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FOREIGN TRADE COMPETITIVENESS OF SUB-SAHARAN AFRICAN COUNTRIES - THE EFFECTS OF CHINA'S TRADE EXPANSION

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ABSTRACT. This paper examines the influence of Chinese powerful economic growth on the competitiveness of Sub-Saharan Africa over the past decade. According to our hypothesis on the one hand the general expansion of China, on the other hand the change of the Chinese specialization patterns generated increasing needs for resources which affected the foreign trade and in this way the trade specialization patterns of the Sub-Saharan African countries. Accordingly the export specialization of Sub-Saharan African countries adapted to China's export specialization trend and maybe there is a connection between the revealed comparative advantage indexes of China and the Sub-Saharan African countries reflecting their specialization. In accordance to the aim the paper established that the trade specialization patterns of Sub-Saharan African countries and China showed an increasingly different picture, it is proved that they completed each other during the studied period. The complementary feature ensures that Chinese economic growth offers increasing foreign trade possibilities to Sub-Saharan African countries, and parallel with this Chinese export possibilities may increase in the Sub-Saharan African regions. The most distinct effect was demonstrable in terms of mineral products, fuels i.e. the products of the primary sector. It also means that China's powerful economic growth ensures continuously expanding export possibilities to Sub-Saharan African countries especially the producing sector of the Southern African region. The complementary feature of the trade specialization patterns is apparent in terms of the Chinese products of the textile industry, the machinery and divers appliances. The increase of competitiveness of these Chinese products results in the increasing export possibility expansion at the Sub-Saharan African market.

JEL Classification: F14, F43, F59

Keywords: competitiveness, foreign trade, China, Sub-Saharan African countries

1. Introduction

The reinforcement of China's global economic, political and geopolitical role has attracted the attention of the international community more and more distinctly to the „Asian lion" over the past decade. There exist hardly any countries

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that, strangely enough, are not involved (interested) in China's increasing strength in the field of working capital investments, international trade or diplomatic relations. The country needs resources for its economic growth, which makes sure its further growth. These resources, however, are not at its disposal without restraint so those must be imported. China's dependence on the world market is increasing perpetually not only in respect of mineral products but also in respect of agricultural products. According to the data published by the US Energy Information Administration (EIA) China became the second largest user of oil by 2011. As for oil, the Middle Eastern countries do not guarantee a safe and reliable source to China. Therefore the location of the purchase of products produced by the primary sector has been, to a large extent, transferred to the Sub-Saharan African (SSA) and South American countries rich in primary commodities.

A wide range of scientific literature, numerous studies and books deal with China's position in global economy, its role in the Asian region (Ming-Te–Tai-Ting Liu 2012, Haltmaier et al. 2007, Wang 2004), its economic, diplomatic relations with the United States (Morrison, 2013, Wang, 2010) and the European Union (Chen, 2012, Yi, 2006) and the analysis of the quality of these relations. The scientific literature related to relationship of China and the Sub-Saharan African countries is recent in spite of the fact that these advances came into existence owing to a process dating back several decades and still developing and becoming more and more complex. From these Kareli's (2012) study is remarkable which focused on how the trade interactions affect the prospects for structural change in SSA. She concluded that China has not facilitated growth-inducing structural change in Sub Saharan African countries in the 2000s. She emphasized that natural resource exporters could utilize the rents generated from commodity exports to support the movement of labor and capital from low to high value-added activities. Related to the trade between China and the Sub-Saharan African countries she established that exports to China are concentrated in only a small number of SSA countries while imports from China are significant for all countries in the region. There are some scientific literatures which are contrast the Sub-Saharan relations both China and Europe (Jacobs, 2011) or China and the United States (GAO, 2013). According to Jacobs (2011) Chinese and European trade relations with Sub-Saharan Africa are becoming more similar. Based on the study of GAO (2013) both U.S. and Chinese trade in goods with Sub-Saharan Africa increased from 2001 through 2011, with Chinese trade increasing faster and surpassing U.S. trade. In both countries' trade with Sub-Saharan Africa imports of crude oil have dominated.

The modern age trade and diplomatic relations between China and the Sub-Saharan African countries go back to the late 1950's when countries on the periphery of global economy concluded an alliance to create cooperation mainly based on ideology. These relations went through crucial requalification at the turn of the century, as a matter of fact coinciding with the reinforcement of China's global economic position. Measures taken to establish and reinforce bilateral foreign trade relations as well as, providing them the basis to establish diplomatic relations and the interregional agreement in relation with China and the Sub-Saharan African countries came gradually into the limelight. On the basis of the conditions of the second ministerial conference of Forum on China-Africa Cooperation (FOCAC)

acquiesced in December 2003 the Far Eastern country guaranteed a zero-rate customs duty of 190 products for the 28 less developed Sub-Saharan African countries. At the third ministerial conference in Beijing in 2006 the concession was extended over 478 African commodities. From 2004 the application of quotes and trade monopolies ceased to exist, the prohibition of import and import permits also decreased, furthermore a significant administrative simplification were implemented.

2. Aim of the study and research methodology

In our research we were seeking, first and foremost, to find out if China's export specialization trend and for this reason increased resource needs affect the trade specialization of Sub-Saharan African countries rich in primary commodities. In this regard, the following questions arose: Is there a connection between China and the Sub-Saharan African countries' specialization patterns in particular product groups, if so, in what direction does it take? And how powerful is the connection? Does the complementary feature of specialization patterns prevail? With the help of econometric methods we were looking for the answer to the question whether the powerful growth of the Chinese economy from the turn of the century ensures continuously expanding possibilities the Sub-Saharan African countries rich in natural resources.

From the above mentioned authors Kareli (2012) dealt with this subject. In her paper she looked at the technological composition of China's and the SSA's foreign trade and how it has evolved over the past decade. According to the results China has reinforced Sub-Saharan Africa's dependence on natural resource exports. SSA has increasingly relied on Chinese manufactured products and the technology intensity of these imports has increased over the decade. At the same time manufacturing good exporters of SSA have not been able to take advantage of the huge Chinese market while they have faced increasing competition from China in third markets.

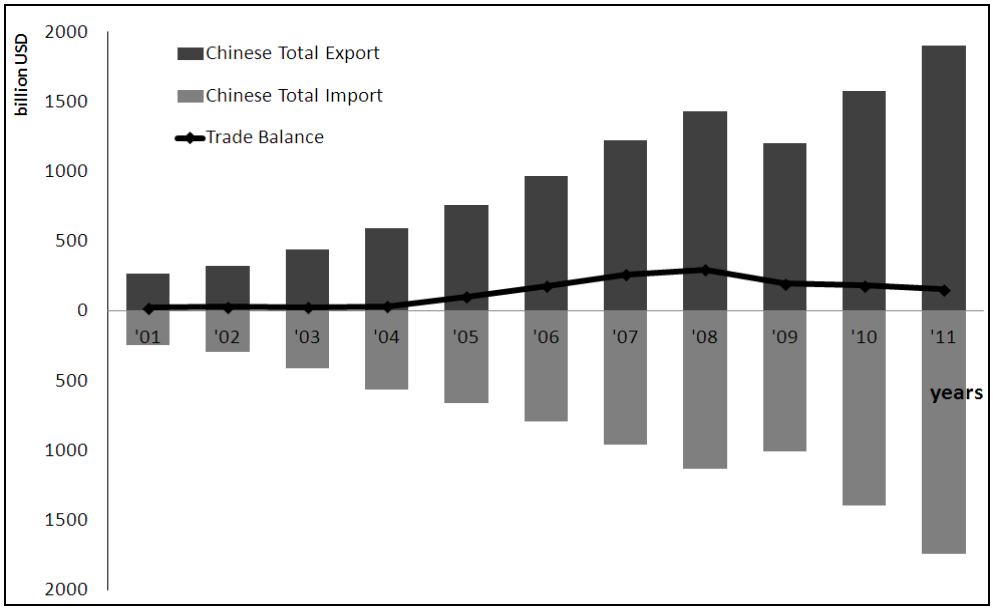
To our analysis we used the database of UNComtrade and the International Trade Centre (ITC) for the concrete calculations in two-digit subdivisions according to the Harmonized System Codes (HS) standardized by the World Customs Organization (WCO). The studied period encompasses the period between 2001 and 2011, considering that these data of the interval are completely available at the time of the closure of the manuscript.

3. Change on the global economic scene

China is seeking to establish its leading role in the Far-Eastern region by expanding its trade relations, taking confidence building measures and launching fundraising campaigns. It was an active participant and initiator of numerous multilateral and regional co-operations. All these are to prove that the rising China is committed to the integration and opening. Owing to China's opening, the world's largest market and one of the most determining investment spots became accessible. One of the most significant stages of these processes was the country's accession to WTO in 2001, which opened new territories to China and its partners to handle economic conflicting interests directly connected with foreign trade relations and rising from their possible background regulation.

