al. (2010) that examines the US and Chinese aluminum and copper futures market information transmission processes.

Studies of the cross-market copper futures

The primary focus of this study is the copper futures markets. Li and Zhang (2008) study the SHFE and LME copper futures over the time period November 1, 1993 through June 17, 2006. They find that the correlation of returns between the two markets was low in the early 1990s, but mostly very high in the 2000s. Granger causality tests indicate price discovery is primarily from the LME to the SHFE, but the SHFE is starting to have greater influence on the price discovery process. The SHFE and LME copper futures contracts are found to be cointegrated, and adjustments (corrections) bring prices back to their long-run relationship whenever their prices deviate in the short term. Lastly, the LME is shown to have a somewhat stronger influence on the SHFE than vice versa. Li and Zhang (2009) also examine the SHFE and LME copper futures markets with many similar results. Additionally, they modeled the data using a Markov switching VECM that allowed for shifts in the intercept and error variance.

Lien and Yang (2009) focus on the effect of trading mechanisms and high-frequency data on the copper futures market prices during the time period from July 1, 2005 to December 31, 2005. They analyze 5-minute returns data using a dynamic conditional correlation GARCH model. The results indicate a bidirectional spill-over of returns and volatility between the LME and NYMEX markets (particularly when the NYMEX is operating their electronic trading system). They also find a similar bidirectional relationship between the LME and the SHFE markets. Lien and Yang conclude that stronger return and volatility relationships result when markets are highly integrated and trading information is easily accessible.

Fung et al. (2010) examine the information flow and market efficiency for the aluminum and copper futures markets on the NYMEX and SHFE over a ten year span from May 14, 1999 to May 13, 2009. A VECM is used to determine the information flow between the two futures markets. Their results indicate that the NYMEX and SHFE markets are significantly cointegrated, and a long-term equilibrium relationship between two markets exists. The overall results demonstrated the same level of market efficiency in incorporating information between each market, and neither market "causes" the other.

METHODOLOGY

Data Collection

This study uses copper futures price data from the three major copper futures markets: the London Metal Exchange (LME), Shanghai Futures Exchange (SHFE) and Commodity Exchange from New York Mercantile Exchange (COMEX). All the data are collected from DataStream 5.0. The daily closing prices for three-month contracts of high grade copper are recorded for the five-year period from June 1, 2006 through May 31, 2011. The three-month copper contract is used in this study because it is the most common contract traded worldwide. A total of 1,304 observations of time series data are collected for each market, which exclude national holidays and weekends.

The data is converted to have common units for the three copper futures markets' prices and quantities. COMEX copper futures quantities are converted from pounds to tons (the quantity unit used on the LME and SHFE). Additionally, the SHFE futures market quotes are converted from yuan (the basic unit of money in China) to U.S. dollars in order to be consistent with COMEX and LME futures market quotes. Historical daily exchange rate information from DataStream is used for this price conversion.

Research Design

The first research question asks what is the relationship between the LME, SHFE, and COMEX copper futures markets? Fundamental data analysis is performed to determine the similarities and/or differences in price and return volatility, and inter-market correlations between each of the three markets are calculated in order to examine these relationships.

The second research question asks what is the cross-market information transmission mechanism? In order to answer this question, we determine which market is most informatively efficient. This is tested by using an overnight cointegration analysis similar to many previous studies (c.f., Becker et al., 1993; Hamao et al., 1990). If the three markets are highly cointegrated, then they can be seen as a 24-hour continuous trading market. The Johansen (1998) cointegration test is used in this analysis. Also, empirical analysis based on a vector error correction model (VECM) attempts to discover the potential long-term equilibrium in overnight cross-market returns.

The third research question asks which market is the price determining market? This question focuses on finding out if one market has dominant pricing power, or not. The answer to this question tends to expose the underlying principles of the price discovering process in the copper futures markets. We use Granger's causality test for answering this question.

Model Specifications

In this study, conintegration and a vector error correction framework are used to examine the cross-market interaction. This is followed by Granger's casualty tests (Engle & Granger, 1987; Granger, 1969). Specifically, we develop a multivariate conintegration and VECM model. For a cointegration relationship to exist between the three markets it must be determined that all data have the same order of stationarity. A long-term equilibrium relationship between the three copper futures markets (LME, SHFE and COMEX) can be represented as:

$$Z_t = LME_t - \alpha SHFE_t - \beta COMEX_t \quad (1)$$

This long-term equilibrium relationship model can be modified into the form of equation 2 as

$$LME_t = \alpha_0 + \alpha SHFE_t + \beta COMEX_t + \mu_t \quad (2)$$

where LME represents the dependent variable, SHFE and COMEX are independent, α and β are slope coefficients, α_0 is an intercept, and μ_t is the disturbance term. A standard unit root test is applied to all three futures markets' overnight return series. For example, using the LME series produces:

$$dLME_t = \alpha + \beta_1 LME_{t-1} + \beta_2 dLME_{t-1} + \beta_3 dLME_{t-2} + \varepsilon_t \quad (3)$$

where dLME refers to the difference between price on day t and its subsequent price ($dLME_t = LME_t - LME_{t-1}$). All α and β_i can be regarded as constant parameters and ε_t is white noise. If the LME copper futures contract price series contains a unit root in the first order difference, the null hypothesis is satisfied (i.e., $\beta_1 = 0$). In order to get stationary data, the null hypothesis needs to be rejected. A *t*-statistic is used to interpret the unit root order of the data series (Dickey & Fuller, 1979).

The next step in the cointegration analysis is to apply a least squares regression model in the form of equation 3. We begin by determining the proper lag term for the model. The same lag term will be used in the VECM analysis. The Akaike information criterion (AIC) rules (Akaike, 1974), and the final prediction error (FPE) (Akaike, 1969) are used to determine the proper lag with minimum error square.

Long-term price equilibrium is the basis for studying cross-market information transmission. Vector error correction functions as a short-term force that helps to bring price deviations back to their equilibrium relationship. Cointegrated variables can be represented in an error correction framework. Since the three copper futures markets are found to be cointegrated in this study, an error correction model is applied to investigate the information transmission mechanism.

The purpose of the last analysis used in this study is to identify which market (if any) is the price discovering market. The Granger causality test will be used to determine whether one or more of the three coppers futures markets is useful in forecasting another. Granger causality test based on the VECM model examine the granger cause in the long-term equilibrium which determines the price discovering market for copper futures. As Feldstein and Stock (1994) suggest, the same lag term determined in the cointegration analysis is used for the Granger causality to test cross-casualty between three the markets.