China's role in the international trade has been gradually rising in value over the past three decades. It had a 3.9% share of the world's export of goods at the turn of the century. The year 2011 was the third year in which China achieved the largest export in the world. At that time the country's complete export of goods and services was US$ 1,898.4 billion, which meant 10.6% of the global export. The Chinese export of goods increased by 613% between 2001 and 2011, the import in the same period grew by 616 % (see Figure 1).

Figure 1 – The tendency of Chinese trade position



Source: On the basis of the database of International Trade Center

In 2011 China's largest catchment areas were the USA (17.1%), Hong Kong (14.1%) and Japan (7.8%). The largest expansion of the Chinese export can be demonstrated in the past years in the trade done with Brazil, Vietnam, Indonesia and India. The shares of the Sub-Saharan African countries are negligible; the most important partner in the region is the South African Republic (0.7%).

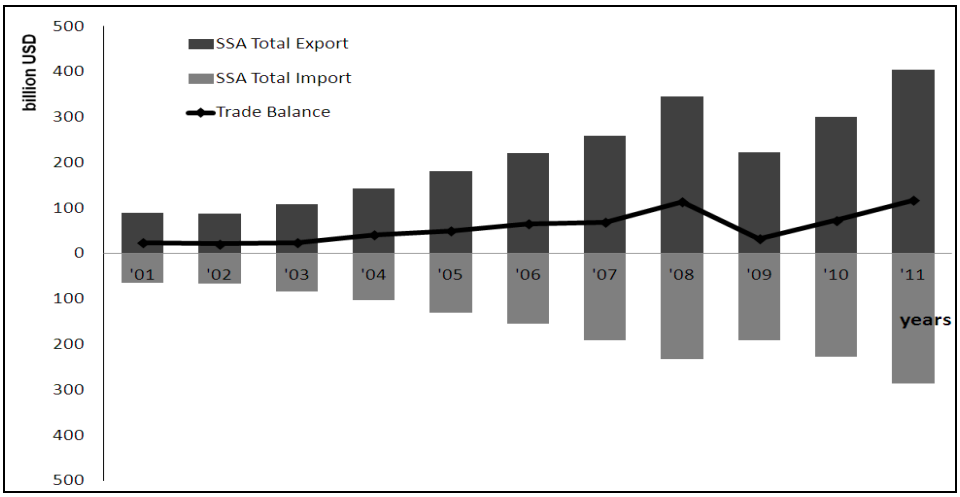
China's complete product import exceeded US$1,743.4 billion in 2011. The largest import partners of the country are Japan (11.2%), the Korean Republic (9.3%), Taiwan (7.2%), the USA (7.0%) and Germany (5.3%). Among the countries of the Sub-Saharan African region the South African Republic (1.8%), Angola (1.4%) and Sudan (0.5%) are the most important partners.

The growth rate of the Sub-Saharan African countries' trade is smaller than the Chinese. In case of export the value increased by 354% in the period under survey, while the import grew by 349 % between 2001 and 2011 (see Figure 2). In spite of this total foreign trade of the region remained insignificant.

The most important foreign trade partner of Sub-Saharan Africa is traditionally the European Union. Quarter of the SSA's export flowed into the member states of EU during the studied period. From the point of view of the export the second largest partner was U.S. (19,8%) in 2010 but next year China became the second in consequence of China's share increased from 17,7% of the preceding year to 19,9%.

Mineral fuels, oils (HS 27) give more than the half of the SSA's export of goods, metals and precious stones (HS 71) have a nearly 10% share in the export of the region.

Figure 2 – The tendency of SSA's trade position



Source: On the basis of the database of International Trade Center

In the ranking of the countries from the point of view of the export Nigeria was the 37th, the Republic of South Africa was the 41st and Angola was the 52nd in 2011. The most significant increase is characteristic of Ghana and the Democratic Republic of Congo.

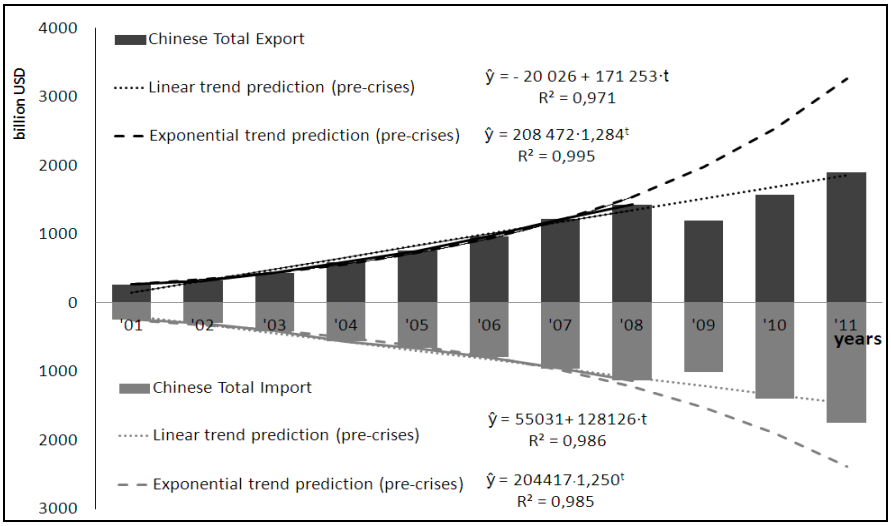
Republic of South Africa has the largest import. Machinery (HS 84) and Mineral fuels, oils (HS 27) are the most important products in the import of the Sub-Saharan African countries.

In connection with the effect of the crises we can establish that similar influence is observable in the Chinese and SSA's trade tendency (see Figure 3 and Figure 4) according with Jánossy's famous theory of trend lines.

As Tarján (2002) wrote Jánossy was the most important Hungarian pioneer of surveys on long time series. He analyzed the reconstruction periods of countries following World War II, and devised the famous theory of trend lines in the 1960s. According to him after a significant economic trauma the performance of the economy and by this means the indicators characterizing it fall down to nadir. Later the country catches the trend line of its long term development up by increase at an accelerated pace ensuing in two period one after the other. Thereafter the tempo of the development slows down and falls down again on the level of the trend characterizing the country.

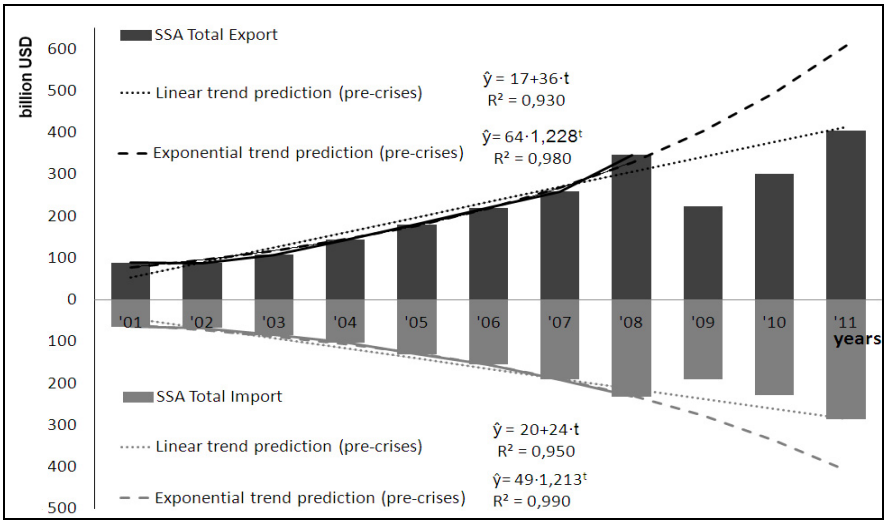
It is proved that the exponential trend is the best fitted to the trade tendency of China and Sub-Saharan Africa but the linear trend is suited for model the tendency too. We can establish that to 2011 China and SSA succeeded in reaching the level justified the prediction made on the basis of the linear trend fitted to the time series.

Figure 3 – The effect of the crises on the tendency of China's trade position



Source: Own calculation on the basis of the database of International Trade Center

Figure 4 – The effect of the crises on the tendency of China's trade position

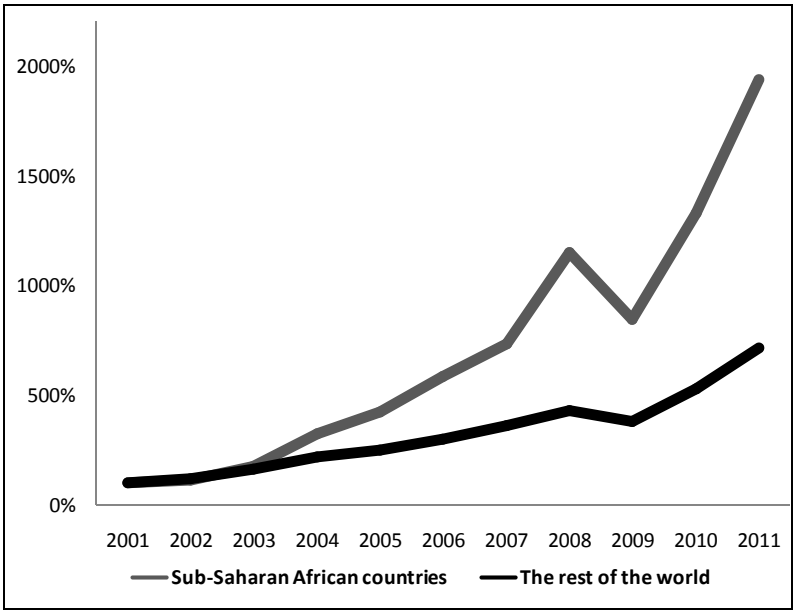


Source: Own calculation on the basis of the database of International Trade Center

4. Features of the foreign trade between China and the Sub-Saharan African countries

The ITC and UNComtrade statistics show that the Sub-Saharan African countries have a minor role not only in China's foreign trade but also in that of the world for the time being.

Figure 5 – The tendency of the export of Sub-Saharan African countries and the rest of the world towards China (2001=100%)



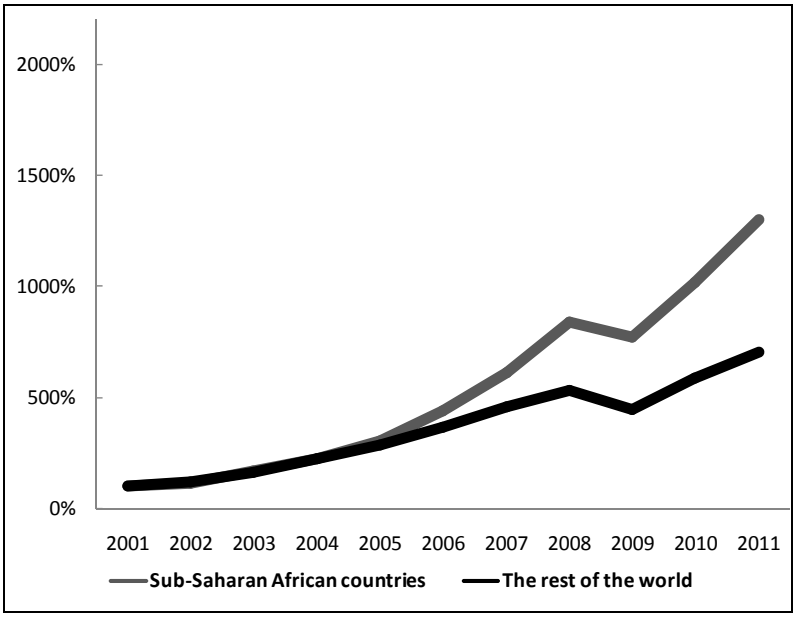
Source: On the basis of the database of International Trade Center and UNComtrade

These countries had a 1.6% share of China's export in 2001, that is the debut of WTO membership, and then in the study period this proportion increasing continuously rose to 2.9% by 2011. In the first years of the twenty-first century, the Sub-Saharan African countries were represented by only 1.8%, then by 2011 this share grew to 5,0%. The Sub-Saharan countries multiplied altogether their export towards China by over nineteen-fold within this short period of time (2001-2011). However, their export value to the rest of the world increased by only sevenfold (see Figure 5 and 6).

Although the foreign trade of the Sub-Saharan African countries with China does not still seem to reach the required standard these days, the dynamism of the expansion, the pace of export-import increase are conspicuous. The increase exceed significantly the pace of growth of foreign trade between China and the rest of the world in respect of both import and export. The majority of the Sub-Saharan African countries have the largest export income from raw material products (energy

resources, mineral resources, different metals). Since in 2008 (the beginning of the financial and economic crisis) their world market price started to fall – except for gold – owing to the decreasing demand so most countries of the region had to count with the decrease of their export income for a short period of time.

Figure 6 – The tendency of the import of Sub-Saharan African countries and the rest of the world towards China (2001=100%)

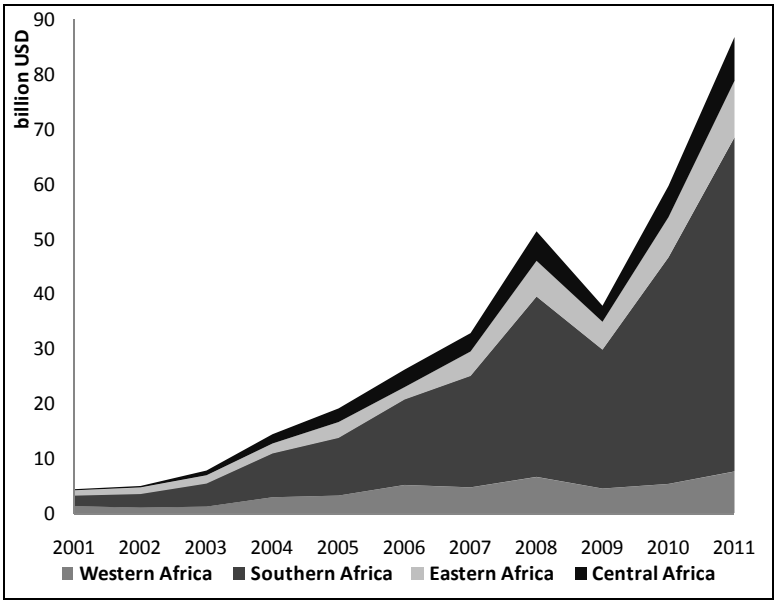


Source: On the basis of the database of International Trade Center and UNComtrade

The trade with China and the dynamics of the export-import increase of the particular Sub-Saharan country groups[1] – that is the Western African, Central African, Southern African and Eastern African regions – show a fairly diverse picture. Nevertheless, a definitely rising tendency can be identified in all the four individual African regions. The most distinct export activity with China is done by the Southern African country group. In terms of import performance the picture is much more subtle. The Western African, Southern African as well as the Eastern African countries import a crucial part of the Chinese goods. The Central African country group has the least share of the Chinese export. Nonetheless, it is vital to emphasize that the dynamics of the expansion of both the import and the export data is the most remarkable in case of the Central African country group (see Figures 7 and 8).

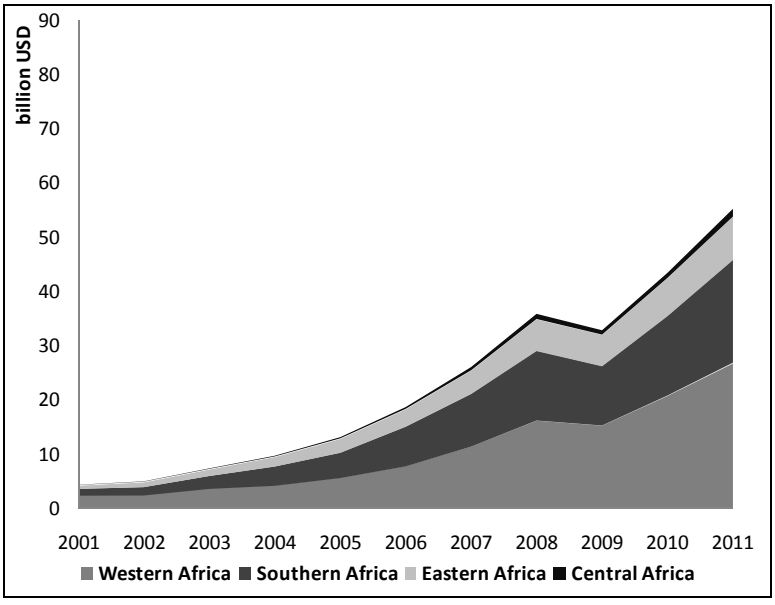
[1] The analysis is done on the basis of the United Nation's official geographical regional division, according to a country group breakdown.

Figure 7 – The share of the export of Sub-Saharan African countries towards China between 2001 and 2011



Source: On the basis of the database of International Trade Center and UNComtrade

Figure 8 – The share of the import of Sub-Saharan African countries towards China between 2001 and 2011



Source: On the basis of the database of International Trade Center and UNComtrade

5. The methods of foreign trade competitiveness measurement

In economic sense connection of a country to the foreign trade or the international division of labor is induced by the different conditions of production of countries, such as existence or lack of the natural resources, the labor or the capital, as well as technology. By the advantages rising from the international trade national economies increase their real incomes and by means of it their living standards. On the one hand the international trade widens the consumption possibilities of the countries, on the other hand makes the international specialization of the countries possible. The emphasis is unquestionable on the effectiveness. If the countries specialize on the products that they produce by the greatest relative effectiveness, that is comparative advantage, so the trade among each other gives mutual advantages for them. The theory of comparative advantage[2] summarizes this assumptions and statements.

To sum it up beside the limited availability of resources the aim of foreign trade is to increase the welfare of countries and their consumers by extending the possibilities of consumption. The foreign trade of the world is extending dynamically; the question is how the foreign trade position of each country is changing in the meantime. Competition is the essential motivation and the prime mover of the operation of market economy as on micro level so on macro level. Several studies and articles deal with the notion, measurability and measurement of national economy. The competitiveness of foreign trade is quite a complex notion, and the cognition of this phenomenon justifies a multilateral approach. Thus there is a wide range of methods applied in the analysis of foreign trade competitiveness.