EMPIRICAL RESULTS

The LME, SHFE, and COMEX – Descriptive statistics and correlations (RQ1)

As discussed above, 1,304 daily closing price observations were collected for each of the three primary copper futures markets (LME, SHFE, and COMEX) for the five-year period from June 1, 2005 through May 31, 2011. Each observation is converted into U.S. dollars per ton. These price series can be represented by $PLME_t$ (Daily closing price for LME), $PSHFE_t$ (Daily closing price for PSHFE) and $PCOMEX_t$ (Daily closing price for COMEX). The return of each

of the three series, R_t, is calculated as the difference between the daily closing price and the previous closing price:

$$RLME_t = PLME_t - PLME_{t-1} \quad (4)$$

$$RSHFE_t = PSHFE_t - PSHFE_{t-1} \quad (5)$$

$$RCOMEX_t = PCOMEX_t - PCOMEX_{t-1} \quad (6)$$

A total of six data series are obtained; three markets (LME, SHFE, and COMEX) times two variables (price, and return). Table 1 provides descriptive statistics for each of the six data series.

The LME and COMEX markets have statistically equivalent mean prices ($6,995.08 vs. $7,003.90), and returns ($0.97 vs. $0.99). However, the SHFE has a significantly higher mean price ($8,072.34; $p < 0.0001$) than both the LME and COMEX, but no significant difference in overnight returns. All of six series exhibit small kurtosis and a small negative skewness which indicates a slightly left-tailed data distribution. The copper futures contract price in the SHFE market has a significantly larger standard deviation ($1,697.90) than the LME or COMEX markets ($1,599.07 and $1,601.32; $p = 0.030$ and 0.035, respectively). This may partially be explained by a significantly higher average price in the SHFE market.

Table 1: Descriptive Statistics (in US dollars per ton)

	Daily Closing Prices*			Overnight Returns**		
	PLME	PSHFE	PCOMEX	RLME	RSHFE	RCOMEX
Mean	6,995.08	8,072.34	7,003.90	0.97	1.52	0.99
Maximum	10,167.00	11,475.00	10,204.00	723.50	432.23	508.17
Minimum	2,823.00	3,511.00	2,777.00	-579.00	-555.96	-583.12
Std. Dev.	1,599.07	1,697.90	1,601.32	143.27	130.58	143.70
Skewness	-0.71	-0.82	-0.71	-0.16	-0.31	-0.27
Kurtosis	3.17	3.53	3.21	4.16	4.12	3.88
Observations	1304	1304	1304	1302	1302	1302

* PLME, PSHFE and PCOMEX represent daily closing prices for LME, SHFE and COMEX copper futures markets, respectively.

** RLME, RSHFE and RCOMEX represent the overnight returns for LME, SHFE and COMEX copper futures markets, respectively.

The standard deviation in overnight returns of the SHFE market ($130.58) is significantly less than the standard deviation of COMEX and LME returns ($143.27 and $143.70; $p = 0.001$ and 0.001, respectively). With similar average overnight returns, but a significantly smaller return standard deviation, the SHFE copper futures contracts appear to be more stable and less volatile than the LME and COMEX markets. Additionally, the SHFE market has the smallest maximum and minimum overnight returns over the five years, which indicates a more stable return on holding overnight copper futures contracts in the SHFE.

Table 2 provides price and return correlation results between the LME, SHFE, and COMEX markets. There is a high correlation between the three markets for copper futures contract price data, but not for the returns data. Panel A shows that the COMEX and LME markets share the most similarity in price with a correlation of 0.998. The SHFE/LME and SHFE/COMEX price correlations are also high at 0.984 and 0.985, respectively.

Table 2: Correlation Tables

Panel A – Daily Closing Prices*				Panel B – Overnight Returns**			
	PLME	PSHFE	PCOMEX		RLME	RSHFE	RCOMEX
PLME	1.000			RLME	1.000		
PSHFE	0.984	1.000		RSHFE	0.205	1.000	
PCOMEX	0.998	0.985	1.000	RCOMEX	0.895	0.212	1.000

* PLME, PSHFE and PCOMEX represent daily closing prices for LME, SHFE and COMEX copper futures markets, respectively.

** RLME, RSHFE and RCOMEX represent the overnight returns for LME, SHFE and COMEX futures markets, respectively.

Panel B shows the LME overnight return is related to the COMEX market (correlation = 0.895). However, extremely low correlations are found between SHFE and both LME and COMEX markets (0.205 and 0.212, respectively). In summary, it appears from the data in Tables 1 and 2 that the COMEX and LME markets share more consistency in both price and return, and the SHFE market is less integrated and features more independency in pricing and returns.

Cross-market information transmission – Cointegration and VECM (RQ2)

Many first-hand price data series are found to be nonstationary. Therefore, a unit root test is necessary to determine the stationarity of the three sets of market returns data before proceeding to the conintegration test. Two different approaches for unit root test are performed for this purpose including the Phillips-Perron and Dickey-Fuller (ADF) root tests (Phillips & Perron, 1988; Dickey & Fuller, 1981). The results of these tests are reported in Table 3. The null hypothesis is rejected under both tests ($p < 0.01$), and therefore the LME, SHFE and COMEX overnight returns are considered to be stationary.

Table 3: Unit Root Test *T*-Statistics

	RLME*	RSHFE*	RCOMEX*
Phillips-Perron	-38.26***	-33.48***	-38.49***
ADF	-38.29***	-33.31***	-38.56***

* RLME, RSHFE and RCOMEX represent the overnight return for LME, SHFE and COMEX futures markets, respectively.

*** Statistical significance at 1% level

The LME, SHFE and COMEX are closely informatively linked, and should move together in the long run, although they may drift apart in the short run. Cointegration is used to describe this stationary relationship, and to investigate the international information transmission

in the copper futures markets. Assuming copper futures returns, $X_t \equiv (LME_t\ SHFE_t\ COMEX_t)$, is cointegrated, then the following VECM can be estimated:

$$dX_t = \mu + A_1 dX_{t-1} + \sum_{i=1}^{k-1} A_i dX_{t-i} + \varepsilon_t \quad (7)$$

where dX_t equals $(X_t - X_{t-1})$, μ is a 3*1 vector of drift; A_i is 3*3 matrix of parameters, and ε_t is 3*1 white noise.

The appropriate lag length, k, must be determined prior to the cointegration test. There are a variety of operational solutions to the problem of choosing the optimal lag length. Most solutions rely on choosing the lag length of minimum square error to the prediction (Akaike, 1974), however Geweke and Meese (1981) found no significant difference in method chosen. In this study, we use the most common Akaike information criterion (AIC) (Akaike, 1974), and the final prediction error (FPE) (Akaike, 1969) to determine the lag term in a simple vector autoregressive model. As shown in Table 4, the lag length k in the VECM chosen by the AIC and FPE is 4.