Scientific sources mention among the theoretical bases of competitiveness the so-called static theories preceding and based on comparative advantages. Thus the notion of competitiveness and comparative advantage are inherently interconnected. In accordance with Frohberg-Hartmann's point (1999) the only difference between them that competitiveness can be described in terms of distortions and imperfections of the market contrary to comparative advantage. According to this fact, under free trade conditions certain countries specialize in production of such products and become their net exporters, which provide them comparative advantages. So comparative advantage is manifested in specialization and that refers to competitiveness.

The notion of revealed comparative advantage (RCA) which is based on specialization was created to employ the theory of comparative advantages. The indexes of revealed comparative advantage permit to find out on the basis of the export specialization of a country's foreign trade or its lack where the given country's comparative advantages and disadvantages are hidden. Poór (2010) established that the revealed comparative advantage indexes are export specialization indexes, however, the study of export specialization cannot only be carried out with the help of RCA-indexes. The revealed comparative advantage indexes are such export specialized indexes that relate the foreign trade position of a given product/product group to another product or make a relational comparison.

[2] David Ricardo published the classic formulation of the comparative advantage in his book which name is On the Principles of Political Economy and Taxation (1817). The modern formulation of the comparative advantage is linked with the name of Eli Filip Heckscher és Bertil Gotthard Ohlin.

The index of the Revealed Comparative Advantage (RCA) linked with the name of Balassa Béla is applied widely to the measurement and the analysis of the international competitiveness. According to Török (1999) this index is based on the assumption that the share of a product (indexed by letter 'j') in the export of a country (indexed by letter 'a') theoretically should be the same as the share of that product in the global export. If the rate of these shares, in accordance with the assumption, is 1, then the product indexed by 'j' has exactly so great importance in the country indexed by 'a', as in the global export, that is there is neither inferred comparative advantage nor inferred comparative disadvantage. If $RCA_{aj} > 1$ (the share in the country is greater than the share in the world), then there is inferred comparative advantage, since the country indexed by 'a' exports the product indexed by 'j' more than expectable. According to the basic idea of the RCA index the inferred comparative advantages and disadvantages equalize among the countries in the international trade. This index is easily applicable for describing the specialization structure, and directly refers to the competitiveness position. The application of the RCA-index is very popular in international practice - while serious critiques are voiced against this index, as for example it does not make the elimination of the grant-in-aid possible. Another part of the critiques emphasizes the asymmetry of the index (it measures the comparative disadvantage in a [0,1[, that is a unit interval and the comparative advantage in a $]1,\infty[$, that is an infinite interval), which raises a problem in the econometric analysis (Fertő, 2006).

To solve these problems numerous indexes were created on the basis of Balassa's idea. Balassa's relative export measure is restricted in terms of both commodity and country coverage, therefore the Vollrath's index eliminates the data of the country indexed by 'a' and the product indexed by 'j' from the denominator. According to Vollrath (1991) index constructed in this way approaches the measurement of the comparative advantage more true to facts, since by the application of this the problem of the coverage is eliminated.

Vollrath examined the trends of international competitiveness basing the analyses upon a concept called revealed competitive advantage and three global trade intensity measures: Relative Trade Advantage – RTA, Relative Export Advantage – RXA and Revealed Competitiveness – RC, defined below[3]:

$$RTA_j^a = RCAX_j^a - RCAM_j^a, \text{ where} \quad (1)$$

$$RCAX_j^a = (X_j^a / X_n^a) / (X_j^r / X_n^r) \quad (2)$$

$$RCAM_j^a = (M_j^a / M_n^a) / (M_j^r / M_n^r) \quad (3)$$

$$RXA_j^a = \ln(RCAX_j^a) \quad (4)$$

$$RC_j^a = \ln(RCAX_j^a) - \ln(RCAM_j^a) \quad (5)$$

The three measures represent alternative definitions of revealed comparative advantage basing on RCAX and RCAM (which identify relative export and import advantage) and solving the problems of the asymmetry. Since all three revealed competitive advantage indexes are interpreted as follows: a positive index reveals a comparative advantage, while a negative value reveals a comparative

[3] Superscript 'r' refers the rest of the world (that is the world minus country 'a') while superscript 'n' refers to all traded commodities minus commodity 'j'.

disadvantage. In our analysis we apply the Revealed Competitiveness index to examine the trend of Chinese and Sub-Saharan African countries' competitiveness.

To more exactly measure comparative advantage or disadvantage, as well as to compare the measured indexes of the period under survey the normalized RC index is necessary to apply. Formally this means the following:

$$\hat{RC}_j^a = RC_j^a - \sum \frac{RC_j^a}{n} \qquad (6)$$

Moreover Vollrath's index is not a perfect method to the comparison relating to time. The average $\hat{RC}_j^a$ value changes per annum, per countries and per sectors. The tendency of the average value depends on the concentration of the countries' yearly export and import.

International literature applies the modified versions of Balassa's index to reveal and to measure the export specialization. In this approach existence or lack of several countries' foreign trade specialization shows in relation to which products/product groups/sectors and to what extent comparative advantage or disadvantage is identifiable. Because of the problems arising due to the measurement and the interpretation consensus, giving a direction on investigation, was not formed during the last decades from the point of view of RCA indexes.

6. The trend of indices of the Sub-Saharan African countries and China

We used the database of UNComtrade and the International Trade Centre (ITC) for the concrete calculations. The studied period encompasses the period between 2001 and 2011, considering that these data of the interval are completely available at the time of the closure of the manuscript. Thus Table 1[4] contains the results of the RCA indices in 2001 and 2011, which classifies product groups in two-digit subdivisions according to the Harmonized System Codes (HS) standardized by the World Customs Organization (WCO). The analysis basically involves two directions. On the one hand we studied the competitiveness of China, the Sub-Saharan Africa as well as its particular regions at the world market. On the other hand we calculated the revealed competitiveness of particular countries and product groups based upon the foreign trade data of China with the Sub-Saharan African countries. It was necessary to simplify concerning the fact that some of the 48 countries of the Sub-Saharan African region did not do any or did only minor trade with China.

Table 1 summarizes China's and the Sub-Saharan African countries' RCA indices, as well as the detailed RCA indices of the Southern African, Central African, Eastern African and the Western African countries.

[4] *Note*: The numbers in bold formatting and black colour fill show that between 2001 and 2011 Vollrath's normalized RCA index increased significantly, by more than 0.5 point in terms of the given country/region/country group. The values indicated by bold formatting and grey colour fill show the decrease by at least 0.5 point during the same period in a country /region/country group breakdown. All the other product group and country/region/country group combinations (that is the non-indicated numbers) show the change in Vollrath's modified RCA between -0.5 and +0.5.

Table 1 – The results of the Chinese and the Sub-Saharan African countries' RCA-indexes per product groups in 2001 and in 2011

HS	Név	China		Sub-Saharan		Southern Africa		Central Africa		Eastern Africa		Western Africa	
		2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
01-05	Live Animals; Animal Products	***0,26***	***-0,24***	0,13	-0,25	***0,80***	***0,06***	***-1,65***	***-3,00***	***2,61***	***1,58***	***-0,16***	***-0,66***
06-15	Vegetable Products; Fats; oils	***-0,50***	***-1,46***	-0,02	0,10	-0,08	0,23	***0,72***	***0,21***	***1,65***	***1,05***	-0,42	-0,15
16-24	Prepared Foodstuffs; Beverages; Tobacco	0,71	0,26	0,64	0,54	0,81	0,34	***-0,52***	***-1,12***	0,40	0,03	0,90	1,21
25-27	Mineral products	***-1,29***	***-3,26***	**1,95**	**2,87**	**0,87**	**2,11**	***5,63***	***4,96***	1,49	1,64	**3,64**	**4,14**
28-38	Products of the chemical and Rubber.	-0,86	-0,61	-1,02	-0,79	-0,69	-0,52	**-2,94**	**-0,32**	-1,50	-1,05	-1,02	-0,88
39-40	Artificial Resins, Rubber and Articles thereof.	-1,27	-0,81	**-1,25**	**-0,58**	-1,09	-0,87	***-2,06***	***-2,65***	-1,52	-1,37	**-0,78**	**0,26**
41-43	Raw Hides and skins, Leather, Furs.	0,56	0,93	0,79	0,73	0,39	0,16	**0,12**	**1,05**	***3,02***	***2,05***	**0,50**	**1,22**
44-49	Wood and Articles of Wood Charcoal; Paper	-1,23	-0,78	0,30	0,15	0,16	0,35	***2,31***	***1,51***	-0,77	-0,79	***1,11***	***0,38***
50-63	Textiles and Textile Articles	**0,90**	**1,83**	***0,17***	***-0,63***	-0,13	-0,55	***-1,23***	***-2,09***	-0,36	-0,16	***0,70***	***-0,45***
64-67	Footwear, Headgear	3,29	3,38	***-1,38***	***-2,08***	***-2,10***	***-2,62***	**-3,52**	**-0,69**	***-0,29***	***-0,80***	***0,09***	***-1,77***
68-71	Articles of Stone; Ceramic Products; Glassware	0,44	0,51	2,23	2,36	2,35	2,37	***5,44***	***2,17***	2,13	2,37	**1,66**	**2,61**
72-83	Base Metals and Articles of Base Metals	**-0,80**	**-0,18**	0,33	0,59	1,17	1,28	**1,67**	**2,25**	-1,42	-1,04	-1,66	-1,28
84-85	Machinery; Electrical Equipment	**-0,72**	**0,29**	-1,73	-1,60	-1,41	-1,17	**-2,78**	**-1,61**	**-3,66**	**-2,10**	-2,95	-2,50
90-97	Others	0,51	0,15	-1,13	-1,41	-1,06	-1,18	**-1,18**	**-0,66**	-1,76	-1,39	***-1,61***	***-2,13***

Source: Own calculaton on the basis of the database of International Trade Center and UNComtrade

As for China in the year of 2001 regarding 7 product groups a *comparative disadvantage* (RCA<0) could be discovered. However, in case of 7 product groups a slight *comparative advantage* (RCA>0) is outlined on the basis of the specialization pattern of the country. By 2011 in two sectors (concerning vegetable and mineral products) the already existing comparative disadvantage continued worsening significantly that is the country's competitiveness decreased in the case of these product groups by the end of the studied period. As for products of the textile industry a considerable comparative advantage increase can be perceived in the same period. The wood industry had a comparative disadvantage in 2011 but not so significantly as at the beginning of the studied period. In terms of machinery and electrical appliances China gained advantage by the end of the period compared to the earlier comparative disadvantage. In paralel, as for base metals a significant rise of comparative advantage is identifiable (in terms of the product group China had still a comparative disadvantage at the end of the period but less distinctly than at the beginning of the studied period).

All in all, it was found that China had a competitive advantage in 7 product groups and a competitive disadvantage in 7 product groups in 2011 but the specialization pattern shows differences (in structure) in the patterns compared to the beginning of the period in relation to live animals and animal products, machinery and appliances.

Based upon the total results in 2001 China had seven product groups with a comparative advantage out of which, in 4 cases, the Sub-Saharan African countries had also a comparative disadvantage in the same year. It points to the conclusion that the specialization pattern of China and Sub-Saharan African countries are relatively identical in 2001 in terms of vegetable and chemical products, artificial resins, machinery and electrical appliances.

In case of live animals and animal products, prepared foodstuffs, rawhides, furs and articles thereof, textiles and textile articles and pearls, gemstone, precious metals, glass product groups China and the Sub-Saharan African countries all had a comparative advantage in 2001, that is the specialization pattern of these product groups is also identical. Conversely, it is necessary to underline that in case of the raw

materials of the textile industry China, while in terms of pearl, gemstone, precious metals, glass product groups the Sub-Saharan African countries had the largest comparative advantage. It all leads obviously to the conclusion that in terms of the product groups in question; on the one hand, they (owing to their specialization in the identical products) were competing in the third world's markets in 2001. On the other hand, in case of the raw materials of the textile industry and textile goods China while in case of pearl, gemstone, precious metals, and glass product groups the Sub-Saharan African countries were in a more advantageous competitive position.

To sum up, it is found that the specialization pattern of the Sub-Saharan African countries and the Far Eastern country shows a far too different picture in 2011. By the end of the period they had a comparative advantage only in three sectors (prepared foodstuffs, raw hides, furs and articles thereof, as well as glassware, and articles of stone) instead of the earlier five sectors during at the same time.

Table 1 also gives a summary of the sectors where the RCA indices, measure of comparative advantage, modified by Vollrath, show a significant that is more than a 0.5 change. The survey of the results makes it apparent that China has achieved an enormous increase in terms of RCA indices in the processing industry; however, a significant decrease has been seen in the primary sector (live animals, animal products, vegetable products, prepared foodstuffs and mineral products).

As for the Sub-Saharan African countries the considerable change of the RCA-indices are not so significant, except for one case: in terms of raw hides, furs and articles thereof, the RCA indices show a considerably positive change. The specialization pattern of the region can be believed more or less stable beyond which is hiding the diverse pattern of certain African regions. For instance, the Western African country group has a fairly similar specialization pattern to that of China in terms of particular sectors; merely a difference in the degree of specialization is identifiable. However, especially in case of the Southern African country group a significant degree of increase of comparative advantage can be seen in relation to the primary sector while in the processing industry a considerable moderation can be identified in terms of comparative advantage. As for other African country groups, for instance, in terms of the Central African region the RCA indices improved by at least 0.5 point during the studied period compared to the performance of the other country groups.

7. Correlation between the RCA indices of the Sub-Saharan African countries and China

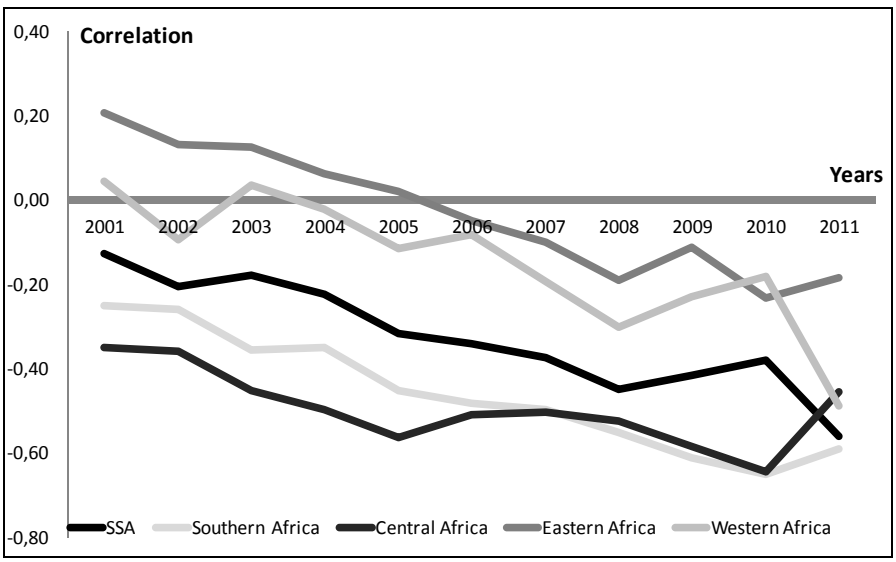
In order to be able to study in what way the export specialization of individual Sub-Saharan African countries differ from one another and to what extent they adapted to China's export specialization, a correlation analysis[5] calculated on basis of Vollrath's RCA indices in a yearly breakdown must be carried out. In the course of correlation analysis the Pearson correlation coefficient is applied as a suitable index to measure the closeness of two set of points. The positive values would show the similar specialization pattern of the countries, that is the results would point out the limits of the trade with one another as they will certainly be forced to compete in the identical third market. While the negative

[5] The methodology is inspired by Ledermann et al. (2008), who carried out an analyses based on a similar model in terms of India, China and Latin America.

values would prove that the specialization patterns quasi-complement one another, that is they demonstrate China's complementary development. We think that it means that in terms of certain product groups China's economic growth guarantees a kind of continuously expanding foreign trade opportunity for the Sub-Saharan countries. However, in terms of other product groups China's export possibilities may also improve in the Sub-Saharan African countries.

The correlation analysis of the period from 2001 to 2011, on the basis of Vollrath's normalized RCA indices, was carried out in a yearly breakdown. Figure 9 demonstrates the correlation between the trend of the RCA indices of the Sub-Saharan African countries (that is to say the four Sub-Saharan African country groups separately) and China's RCA indices. Indices based on the database of the International Trade Centre and UNComtrade, calculated on product groups of HS nomenclature, on the basis of aggregated data from 2001 to 2011. At the beginning of the period the correlation was negative but only to a small extent, which leads to the conclusion that initially the foreign specialization of the Sub-Saharan African countries did not have a close connection with the Chinese specialization pattern. Then a definite decrease can be seen as a consequence of which the correlation sets a value of -0.56 by the end of the period. It leads to the conclusion that by 2011 the trade specialization of the Sub-Saharan African countries is the complements that is the complementary to China's specialization pattern. That promotes the foreign trade intensity of the Sub-Saharan countries with China: on the one hand, by increasing indirectly the opportunities of the individual companies of the region to appear on the foreign market, on the other hand, it may ensure that China has the appropriate export possibilities with the Sub-Saharan countries in terms of the intensity of trade relations.

Figure 9 – Correlation between the RCA indices of the Sub-Saharan African (SSA) countries and China's RCA indices



Source: Own calculation on the basis of the database of International Trade Center and UNComtrade

Graphs illustrating the results from the correlation calculation made on the basis of particular Sub-Saharan African country groups and China's RCA indices show a miscellaneous picture.

In respect of the Southern African countries the calculation provides a steeply descending graph predicting a negative correlation, where the values of about -0.25 of the beginning of the studied period shifted to -0.65 by 2010 and to -0.59 by 2011 (after a minor correction), which made them sink to a considerably strongly negative correlation relation.

The interpretation of the negative correlation can be that the complementary feature of the trade specialization pattern of the two African country groups and China prevails more and more distinctly during the studied period, which leads to the conclusion that the foreign trade between the two country groups and China have expanded.