Table 4: Lag Order Selection Criteria

Lag	AIC	FPE
0	36.40906	1.30E+12
1	35.68099	6.29E+11
2	35.62719	5.96E+11
3	35.60985	5.86E+11
4	35.60718*	5.84E+11*
5	35.60747	5.84E+11
6	35.61998	5.92E+11
7	35.62307	5.94E+11
8	35.62101	5.92E+11

* Indicates lag order selected by the criterion

AIC: Akaike information criterion

FPE: Final prediction error

Next, we perform the Johansen (1991) cointegration test. Both trace and maximum eigenvalue test methods are applied in this study. As Table 5 indicates, the null hypothesis is rejected as both trace value and max eigenvalue exceed the 0.01 level critical value. This demonstrates that all three markets are highly cointegrated, and have a high level of information transmission with synchronized moves in the long run. The rejection of the null hypothesis implies at least three cointegration equations in the long run for three markets. The cointegration test, which is the precondition for estimating VECM, is performed under the assumption that there are linear trends in the data, so the model allows the nonstationary relationships in the model to drift.

These results confirm that the LME, SHFE, and COMEX copper futures markets remain in a long-term equilibrium relationship. Any price divergence in the short-term will disappear and return to the long-term equilibrium. Additionally, the returns of three-market equilibrium relationship suggests an efficient price information flows between markets, and any news in one market is promptly transmitted to the others such that investors can treat the three markets as a

continuing trading market. Arbitrage opportunities due to information asymmetry do not exist within three markets because information is transparent and efficiently processed

Table 5: Johansen Cointegration Test		
Number of Cointegating Equations	Trace	Max. Eigenvalue
None	953.15***	401.67***
At most 1	551.48***	348.03***
At most 2	203.45***	203.45***
*** Statistical significance at 1% level		

The regression for the cointegration equation between three markets finds the following coefficient estimates (See Table 6):

$$LME_{t-1} = 1.072\ SHFE_{t-1} - 0.288\ COMEX_{t-1} + 0.127 \quad (8)$$

Both R^2 (0.80) and the Durbin Watson statistic (2.73) indicated a good fit for the cointegration equation.

Table 6: Regression Output For The Cointegration Equation Standard errors in ( ); *t*-statistics in [ ]	
Cointegrating Equation Coefficient Estimates	
SHFE (-1)	-1.072 (0.056) [-19.043]
COMEX (-1)	0.288 (0.061) [4.740]
C	-0.127
Durbin Watson	2.73
R^2	0.80

Next, we solve the VECM model in order to examine the price transmission mechanism between copper futures markets. Equation (8) is reformulated as follows:

$$\varepsilon_t = LME_{t-1} - 1.072\ SHFE_{t-1} + 0.288\ COMEX_{t-1} - 0.127 \quad (9)$$

where ε_t is the error correction term in the VECM. The VECM is then formulated as follows using a lag term of 4:

$$\begin{aligned} dLME_t = {} & \alpha_0 + \beta_0\varepsilon_t + \beta_1 dLME_{t-1} + \beta_2 dLME_{t-2} + \beta_3 dLME_{t-3} + \beta_4 dLME_{t-4} \\ & + \beta_5 dSHFE_{t-1} + \beta_6 dSHFE_{t-2} + \beta_7 dSHFE_{t-3} + \beta_8 dSHFE_{t-4} + \beta_9 dCOMEX_{t-1} \\ & + \beta_{10} dCOMEX_{t-2} + \beta_{11} dCOMEX_{t-3} + \beta_{12} dCOMEX_{t-4} \end{aligned} \quad (10)$$

$$\begin{aligned} dSHFE_t = {} & \alpha_0 + \beta_0\varepsilon_t + \beta_1 dLME_{t-1} + \beta_2 dLME_{t-2} + \beta_3 dLME_{t-3} + \beta_4 dLME_{t-4} \\ & + \beta_5 dSHFE_{t-1} + \beta_6 dSHFE_{t-2} + \beta_7 dSHFE_{t-3} + \beta_8 dSHFE_{t-4} + \beta_9 dCOMEX_{t-1} \\ & + \beta_{10} dCOMEX_{t-2} + \beta_{11} dCOMEX_{t-3} + \beta_{12} dCOMEX_{t-4} \end{aligned} \quad (11)$$

$$dCOMEX_t = \alpha_0 + \beta_0\varepsilon_t + \beta_1 dLME_{t-1} + \beta_2 dLME_{t-2} + \beta_3 dLME_{t-3} + \beta_4 dLME_{t-4} + \beta_5 dSHFE_{t-1} + \beta_6 dSHFE_{t-2} + \beta_7 dSHFE_{t-3} + \beta_8 dSHFE_{t-4} + \beta_9 dCOMEX_{t-1} + \beta_{10} dCOMEX_{t-2} + \beta_{11} dCOMEX_{t-3} + \beta_{12} dCOMEX_{t-4} \quad (12)$$

The results from running the VECM using equations (10) through (12) are presented in Table 7. The results are generally very good. The F-statistics for each regression are highly significant, and the R^2 values are reasonably high for the overall fitting of the VECM. Most of the model coefficients exceed a 1% statistical significance level. This provides strong evidence of cross-market information transmission efficiency in returns.

Table 7: VECM Output

Error Correction:	dLME	T-stat	dSHFE	T-stat	dCOMEX	T-stat
β_0	-0.791	-8.775***	0.918	14.922***	-0.648	-7.074***
β_1	-0.378	-3.838***	-0.610	-9.083***	0.690	6.885***
β_2	-0.479	-4.591***	-0.504	-7.081***	0.445	4.194***
β_3	-0.457	-4.821***	-0.397	-6.143***	0.134	1.387*
β_4	-0.182	-2.850***	-0.185	-4.262***	0.055	0.848
β_5	-0.684	-8.160***	-0.116	-2.022**	-0.554	-6.499***
β_6	-0.425	-6.074***	-0.088	-1.837**	-0.330	-4.639***
β_7	-0.275	-5.172***	-0.088	-2.419**	-0.239	-4.413***
β_8	-0.147	-4.836***	-0.063	-3.063***	-0.148	-4.802***
β_9	0.455	6.748***	0.122	2.649***	-0.791	-11.554***
β_{10}	0.536	5.769***	0.176	2.783***	-0.538	-5.696***
β_{11}	0.415	4.508***	0.179	2.849***	-0.263	-2.813***
β_{12}	0.195	3.066***	0.110	2.534**	-0.060	-0.932
α_0	0.124	0.030	0.498	0.175	0.302	0.071
R^2	0.478		0.662		0.470	
F-statistic	90.545***		193.539***		87.580***	

*** Statistical significance at the 1% level

** Statistical significance at the 5% level

* Statistical significance at the 10% level

α_i and β_i refer to the correlation coefficients in equations (10), (11), and (12); where β_1 to β_4 are "lagged LME" coefficients, β_5 to β_8 are "lagged LME" coefficients, and β_9 to β_{12} are "lagged LME" coefficients

Several conclusions can be drawn from the statistical results. First, although each market has a significant influence on the other markets, the strongest influence comes from the LME market towards the SHFE market, and vice versa. This is evidence by the significant β5 through β8 in the dLME column (*t*-statistics of -8.160, -6.074, -5.172, and -4.836), and β1 through β4 in the dSHFE column (*t*-statistics of -9.083, -7.081, -6.143, and -4.262). This is particularly true within the first two day lags of information.

Second, the influence of information flow between LME and COMEX are consistent in direction (all error correction coefficients are positive in both directions of information flow). This indicates the two markets share information transmission efficiency and move together. Conversely, the information power of the SHFE market on the other two markets is reversed in direction. Although the long-term equilibrium relationship between the three markets has been

found to remain closely linked, it is still possible for LME and COMEX markets to foster each other while interfering with the SHFE market. This possibly explains why the SHFE copper futures contract return is less volatile than its COMEX and LME counterpart. As the three markets move together in the same direction in the long run, the LME and COMEX counterparts slightly impede or slow the movement in the SHFE market, thus making the daily return smoother.

Lastly, all three markets show efficiency in terms of information transmission. The price changing signal and volatility is received and delivered between markets. It appears that all three markets remain at the same level of market efficiency and arbitrage opportunities cannot be exploited in the process. Investors can regard all three markets as a single continuous trading market, and all information flows are efficient and transparent.

Price discovering market(s) – Granger causality test (RQ3)

Granger casualty test are employed to identify the price discovering market. Prior literature has mixed findings where Li & Zhang (2008) find Granger casualty between the LME and SHFE markets (but stronger from the LME to the SHFE); however, Hua and Chen (2007) and Shyy and Butcher (1994) find only the LME influences the SHFE, and not vice versa. None of these studies examine the relationship between the LME and COMEX, or the SHFE and COMEX. Fung et al. (2010) do examine the SHFE/COMEX markets, but they find no Granger casualty between them, and they do not consider the LME.

Equations (10), (11), and (12) represent the VECM for the Granger casualty test. Granger causality can be used to test the influence of the three copper futures markets on each other since all three data series are found to be stationary without difference. Table 8 provides the output of the Granger causality test. The results indicate that each of the three markets have significant Granger casualty to their counterparts as all F tests are statistically significant at $p < 0.01$ level. These results are consistent with the VECM indicators discussed above. Thus, it can be concluded that each market is Granger cause for the other copper futures markets (bi-directional information flows).

Table 8: Granger Causality Test

Null Hypothesis:	F-Statistic
SHFE does not Granger cause LME	3.95***
LME does not Granger cause SHFE	202.88***
COMEX does not Granger cause LME	5.43***
LME does not Granger cause COMEX	3.09***
COMEX does not Granger cause SHFE	220.95***
SHFE does not Granger cause COMEX	2.98***
*** Statistical significance at 1% level	

SUMMARY AND CONCLUDING COMMENTS

Discussion of Research Findings

This study uses data from the LME, SHFE, and COMEX copper futures markets to provide a basis of understanding of cross-market interaction, and information transmission mechanisms in the copper futures markets. Three-month copper futures contracts are examined for the 5-year period from June 1, 2006 to May 31, 2011. The analysis includes preliminary data mining, a data stationary test, cointegration tests, and VECM followed by Granger casualty tests.

The current study's research design and methodology are similar to some of the most recent studies of the copper futures markets (c.f., Fung et al., 2010; Li & Zhang, 2009, 2008). The study also uses the most recent data available (through May 31, 2011) to examine the interrelationships between the three most significant world copper futures markets. Further, most prior research only looks at the effects of two copper futures markets on each other: either the LME and SHFE (Li & Zhang, 2009, 2008; Hua & Chen, 2007), or COMEX and SHFE (Fung et al., 2010). They do not examine concurrently the influence of all three markets on each other (see Lien & Yang for the exception using 2005 data). The current study is unique in that it uses the appropriate methodology to simultaneously examine the most recently available price and return data for all three of the world's most significant copper futures markets.

The relationship between the UK, US, and Chinese copper futures markets (*RQ1*)

High cross-market correlation is identified in prices from the three futures contract markets. High correlation between LME and COMEX in overnight return is found, but not for SHFE market. All three markets demonstrate similarities in price and return volatility variance. The SHFE has the highest average overnight return and the lowest variance in return volatility. The evidence from overnight return correlations demonstrates an integrated relationship between the LME and COMEX. The SHFE market shares a correlation of only 0.2 with other markets which implies more independence in terms of return volatility from its LME and COMEX counterparts.

The cross-market information transmission mechanism (RQ2)

A long-term cross-market conintegration relationship is identified between the three copper futures markets. Overnight returns for each market move in long-run equilibrium, and any short-term price deviations correct to the long-run equilibrium.

The efficiency of the information transmission mechanism is significant across markets. Each market poses its impact on the other markets (along with their own lagged information). Arbitrage opportunities from cross-market information asymmetry do not exist as information across markets is fully exchanged when market is in equilibrium. Given the significant level of integration efficiency and significant information transmission, the three copper futures markets can be treated as a single continuing trading market.

The LME and SHFE share a more significant level of market integration than the COMEX and SHFE, or COMEX and LME. Contract returns in each market are significantly influenced by the lagged information from the other two markets. The LME and COMEX provide a positive impact on each other, but they have a reversed effect on the SHFE market. This reversed effect in information transmission possibly explains a less volatile return fluctuation in the SHFE copper futures market.

The price determining market (RQ3)

The data analysis finds significant bi-directional Granger causality between the three major copper futures markets. Each market has Granger cause and is Granger caused by the other two markets. All information is fully incorporated across the markets providing further evidence of essentially one continuous trading market. While all of the three major copper futures markets are affected by changes taking place in the other markets, the most significant Granger cause is from the LME to SHFE and COMEX to SHFE markets.

Concluding Comments

This study finds that the three major copper futures markets are highly correlated, share an efficient and effective information transmission mechanism, and no market is superior in the price discovery process. The study provides a systemic analysis of cross-market copper futures, and the results have implications for copper futures market participants. Similar market efficiency is found across markets suggesting a similar worldwide trading atmosphere. Evidence also indicates arbitrage opportunities are not available from cross-market trading. However, traders could refer to other markets and design a trading strategy accordingly. The SHFE copper futures investors should particularly focus on the LME market with close monitoring due to large impact of information transmission. Also, the LME and COMEX markets have a reversed short term influence on the SHFE market. It may be ideal for SHFE copper futures investors to hedge their portfolio in the LME or COMEX markets and vice versa.

The SHFE futures market has seen tremendous development during recent years. Price discovering power and market efficiency have improved compared with results suggested by previous research. Chinese policy makers and regulators should emphasize international integration as the SHFE market is more isolated in terms of price volatility and information transmission in the global context. A 24-hour telephone trading system may be needed to capture international pricing signals, and provide China with increased power in the price discovering process.