The graph of the Eastern African country group, however, shows a dual picture. From the beginning of the studied period the continuously descending graph illustrating the correlation between the country group's RCA indices and China's RCA indices calculated on the basis of product groups remains within the positive range until 2005 then a perpetually descending trend can be seen, then it continues to remain in the negative range and sets the value of -0.18 at the end of the period. However moderate it is, the complementary feature of the foreign trade specialization is also apparent in case of the Eastern African country group: the theoretical possibility of foreign trade expansion done with China.

Regarding the Western African country group[6] following the initial 0.05 correlation value of the studied period a continuously descending graph is shown, which sets a value of -0.18 in 2011 (after a steep fall), that is at the end of the period a value of -0.49 is set. Results of correlation calculations done on the basis of RCA indices are well justified by the foreign trade data of China and the particular Sub-Saharan African country groups.

8. Conclusions

Since the accession to the WTO Chinese foreign trade has soared. China's fascinating economic performance has been accompanied by an increasing need for raw materials, which is mainly fulfilled from import. Statistics of ITC and UNComtrade show that China's trade with Sub-Saharan African countries is increasing. In the study we were trying to answer the question if the Far-Eastern country's increased needs for resources have a demonstrable effect on the trade specialization of Sub-Saharan African countries rich in raw materials. In accordance to the preliminary hypothesis the most distinct effect was demonstrable in terms of mineral products, fuels, i.e. the products of the primary sector. It also means that China's powerful economic growth ensures continuously expanding export possibilities to Sub-Saharan African countries especially the producing sector of the Southern African region. The complementary feature of the trade specialization patterns is apparent in terms

[6] Note that within the West African country group, particularly in case of Sudan, regarding the year of 2007, no direct trade data provided by the country were found, so we did the calculation as usual on the basis of mirror trade data.

of the Chinese products of the textile industry, the machinery and divers appliances. The increase of competitiveness of these Chinese products results in the increasing export possibility expansion at the Sub-Saharan African market.

So the specialization pattern of the Sub-Saharan African countries and China shows an increasingly different picture during the studied period, from which we can draw several conclusions. On the one hand, the Sub-Saharan countries have to or should increase the export of products (product groups) in terms of which China's foreign market position is not strong enough or may tend to decrease. On the other hand, the Sub-Saharan African countries must also seek to diversify the export structure. In connection with this, it would be logical to attach new sectors to their already existing export branches especially in connection with sectors in terms of which a) China's foreign market position is not dominant and b) can be adjusted to the already existing export branches.

It is often characteristic of the Sub-Saharan African region that their export activity is concentrated on few products/product groups, which greatly increases, among others, the demand and currency exposure of the country**.** The diversification of the export structure would be indispensible in these countries as the exposure to the change in the raw material prices at the world market may cause severe damage to their economy. Especially the raw material producing countries must expect – such possible dangers as – the deterioration of exchange rates, difficulties deriving from the low diversification of the production structure, weak or increasingly weak relationship between the producing and non-producing sectors. However the exposure to world market prices (consequently, the volatility of the state incomes), the „Dutch disease"[7] accompanied by the appreciation of the real exchange rate and the deterioration of competitiveness and last but not least the risk of „paradox of plenty" [8] can be dangerous too.

[7] The phenomenon was first described by *The Economist*, the British economic and political weekly in 1977. The model was published by Max W. Corden and Peter J. Neary only in 1982. The economic problem, being not only a theoretical category, is caused by the fast run-up of export incomes deriving from raw materials. It is very difficult to prove the Dutch disease in a particular country: the principal revealing signs, such as the decline of the processing industry, but mostly the appreciation of the real exchange rate, may appear as a consequence of other economic effects (Corden-Neary, 1982).

[8] The phenomenon was first described by Richard Auty in 1993, in his work Sustaining Development in Mineral Economies: The Resource Curse Thesis (Auty, 1993). Later two American economists, Jeffrey Sachs and Andrew D. Warner outlined this economic phenomenon in Natural Resource Abundance and Economic Growth, which reveals the correlation between the abundance of natural resources and insufficient economic growth. However, based upon empirical research, opposing views have also appeared in recent years: Tiago Cavalcanti, Kamiar Mohaddes and Mehdi Raissi analysed data sequences regarding the period from 1980 to 2006 in 53 countries. The figures showed that oil production and its sale at the export markets influenced positively both short-time growth and the long-term income level of the given country (Cavalcanti et al., 2006).

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AN EMPIRICAL ANALYSIS OF ENERGY CONSUMPTION AND ECONOMIC GROWTH IN INDIA: ARE THEY CAUSALLY RELATED?

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ABSTRACT. In this paper an attempt is made to present the energy scenario of India in terms of energy consumption, energy security and energy efficiency. Growth trends and the changes in growth trends of these variables have been estimated for the period 1981 to 2010. In addition, the study makes an attempt to study the causal relationship between energy consumption and GDP both at aggregate and disaggregate levels using cointegration and Vector Error Correction (VECM) methods. The empirical results reveal that India is energy insecure, in spite of an increase in energy efficiency. It seems energy consumption and GDP are bidirectional related at the aggregate level. In view of these findings some policy suggestions have been provided.

JEL Classification: Q42, Q43, Q50, Q56

Keywords: Energy security, energy efficiency, causality, cointegration, VECM model, holistic approach, sustainable economic growth

1. Introduction

India is one of the fastest growing economies in the world. Energy consumption is among the key inputs in attaining such growth. India's growth experience is somewhat different from the experience of developed countries as its energy requirements are growing faster leading to energy insecurity and due to the pollution impacts. Sustaining the present economic growth in India requires an increase in the energy security coupled with energy efficiency and with an effective policy of reducing CO_2 impacts. Energy security has become an important concern for the policy makers in India as it is vital to achieve the targeted economic growth of 9-10 percent in the coming years. India's energy consumption has grown at a trend growth rate of 4.5 per cent and the production by 3.72 per cent during 1981 to 2010. India accounts for 2.4 per cent of the world's total annual energy production,

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but consumes about 3.3 per cent of the world's total annual energy. With a targeted growth rate of 10% to 9 per cent and an estimated energy elasticity of 0.56 (for the period 2001 to 2010), the energy requirement in the country is expected to grow at 5.6 per cent in coming 5-6 years. Though primary energy consumption has increased significantly in absolute terms, India's per capita consumption of energy continues to be lower than many emerging economies. The Government of India in its mid-term review of the Tenth Five Year Plan recognized the fact that under-performance of the energy sector can be a major constraint in achieving a growth rate of 8% GDP during the plan period. It has, therefore, called for acceleration of the reforms process and adoption of an integrated energy policy. However, the relationship between energy and economic growth has different implications. If energy growth influences economic growth, and not vice versa, Increase in energy consumption is important to enhance and sustain economic growth. But this has environmental implications. And the policies aiming at energy conservation may retard economic growth. Contrarily, if economic growth influences energy consumption, energy conservation policies may be attempted with little or no significant impact on economic growth. Similarly if there is bi-directional causality, a combination of these policies may be attempted. If there is no causation between growth and energy consumption, they are independent, and the policies have to be attempted in each without bothering implications for the other. Following Kraft and Kraft (1978), several researchers have attempted to study the relationship between energy consumption and GDP though; the evidence is not conclusive.

The earlier works on causality between energy consumption and economic growth have been due to several authors. The authors have used several methodological approaches, varying time period data sets for different countries. These studies have involved several countries in cross-country context, and sometimes a single country in studying the cause and effect relationship between these two variables. Most of these are aggregative studies though, some have concentrated on disaggregate energy consumption such as oil, petroleum, coal and power. The evidence presented by these studies is mixed and not conclusive. However, the studies on the causal relationship using long period data of India are limited. There are no empirical studies which attempted the changes in growth and elasticity using time series data.

In view of the importance of energy consumption in influencing economic growth and its sustainability and the resultant environmental effects, the present work attempts to study the causal links between energy consumption and GDP of India both at aggregate and disaggregate levels. The study is arranged as follows: In the next section we present the brief review of relevant empirical studies on the issue. Section III is on data and econometric model. In section four, we present the empirical findings. The final section is on conclusions and policy implications.