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GENDER AND THE INTERNATIONALIZATION OF SMES

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ABSTRACT

The research in this paper presents the findings of a fieldwork looking at the internationalization behaviour of small and medium sized enterprises (SMEs) in the agricultural and manufacturing sectors in the Jamaican economy. The work was aimed at understanding the impact that gender has on the internationalization of these SMEs.

Hitherto this work, not many papers in the internationalization discourse focused on the role of gender in the decision making process. This is especially so in the context of small and developing economies where gender issues are more critical than in larger developed societies.

Using the logistic regression model, this paper analysed the impact that gender has on the export behaviour of 92 SMEs in Jamaica. The results show that it is the firm's size and not the gender of the entrepreneur or the age of the firm that is most important in the internationalization decision making. The policy implications of the work are also noted.

Key words: Gender, exporting, internationalization, small and medium sized enterprise (SMEs).

INTRODUCTION

The internationalization of small and medium sized enterprise has received a significant amount of attention since the work of McDougall & Oviatt (1991). In their early work, McDougall & Oviatt observed that international new ventures, which are classified as businesses that from inception, seek to derive a significant competitive advantage from the use of resources, and the sale of output in multiple countries (McDougall et al, 1994) were becoming a huge phenomenon in the entrepreneurship field. The research in this area took off with a large body of work focusing on the age and size as determining factors in the internationalization thrust of small firms (Williams, 2009, 2011; Leonidou, et al 1998; Dana, 2004 etc). Other areas of work focused on issues such as: strategies firms use for internationalization (Bell et al, 2004; Crick, 2002), and resource profile required for internationalization (Brush et al, 2002). However, a significant variable that has not been studied in a consistent way, especially in developing countries, is the role of gender in the internationalization process. With women-owned SMEs accounting for a significantly larger number of firms than male-owned SMEs, only a small number of female-owned SMEs are engaged in exporting. It is therefore critical to study the impact that gender has on the internationalization process of these firms. As such, the work in

this paper will try to answer the following research question: What is the impact of gender on the export propensity of small and medium sized firms in Jamaica?

Jamaica as a study context provides some novelty to the work as this phenomenon has not been looked at in this location before. In order to strengthen the emerging research field on international entrepreneurship, this context specific study will aid in better understanding the internationalization phenomenon in different jurisdictions, which can enhance theory building surrounding the issues of small firm internationalization (Brush & Manolova, 2004).

Jamaica is a small economy with a total GDP of roughly US$15billion. The economy consists of around 2.7million people, and it has a huge balance of trade deficit with imports almost three (3) times its exports. For 2011, according to balance of payments data from the Bank of Jamaica, the country's imports stood at US$5,923.5million while exports were US$1662.5. Further, from a survey of small firms in the economy, results show that a significant portion of firms are women-owned. However, it appears that only a small number of these firms are engaged in exporting (Nicholson & Garvey, 2002). It is this observation that is an important catalyst for the study reported in this paper. If public policymakers are to encourage more small firms to export, they will have to first understand the relationship between gender and the export behaviour of these firms since the majority of firms are female-owned. The results presented in this paper will give an indication as to what role gender plays in the export behaviour of the firm. This will help public policymakers to design better export policies that can motivate more small firms, especially female headed firms, to enter into exporting.

To respond to the research question, the remainder of the paper is organised as follows: the next section will present a review of the literature in relation to the role of gender in the internationalization process. It will look at the findings from previous works on gender and internationalization. Also, it will examine the findings in relation to other variables that are used as control, that is, firm size and firm age. Following this review of the literature, the paper will focus on the method that is used to answer the research question. The subsequent sections will present the results and discussion of these. The paper will end with some concluding remarks.

LITERATURE AND RESEARCH VARIABLES

There is a large and burgeoning literature on the internationalization of the firm (Pope, 2002; Mittelstaedt et al., 2003; Calof, 1993; Leonidou & Katsikeas, 1996; Andersson et al., 2004). The majority of the literature however, seems to assume away gender differences in the internationalization behaviour of these firms. There is no explicit attention given to the role of gender although research suggests that women-owned firms generally have different organisational practices, structures, cultures and policies (Brush, 1999). Indeed, these behavioural characteristics of women-owned firms are important for internationalization as the literature suggests that human resources are generally the most critical for firms pursing an international strategy (Brush et al., 2002). It is the human resources that will shape the organisational structures, policies, culture and practices of firms. Therefore, if women-owned firms are found to differ in these respects compared to their male counter-parts, it may suggest

that there is also a difference in the human resources make-up of female-owned firms. This difference in human resources profile of female-owned firms versus male-owned firm may be able to explain, the internationalization pattern of female-owned firms.

Besides human resources, financial resources also play an important role in the internationalization strategy of small firms (Williams, 2009; Bloodgood, et al, 1996; Brush et al., 2002). Financial capital helps firms to acquire the necessary resources, including high quality human capital that is needed for strong performance in the international marketplace. Firms with a higher stock of financial resources are better able to overcome the constraints associated with going international because they are able to acquire the necessary skill-sets to operate in an international location. However, the access to financial resources is not always readily available for female-owned businesses. Research has shown that women-owned businesses generally get a low level of venture capital equity financing (Brush, 2002). Also, specifically in the context of Jamaica, female-owned firms find it more difficult to access capital from the commercial banks than male-owned firms (Williams, 2010). The inability for these women-owned firms to raise capital no doubt will impact on the internationalization pattern of these firms.

Besides, gender of the owner of small firms, other commonly studied demographic variables that impact on the internationalization efforts of small firms are size, which is normally used as a proxy for the level of resources that the firm possesses, and age, which is generally used as a proxy for experience. There is an extensive literature on these demographic variables and their role in the internationalization process of small firms, especially the exporting phase of that process.

The resource-based view of venture internationalization posits that larger firms, due to the number of employees will have access to more resources (e.g. experienced managers, financial resources etc.) that small firms do not have. Because exporting demands large amount of resources, small firms will be constrained in their ability to enter international markets (Bloodgood et al., 1996). This resource constraint is even more evident in female-owned firms which tend to be smaller in terms of number of employees. This seems to be the case in Jamaica for example (Williams, 2010). There is no doubt that firm size is seen as a useful surrogate measure of the firm's resource stock (Bonaccorsi, 1992; Brush & Manolova, 2004). Large firms are said to have more resources (e.g. financial, technology, human capital etc.) than smaller firms, and therefore, are more successful in the export market (Philp, 1998). While this logic seems to make sense, empirically, the evidence from the research is mixed. As such, researchers have argued that for all the attention given to this variable, there seems to be very little agreement regarding its impact on either export propensity or export success (Aaby & Slater, 1989).

The most common finding regarding the relationship between firm size and export propensity is that there exists a positive relationship (Leonidou & Katsikeas, 1996). Size is generally used as a surrogate for the firm's resources. In this regard, studies have suggested that there is a critical minimum size for exporting to take place (Mittelstaedt et al., 2003). The recommendation is that below 20 employees, exporting becomes infeasible. This argument finds support with previous work of Bilkey (1978), who found that beyond a certain point, exporting is positively correlated with firm size, but below a minimum point there is no correlation. Because

size reflects the productive capacity of the firm, then, below a critical minimum, the firm will not have sufficient capacity to at least initiate exporting (Mittelstaedt et al., 2003). While this argument sounds persuasive, the empirical reality suggests otherwise. Firms with less than five employees are observed operating in the export market (Philp, 1998; Calof, 1993; Moen & Servias, 2002 etc.), whereas, the proxy for sufficient productive capacity is suggested as 20 employees minimum. Size as a surrogate for productive capacity seems to be an argument which better suits continued export development than export propensity.

What most of the work on size and exporting have not done however, is to justify why size is important given that empirically, firms of all sizes are engaged in exporting. Indeed, recent works have taken a more critical look at the size variable and provided a strong rationale for its importance in the exporting process. For example, Hall & Tú (2004) argued that it is the fixed cost associated with entry which makes size an important variable in the decision to export. Their logic suggests that the high fixed cost involved with exporting is important because small firms which are resource poor are more vulnerable to sunk costs. This is also true for women-owned firms which previous works have suggested, suffer in relation to raising financing for their operations (Brush, 2002; Williams, 2010). To elucidate, fixed cost associated with search for market, negotiation, certification (e.g. ISO 9000 or HACCP), can be exorbitant. Small firms which are resource poor will not be able to afford these costs, as such; it may dissuade them from even giving thought to exporting.

While the fixed cost argument is a compelling reason to justify firm size as a significant variable that impacts the decision to enter export markets, if the firm has a highly competitive product and there is a growing demand in the export market for this product, there are methods which can be used to overcome the fixed cost problem (Williams, 2010). For example, firms may get assistance for certification from national governments. Some small firms may also network with larger firms which are resource rich and have already borne the fixed cost involved in exporting (Coviello & McAuley, 1999; Lipparini & Lorenzo, 1999). Networking will help smaller firms to get their products in the export market at a lower cost than if they were to seek the market on their own. Again, this has implications for women-owned firms as networks seem to have an impact on the performance of these firms (Lerner et al, 1997). Women-owned firms sometimes have difficulty in formulating strong business networks that may help them to overcome the constraints of size.

Another important justification why size is important can be found in the explanation for economies of scale in production and distribution (Williams, 2010). Firm size is also used to reflect the level of economies of scale in production which the firm can achieve (Penrose, 1980). In this highly liberalized trading environment, which both large and small firms now operate; success is heavily driven by economies of scale especially in production and distribution. Economies of scale is a function of the firm's resources and the sector within which it operates. It leads to a reduction in the unit cost of output thus allowing firms to sell products at a more competitive price. Small firms, due to their limited resource stock, will not be able to gain the same level of economies of scale as large firms. It is therefore reasoned that the larger the firm, the greater the prospects for economies of scale, thus, the more confidence it will have to enter foreign markets.

Most of the arguments that are used to show why size is important in the internationalization discourse are the same ones that can be used to show why gender is also critical. Women-owned businesses generally face the same challenges as smaller firms especially in raising finance, building business networks, and recruiting high quality human resources. This size debate brings into clear focus, the critical role of gender in the internationalization debate.

Another important variable that brings into focus, the role of gender in the internationalization strategy of small firms, is the age of the firm. Before, Brush's work on the issue of age in the internationalization process of the firm was not taken very seriously in the discourse (Brush & Manolova, 2004). From a resource-based view perspective, it is argued that older firms will have considerable more resources than younger firms. The logic here is that firms acquire resources over time, and as such, the older ones will have acquired more resources (Autio, 2005). Because older firms will have a larger stock of resources than younger firms, the resource-based view of venture internationalization argues that they will be better able to build an international basis (Bloodgood et al., 1996).

Age is also used as a surrogate for experience, which according to the process theory of internationalization, is critical for small firms to enter into international markets. Indeed, the process theory of internationalization posits that firms progress in a stepwise manner in moving from their domestic market to international markets (Johanson & Wiedersheim-Paul, 1975; Johanson & Vahlne, 1977). Underlying this gradual process is the assumption that firms will need to develop their knowledge of the foreign market before allocating huge amount of resources there. In other words, managerial learning is a critical resource for firms which intend to export. This is where experience comes in. Again, the link to gender is clear as most women-owned firms are seen as younger than male-owned firm.

Jovanovic, (1982) viewed firm age as a reflection of learning. Learning, according to the postulates of the process theory is a critical resource that will enable firms to enter export markets. International markets are very diverse and business practices are different from those of home markets. To operate effectively in these markets, theorists of the incremental stage orientation argue that firms will have to develop skills relating to the foreign market (e.g. learning the language of the market), know the culture in these markets, and develop confidence in overseas operation before large volumes of resources are committed. Gathering this knowledge and experience it is argued, comes overtime. As soon as the firm grows older it will acquire more knowledge of how overseas markets operate. The knowledge which firms acquire over time will help them to overcome the constraints that are generally associated with lack of experience, which normally prevent them from performing credibly in international markets.

While the experience argument seems compelling on the surface, the empirical evidence suggests otherwise. There are firms that are going international from inception. The rise of these international new ventures and born globals (Knight & Cavusgil, 2004; Oviatt & McDougall, 1994) have led to doubts regarding the assumption that firms need large amounts of experience in order to enter international markets. Firms both in high technology sector and the manufacturing sector are observed going international even before they start any operation in their domestic market (Crick, 2002). This evidence further bemused the proponents of stage

theory who argue that age is a reflection of experience, know-how, and alleviates the liability of foreignness and newness. This fact underscores the numerous critiques that have been levelled at the stage school of thought (Johanson & Vahlne, 1990; Knight & Cavusgil, 2004).

There are still some inconsistencies in the empirical findings regarding the impact of age on export performance despite the sound theoretical arguments, which suggest that firms may not necessarily enter export markets incrementally. Studies in different jurisdictions have shown that the firm's age is not a significant factor in determining the level of internationalization (Andersson et al., 2004). Further, Keng & Jiuan, (1989) found that there is no statistically significant difference between younger and older firms' interests in exporting. They conclude that this finding does not give support to the contention that younger firms are more interested in exporting than older ones.

Theoretically, the idea that younger firms are more interested in exporting than older firms can be justified. (Rhee, 2002; Autio et al., 2000). In the organisational theory literature, theorists point to structural inertia as a result of age. They posit that structural inertia in a firm increases with the age of the firm. This result in older firms being slower in responding to change compared to younger firms. Since exporting calls for important changes to be made in the firm's operational activities, then, older firms will respond less quickly than younger ones. Despite this justification however, there are still other studies that have found a positive relationship between age and export propensity of the firm.