2. Review of literature

In this section, we attempt a brief review of empirical literature available on the subject. Mukhopadhyay and Chakraborthy (2005) and Parikh and Chaitanya (1980) studied the energy intensity in India and claim that the energy requirements per unit value added are higher. Mitra (1992) observes that many developing countries are still using energy planning methods developed to face the challenges of advanced

countries. Reddy and Balachandra (2005) looked at various parameters that influence the energy demand in India. Following Kraft and Kraft (1978), several researchers have attempted to study the relationship between energy consumption and GDP though; the evidence is not conclusive. Mallick (2009) examines whether energy use drives economic growth or vice versa in the Indian context during 1970–71 to 2004–05. Using the Granger causality test, the study suggests that it is the economic growth that fuels more demand for both crude oil and electricity consumption and it is the only growth of coal consumption that drives economic growth. When influence of different components of energy on the two major components of economic growth is investigated with the same causality test, none of the energy components found to be significantly influencing the two components of economic growth, viz. private consumption and investment (Granger, 1969 Granger, 1988). In contrast, the variance decomposition analysis of Vector Autoregression (VAR) suggests that there could be a bidirectional influence between electricity consumption and economic growth, other results remaining unchanged (Johansen,1988; Johansen,1991). Therefore, the study yields mixed and contradictory results. The evidence of bi- directional relationship is found in the works of Ghazi and El- Sakka (2004) and Jumbe (2004) which have analyzed Canada and Malawi respectively. On the opposite, the works of Rufael (2005) and Morimoto and Hope (2004) in Shangai and Sri Lanka show the presence of unidirectional causality running from energy consumption to economic growth. The results of Soyatas and Sary (2006) are once more mixed. Oh and Lee (2004) find evidence of a long-run bi-directional causal relationship and a short-run unidirectional causality running from energy to GDP in Korea.

Besides, Yoo and Jung (2005) find support for unidirectional causality from nuclear energy consumption to economic growth for Korea. In an examination of the causal relationship between nuclear energy consumption and economic growth for a sample of six countries (Yoo and Jung, 2005). Yoo and Ku (2009) provide evidence of unidirectional causality from nuclear energy consumption to economic growth for Korea; unidirectional causality from economic growth to nuclear energy consumption for France and Pakistan; bidirectional causality between nuclear energy consumption and economic growth for Switzerland; and the absence of a causal relationship between nuclear energy consumption and economic growth for Argentina and Germany. However, these two studies examined the causal relationship between nuclear energy consumption and economic growth within a bivariate framework (Yoo and Ku, 2009).

As Apergis and Payne (2010) in their study examines the relationship between nuclear energy consumption and economic growth for sixteen countries within a multivariate panel framework over the period 1980–2005. As cited by Apergis and Payne that Pedroni's (1999, 2004) heterogeneous panel cointegration test reveals there is a long-run equilibrium relationship between real GDP, nuclear energy consumption, real gross fixed capital formation, and the labor force with the respective coefficients positive and statistically significant. The results of the panel vector error correction model finds bidirectional causality between nuclear energy consumption and economic growth in the short-run while unidirectional causality from nuclear energy consumption to economic growth in the long-run. Thus, the results provide support for the feedback hypothesis associated with the relationship between nuclear energy consumption and economic growth (Apergis and Payne, 2010).

According Apergis and Payne (2010) there are four hypotheses have been associated with the causal relationship between energy consumption and economic growth. First, the growth hypothesis postulates that energy consumption can directly impact economic growth and indirectly as a complement to labor and capital in the production process. The presence of unidirectional causality from energy consumption to economic growth confirms the growth hypothesis. Second, the conservation hypothesis suggests that energy conservation policies which reduce energy consumption and waste will not have an adverse impact economic growth. Apergis and Payne concluded that the conservation hypothesis is supported if there is unidirectional causality from economic growth to energy consumption. Third, the feedback hypothesis asserts that energy consumption and economic growth are interrelated and may very well serve as complements to each other. The feedback hypothesis suggests there is a bidirectional causal relationship between energy consumption and economic growth. Fourth, the neutrality hypothesis considers energy consumption to be a relatively small component of overall output and thus will have little or no impact on economic growth. As in case of the conservation hypothesis, energy conservation policies would not adversely impact economic growth. The absence of a causal relationship between energy consumption and economic growth lends support for the neutrality hypothesis (Apergis and Payne, 2010).

Fatai et al. (2004) collected data for the selected countries from the International Energy Agency (IEA) energy database which comprises annual data 1960–1999, for coal, oil, gas, electricity and total final energy consumption. All data were transformed to natural logarithms. Fatai et al. (2004) attempted to study the close relationship between energy consumption and real GDP growth and found that energy conservation policies are likely to affect real GDP growth. They examined the possible impact of energy conservation policies on the New Zealand economy and compared with Australia and several Asian economies. They confirmed that there is causality between energy consumption and GDP in New Zealand further investigated as is the causal relationship between GDP and various disaggregate energy data (coal, natural gas, electricity and oil). In this study, they also found that energy conservation policies may not have significant impacts on real GDP growth in industrialized countries such as New Zealand and Australia compared to Asian economies (Fatai, Oxley and Scrimgeour, 2004).

Fatai et al. (2004) found evidence of a unidirectional link from real GDP to aggregate final energy consumption and unidirectional link from real GDP to industrial and commercial energy consumption in New Zealand and Australia. They further revealed that in the case of the four Asian economies: India, Indonesia, Thailand and The Philippines, a unidirectional link from energy to income was established for India and Indonesia and a bidirectional link for Thailand and The Philippines (Fatai, Oxley and Scrimgeour, 2004). Our study has taken different years 1981-2010 and we mainly focused on Indian energy consumption.

In another study, Akilo (2008) examines the causal relationship between energy consumption and economic growth for eleven countries in sub-Saharan Africa. Using the auto-regressive distributed lag (ARDL) bounds test, the study finds mixed results. With the exclusion of the obvious differences among countries in terms of structural and economic policy characteristics, the multiplicity of results obtained depend upon the variables adopted and, above all, from the methodological

approach followed to test causality. Initially using the standard Granger test and the Sims' methodology the causal relationships are tested. These two approaches assume that data series are stationary. As pointed out by Granger (1988) these tests do not permit to find any long-run information between the variables, being able to capture only the short-run relationships. For this reason, the empirical findings of causal linkages based on these tests are often inconsistent. Later, researchers have begun to employ a cointegration approach which is now considered as the most appropriate to investigate for causality since it overcomes the problem depicted before. Kraft and Kraft (1978), Akarca and Long (1980), Yu and Wang (1984), Erol and Yu (1987), Hwang and Gum (1991), Stern (1993), Masih and Masih (1997), Glasure and Lee (1997), Asafu-Adjaye (2000), Yang (2000), Soytas, Sari and Ozdemir (2001), (Guttormsen, 2004), and Rufael (2005) are studies which have made important contributions to the literature.

There are also studies which examine energy by separating it into its sub-components such as electricity and petroleum. Ghosh (2002) examined economic growth and electricity consumption of India and found a uni-directional causality relationship from economic growth to electricity consumption. Jumbe (2004) found the relationship between electricity consumption and GDP for Malawi for the period between 1970 and 1999 and found a bi-directional causality relationship. However, when he examined the relationship between non-agriculture GDP and electricity consumption, he found a unidirectional causality relationship from GDP to energy consumption. Rufael (2006) examined the relationship between electricity consumption ad GDP for 17 African countries for the period between 1971 and 2001 and found mixed results. Nachane, Nadkarni and Karnik's research (1988) using the Engle-Granger cointegration approach found long-run relationship between energy consumption and economic growth for 11 developing countries and five developed countries. Similar methodologies were also used in other studies. However, these results were ambiguous.

3. Data and the econometric model

The basic source for the data collection is the Planning Commission, India. The study period considered for the empirical analysis was 1981 to 2010. The data on variables such as energy consumption, production, and imports at the aggregated level and for various sub-components such as coal, petroleum, electricity, natural gas, and nuclear power have been collected for this period. The data on real GDP has been collected from the Economic Survey of India. More precisely the dataset comprise annual measures of GDP in constant prices and of various energy components. All the series have been transformed into natural logarithms for the required computations. An empirical analysis involving growth rates, elasticity and causality has been attempted for the study period.

To study the trends in energy consumption, production and imports for the total energy and its various components a semi-log functional form has been estimated and the growth rates have been computed as g=b*100. A double-log functional form has been estimated in computing the energy elasticity (which is measured as the ratio of growth rate of GDP to the growth rate of energy), captures both the structure of the economy as well as the efficiency. Similarly, the changes in trends in growth and elasticity of various components of energy have been computed.

For this purpose, the study period has been divided into three sub-periods, viz; 1981 to 1990, 1991 to 2000 and 2001 to 2010. A linear trend growth model with the intercept and slope dummies has been employed to verify changes in the trends. Two measures of energy security indicators have been employed in this study: i) Energy Security Indicator in terms of Imports, which is defined as a ratio of energy imports to total energy consumption (ESIM) and ii) Energy Security Indicator in terms of production, which is defined as a ratio of energy production to total energy consumption (ESIP). Energy security requires a decline in ESIM and also an increase in ESIP. In order to verify the causality, we examine the relationship between energy consumption and GDP of India using a two-step procedure as follows:

The first step investigates the existence of a unit root in the variables. Since many macroeconomic series are non-stationary, unit root tests are useful to determine the order of integration of the variables and, therefore, to provide the time-series properties of data, the Philips – Perron test (1988) has been employed.

The second step explores the causal relationship between the series. If the series are stationary, then the standard Granger's causality test should be employed. But, if the series are non-stationary and the linear combination of them is stationary, the ECM approach should be adopted. For this reason, testing for cointegration is a necessary pre-requisite to implement the causality test. We have used Johansen's method for verifying the cointegration between natural logs of energy consumption and GDP.