In an early Peruvian study, Daniels & Guyboro, (1976) found evidence that older firms are more likely to become exporters. Peruvian firms serve their local market first then gradually move to the export market. It is important to note the context in which this finding was observed. In 1976 the liberalization of markets was not as pervasive as today. Also, the improvements in information and communication technologies today are vastly different from 30 years ago. As such, it can be argued that the finding is consistent with the features of its environment. More recently, Brouthers & Nakos, (2005) although they did not measure export performance as export propensity, showed that older firms are more likely to be more successful in the export market. From this, it is implied that they are more likely to become exporters also.

Overall, both the arguments for age and size show that gender has to be a serious consideration in the internationalization process of the small firm. Women-owned firms are generally found to be smaller and younger, and as the results from age and size showed above, these firms may find it difficult to engage successfully into international operations with these characteristics. It is these observations that have provided the catalyst for this study and especially in the Jamaican context, where there is a dearth of work on this subject.

THE RESEARCH METHOD

To motivate this study, a model which captures the dichotomous nature of the dependent variable had to be found. The normal linear regression model is not suitable given that it produces values greater than 0 or 1, which represent the probability of the dependent variable occurring. In other words, it will present misleading probabilities since the values will be greater

than 1. As such, a model of the qualitative genre had to be found. The selected model is the logit model. This model provides the probability of the event occurring and also take into consideration, the fact that the data is not derived from a normal population. This is important as it does not violate the normality assumption of the error term. Indeed, the logit model provides similar results to that of other qualitative models such as the probit model and as such, it does not make a difference which model is chosen (Gujarati, 2003).

The specific form the model took is as follows:

$$Y = ß_1¥ + ß_2Ø + ß_3Þ+ε \quad \textbf{(1)}$$

where Y is the odds of the firm becoming an exporter, that is, its export propensity

¥ is the size of the firm
Ø is the age of the firm
Þ is the gender of the owner of the firm

and

ε is the error term

Model 1 is estimated to produce some answers to the research question posed in this paper.

THE RESEARCH VARIABLES

The variables used in this research are: the age of the firm, the size of the firm, the gender of the entrepreneur, and the dependent variable, export propensity. These variables were taken from previous works on the subject in order to enhance the reliability. The operationalization of these variables is presented in the table below.

Table 1: Operationalization of Research Variables

Concept	Operational Measure	Previous Works
Dependent Variable: Export Performance	Dummy variable 1= exporter 0 = non-exporter	Obben & Magagula, 2003
Independent Variables: Firm Size	Number of employees	Obben & Magagula, 2003, Pope, 2002,
Firm Age	Number of years since firm was legally established and being in existence	Daniels & Guyburo, 1976, Brouthers & Nakos, 2005, Lee et al 2012.
Gender of Owner	Dummy variable 1= Male 0=Female	Brush, 2002

THE RESEARCH SAMPLE AND DATA COLLECTION

The data for this researcher were collected from a survey of 92 firms in the agriculture and manufacturing sectors in the Jamaican economy. For the purposes of this research, small and medium enterprise was measured as firms having 100 or less employees. This definition is in keeping with previous works which showed that for exporting to take place, a minimum of 100 employees gives sufficient capacity to the firm (Crick, 2002).

The list of firms for this study was taken from the JAMPRO export directory which consists of over 400 firms in the export business. A list of over 300 non-exporters that have the potential to export was also consulted. These non-exporters have also worked with JAMPRO, which is the country's premier export organisation. As such, all companies that are involved in exporting must pass through this organisation. Therefore, the data garnered from here is comprehensive. All the firms in the export directory were contacted given the small size of the population. A total of 44 exporter and 48 non-exporters responded positively to the request to be interviewed for this study.

A structured questionnaire focusing on the demographic characteristics of the firm, the export motivation, the reasons for non-exporting among other issues, was used to collect the data. The instrument was self-administered, and respondents in all cases were owners of the firm. Interviews with these persons lasted for about 45 minutes. These interviews provided valuable data that were used to estimate the regression model above. The tables below provide some frequency statistics on the variables of importance to the issues under consideration in this paper.

Table 2A: Number of Employees

Range	Frequency	Valid Percent	Cumulative Percent
<10	37	40.2	40.2
10-19	16	17.4	57.6
20- 29	9	9.8	67.4
30-39	3	3.3	70.7
40- 49	9	9.8	80.4
50- 100	18	19.6	100.0
Total	92	100.0	

Table 2B: Age of the Firm

Range	Frequency	Valid Percent	Cumulative Percent
<= 5yrs	7	7.6	7.6
6-10 yrs	14	15.2	22.8
11-15 yrs	23	25.0	47.8
16-20 yrs	13	14.1	62.0
> 20yrs	35	38.0	100.0
Total	92	100.0	

Table 2C: Gender of the Owner			
Category	Frequency	Valid Percent	Cumulative Percent
Female	37	40.2	40.2
Male	55	59.8	100.0
Total	92	100.0	

RESULTS

The purpose of this study was to understand the impact that the gender of the owner of small and medium sized firms have on the internationalization behaviour of these firms. Gender is a widely ignored issue in the study of internationalization behaviour of small firms, but the literature shows that gender does impact on the resource capabilities of the firm, and by extension, the ability to internationalize. To shed light on the research question, the data were analysed using the logistical regression model- logit, given the dicothomous nature of the dependent variable. Table 3 below presents the results from this analysis.

Table 3: Results from the Logit Model			
Variables	B	Wald	P-value
Constant	-.45	.56	.45
Firm Age	-.01	.35	.56
Firm Size	.03	7.2	.01*
Gender of Entre	-.10	.05	.83
Nakelkerke R^2	.13		
Hosmer and Lemeshow χ^2	11.68(8)**		
Dependent Variable: Export Performance *= significant at the 5%level **= variable not significant p-value is (0.17)			

The results show that firm size, not age or the gender of the entrepreneur is what explains the internationalization behaviour of the small firms in Jamaica. This result is consistent with previous works in the area (Leodiou & Katsikeas, 1996; Leonidou, et al, 1998, Williams, 2009).

In order to test the strength of this result, the level of multi-collinearity in the data was also observed. The variance inflation factor (VIF) and the tolerance statistics were used instead of the much higher level Pearson R correlation co-efficient. The VIF and tolerance statistics will pick up more subtle forms of correlation which the Person R may overlook. Table 4 below presents this result.

Table 4: Test for Multi-collinearity		
	Collinearity Statistics	
	Tolerance	VIF
Entrepreneur's Age	.962	1.040
Entrepreneur's gender	.973	1.027
Number of Employees in the company	.984	1.016

The results from these statistics suggest that multi-collinearity is not a problem in the data set. When the VIF is less than 10 and the tolerance is more than 0.1, the level of correlation between the variables in the model is generally low. In none of the cases was the VIF over 10 nor the tolerance statistic below 0.1.

Further, another test of the robustness of the model was employed to ensure the results are indeed strong. The predictive accuracy of the model was used to determine its efficacy in forecasting whether or not a small firm in Jamaica becomes an exporter. Table 5 below presents this result.

Table 5: Predictive Accuracy of the Model

Observed		Predicted		
		Export Performance		Percentage Correct
		Non exporter	Exporter	
Export Performance	Non exporter	37	11	77.1
	Exporter	22	22	50.0
Overall Percentage				64.1

Again, the model has a relatively high predictive accuracy. The findings show that the results presented here will predict with a 64 percent accuracy that the firm becomes an exporter or a non-exporter. This prediction accuracy is in line with previous works on the subject (e.g. Williams, 2009; Hall & Tu,2004).

Also, the model diagnostics show that the results are strong. The R-sqaure is about 13 percent which yet again is high relative to other works in the field (Williams, 2009). Further, the Hosmer and Lemeshow statistic is non-significant, a result which shows that the theoretical model is not different from the fitted model.

Overall, the results presented in this model seem robust. They suggest that it is firm size and not the gender of the entrepreneur or the age of the enterprise which is most critical for internationalization strategies. This finding is interesting given the strong call for gender policies in most countries that are designing policies to assist their small business sector. The next section of this paper will discuss some implications of these findings.

DISCUSSION OF RESULTS

The aim of the research in this paper was to understand how the gender of the owner of a small firm impact on the firm's ability to engage in international markets. Internationalization is seen as an important strategy to help small firms grow and survive (Lee et al., 2012). However, to execute this strategy, the firm has to be able to acquire the relevant resources needed to overcome the constraints to operate in the international marketplace. Female-owned firms are generally seen to be less resourceful than male-owned firms, and as such, the expectation is that they will be less likely to internationalize. This expectation however, was hardly ever tested empirically in the extant literature (Brush, 2002). This study has moved the literature further by formally testing, using rigorous scientific techniques, the relationship between gender of the owner of a firm and the propensity of the firm to internationalize, where internationalizing here

is captured as the ability to export. The study also makes the work quite novel as it uses, data from a geographical region, Jamaica, which has a dearth of literature on the subject. The findings from this region will no doubt add new insights to the work in this area so that theorists looking at gender and internationalization of the firm can have a broader perspective on how to formulate a general theory on the subject.

The results from the analysis suggest that gender of the owner does not have any significant impact on the internationalization strategy of the small firm. In other words; whether the owner of the firm is male or female, that is not what matters for internationalization efforts. The analysis suggests that what is most important in this regard is the size of the firm. This finding resonates with a lot of previous works on the subject, (e.g.Williams, 2009, 2010; Leonidou et al., 1998, Hall & Tu, 2004). What this result suggests is that, resources are most important for the internationalization of the firm, not the gender of the owner. Size was used as a surrogate measure of resources. The results from the analysis of the data suggest that there is indeed a positive relationship between firm size and internationalization. The interpretation of this result is that large size firms are more likely to internationalize than smaller firms. Intuitively, this fits into the premise on which the resource based literature is built.

The resource based view of venture internationalization (Bloodgood et al, 1996) notes that firms that have a large stock of resources have a greater proclivity to internationalize than those without. Resources go beyond the physical assets of the firm to include human capital assets, financial assets, networks, and also culture and organisational structure (Williams, 2009). These resources help the firm to deal with some of the difficult issues in pursing an international operation. For example, the cost of looking for new markets is not cheap. If firms do not have the requisite financial capital, it will be difficult for them to find these new markets and extend their sales abroad. The more financial resources a firm has, the greater the likelihood that it will be able to carry out this search and find new markets that it can service with its offerings. Critically also, when the firm has a high stock of financial resources, it will be able to hire high quality human capital resources which are important for designing the correct strategies to internationalize. Indeed, there is no doubt that resources play an important role in the quest for firms to internationalize, especially in the context of small firms where such resources are generally scarce. It is in this light that gender, although not a significant variable in this research, becomes an important consideration in the internationalization discourse.

Most of the work on gender and the ownership of firm (Williams & K'nIfe, 2012; Brush, 2002) have shown that female-owned firms are generally less resourced than male-owned firms. This limited resource constraints can dissuade female-owned firms from internationalizing given that there is not much resources to overcome the obstacles involved in entering international markets. Female-owned firms it is argued, generally have weak network support, are unable to access financial capital, especially venture capital, are unable to recruit high quality human resources, and in most cases, have informal business organisations (Lerner et al., 1997; Williams & K'nIfe 2012). It is for these reasons, female-owned firms find it harder to internationalize than male-owned firms. In other words, it is not the gender that is most important; it is the handicap of being resource constrained because of the gender that makes internationalization of female-owned SMEs an unlikely occurrence.

IMPLICATIONS FOR POLICY

The results suggest that size and not the gender of the owner or age of the firm is most relevant for the internationalization of the small firms in this sample. The clear implication it sends to policymakers that are interested in getting more of their small firms to engage in international activities is that they will have to ensure that firms grow and do not remain small. Therefore, rather than policies geared towards gender differences in the firm, policymakers should ensure that they put into place, policies that can generate growth in the small firm irrespective of the gender of the owner. There will be a need therefore for ensuring equal access to financing, provision of support for search for international markets, dissemination of information about customers in international markets among other things. These policies should be broad-based and not geared towards a firm because of the gender of the owner. In this way, the policymakers will ensure the growth of the firms in their locale so that they can all become engaged in international market operations rather than limiting the growth agenda to a specific type of firm.

Besides public policymakers, managers of these small firms have to also institute policies that will enable their firms to grow as well. The managers in these firms will have to design strategies in order to bolster the growth potential of their firms. One such strategy is to hire high quality human resources. Again, the gender of the hiree should not be the most important factor. The competence of the employee is paramount. The employee must have an international frame of reference and is agile enough to help the small firm to design strategies to enter into international markets. This is especially true for firms that are operating in small, open economies like Jamaica. Because the domestic markets in these locales are too small to ensure long-terms growth and survival of the enterprises, it is important that these firms operate in the international market place. Other growth strategies such as product diversification and formulation of business networks will also be important for managers to consider.

CONCLUDING THOUGHTS

The work presented in this paper argues that it is firm size and not the gender of the owner of the firm nor the age of the firm that is most critical for the internationalization activity of the small firm. The findings add to the general body of literature that looks at the internationalization of firms but which generally ignores the gender variable. The result from this research is an addition to this rich literature. Further, the novel context in which the work was done, adds some uniqueness to the results. Jamaica is a context in which the issue of gender and internationalization of the firm has not been studied before. This new context will add a rich perspective to the literature.

While the results from this research are robust as indicated by all the diagnostic statistics generated from the logistical regression model, it is still not clear how the external validity of the work will turn out. As such, future researchers should consider extending the work to other jurisdictions, especially other small economies like those of the Jamaica such as Barbados,

Trinidad, Seychelles, Malta among others. This comparative work will no doubt, help to improve the external validity of the findings.

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