The present study utilizes Johansen maximum likelihood procedure for co integration test using maximum Eigen-value and Trace statistics. However, in the first step, Phillips – Perron (1988) unit root test is used to verify the degree of integration. The test (PP) proposes an alternative non-parametric method for serial co-relation when testing for a unit root among the variables. The PP method estimates the non-augmented Dicky-Fuller test (1979) equation and modifies the t ratio of the coefficient so that serial correlation does not affect the distribution of the test statistic. If the presence of co integration is confirmed by Johansen test, the vector error correction (VEC) model can be used to show the direction of causality relationship.

4. Empirical Findings

The trends in growth and elasticity at the aggregate level and for various sources of energy consumption have been computed dividing the study period (1981 to 2010) into three sub-periods, viz; 1981 to 1990, 1991 to 2000 and 2001 to 2010. The sub-periods have been chosen on the basis of an economic reasoning that the first sub period represents passive liberalization and the later periods, economic reforms and active liberalization in India. The linear trend growth equation of the following type has been used to see the changes in the trends in variables:

$$L_n\, Y = \alpha + \beta_t + (\alpha_1 - \alpha)D_1 + (\alpha_2 - \alpha_1)D_2 + (\beta_1 - \beta)D_{1t} + (\beta_2 - \beta_1)D_{2t}$$

Where $D_1 = 0$ for the period 1981 to 1990 and $D_1 = 1$ for the remaining period, $D_2 = 0$ for the period 1991 to 2000 and $D_2 = 1$ for the remaining period, α and β are intercept and slope parameters for the period 1981 to 1990 and a_1 and b_1 are those for the period 1991to 2000. Similarly a_2 and b_2 are those for the period 2001 to 2010.

L_n Y= Natural logarithm of Y, say energy consumption
($\alpha_1 - \alpha$) = differential intercept for the second sub-period
($\alpha_2 - \alpha_1$) = differential intercept for the third sub-period
(β_1 – b) = differential slope coefficient (growth rate) for the second sub-period
($b_2 - \beta_1$) = differential slope coefficient (growth rate) for the third sub-period
α = intercept for period one
β = Slope coefficient (growth rate) for the period one.

4.1 Trends in energy security

The increase in ESIP and the decline in ESIM indicate a decline in energy dependence and therefore, an increase in energy security. These ratios have been computed and a linear trend equation with intercept and slope dummies has been used to verify the changes in energy security over the study period. The results presented in table 1 reveal that energy insecurity is on increase in India. The model used is as follows:

$$Y_t = \alpha + \beta + (\alpha_1 - \alpha)D_1 + (\alpha_2 - \alpha_1)D_2 + (\beta_1 - \beta)D_{1t} + (\beta_2 - \beta_1)D_{2t}$$

Where, Y_t is a measure of energy security, D_1 =0 for 1981 to 1990 and =1 for the rest of the period, D_2 =0 for 1991to 2000 and =1 for the remaining period. And t=time.

Table 1 Energy Security Trends in India

Variable	1981 to 1990	1991to 2000	2001 to 2010
ESIM	-1.0	0.0	1.0
ESIP	2.0	-1.0	-2.0

Source: Computed by the authors.

4.2 Trends in Energy Consumption

Energy consumption and energy insecurity move together. As energy consumption increases energy insecurity also increases. To trace this, we have studied the trends in energy consumption in India using the same model. For this purpose, both total energy and various sources of energy have been used. We have estimated the trends in growth and elasticity for coal and lignite separately. Coal is the most important energy source in India as it constitutes 50 per cent of the total energy. It is an important source of generating power in India. Therefore, we have studied the trends in coal energy consumption to start with. The directional growth rates have been computed using the following model

$$L_n Y_t = \alpha + \beta_t + (\alpha_1 - \alpha)D_1 + (\alpha_2 - \alpha_1)D_2 + (\beta_1 - \beta)D_{1t} + (\beta_2 - \beta_1)D_{2t}$$

Where, $L_n Y_t$ is the natural log of coal and t is time. Other coefficients have the same meaning as explained above. Below we present the growth rates of energy consumption for various sources including coal:

Table 2 Growth Rates of Energy Consumption in India

Energy source	1981 to 1990	1991 to 2000	2001-2010
Coal	3.33	3.01	6.03
Lignite	17.87	5.18	3.06
Oil	9.88	7.02	3.45
Petroleum	7.69	1.71	0.67
Natural Gas	20.76	7.13	5.99
Hydro Power	-4.68	1.00	9.00
Nuclear Power	19.15	12.57	2.59
Wind Power	-5.30	14.28	19.58
Com. Energy	4.06	5.08	5.86
Total Energy	3.90	8.14	4.50

Source: Computed by the authors

The results indicate that coal consumption is growing at an average rate of 3.33 per cent during the first sub period, 3.01 per cent in the second sub period and 6.03 per cent in the third sub-period. Coal and lignite combined are the largest source of energy in India meeting about 55 per cent of commercial energy requirement. The lignite consumption is not sizeable, and the growth shows a decline continuously. However, the growth of coal has been stable in the second sub-period and has grown at 5.18 per cent in the third sub-period. The lignite has increased by 17.87% during first sub-period. It has declined in the second sub-period and further to 3.06 per cent during the third sub-period. Therefore, the growth trends in the lignite sector have continuously declined. The trends in growth rates of these sources of energy are as expected as their efficiency is at a lower level and due to substitution of other energy sources.

The decade of the 1970's has witnessed major oil supply disruptions. During the 1970s, the OPEC has cut down its oil production causing severe oil supply distortion to the developing as well as developed countries. From 1975 onwards the oil prices remained high and only during recent period, they came down and started rising again. During 1980, due to rising oil prices the second oil shock had taken place. And during October, 1990, Iraq invaded Kuwait leading to a phenomenal rise in oil prices. However, during the 90s the oil price shock has been absorbed and the impact was not as serious as it was during the 1980's. Due to these turn of events, energy consumption of oil has been impacted and the growth rate of the oil consumption reveals this picture. When we locate the table mentioned below, it is clear that oil energy consumption in India has grown by 9.88 per cent during the first sub-period, i.e. 1980-81 to 1990-91, and this has slowed down slightly during the second sub-period to 7.02 per cent. Similarly, in the third sub-period, the oil consumption has fallen further by 3.45 per cent. The decline in the growth rates of energy consumption of oil reflects the price volatility on the oil front. Analogously, the petroleum consumption has increased by 7.69 per cent during the first sub-period and declined to 1.71 per cent during the second period. The growth in consumption of petroleum has further dwindled to 0.67 per cent during the third sub-period. Both oil and petroleum energy consumption growth had similar trends reflecting the situation in international oil price rise and volatility.

The consumption of natural gas in India has grown by 20.76 per cent during the first sub-period and came down to 7.13 per cent during second sub-period. This growth has further fallen to 5.99 per cent during the third sub-period. Though, the growth rate in the consumption of natural gas has been showing a decline over the three sub-periods, it is still one of the fastest growing energy consumption components in India.

India is one of the largest producers of electricity power in the world. It is ranked sixth in the annual electricity consumption, accounting for about 3.5 per cent of the world's total annual energy consumption. India's need for power has increased at a phenomenal rate as it is one of the strategic components of sustaining economic growth. When we locate the growth trends in energy consumption of power, the following results emerge. The growth trends of three sources, viz. hydro power, nuclear power, and wind power have been presented in the same table. It has been perceived that hydro power was growing at a negative growth rate of 4.68 per cent during the first sub-period and this trend has been reversed during the second sub-period as the hydro power energy consumption has increased by 1 per cent. This has further increased to 9 per cent during the third sub-period. Thus, the energy consumption of hydro power has increased astoundingly during 2000-01 to 2009-10. When we look at the growth trends of energy consumption of nuclear power, a somewhat different picture emerges. It has grown by 19.15 per cent during the first sub period and fell to 12.51 per cent during the second sub-period and further declined to 2.59 per cent. Similarly, wind power was growing at a negative growth rate of 5.3 per cent during first sub-period, has started rising at 14.28 per cent and it has further increased to 19.58 per cent which clearly shows that an increasing interest in consuming wind energy as a source of power. The growth trends in the power energy reveal the importance of hydro power and wind power. Thus the growth trends of various components of energy have presented mixed trends during these sub periods. Similar mixed trends are noticed at the aggregate level also.

Total Energy Consumption

Total energy consumption in India is growing at 3.9 per cent during the first sub-period and it has risen to 8.14 per cent during the second sub-period. However, it has declined to 4.5 per cent during the third sub-period. Incongruous to this, commercial energy has grown at 4.06 per cent in the first sub- period, and continued to grow at 5.08 per cent and 5.09 per cent in the succeeding sub-periods.

Total Energy Production

We now present the trends in the growth of energy production in India. The total energy production in India has grown by 4.82 per cent during the first sub-period and has risen to 7.51 per cent. However, it came down to 3.72 per cent during the third sub-period. Therefore, in the recent period, energy consumption is growing by 4.5 per cent and the production is growing by 3.72 per cent leading to a widening gap between production and consumption. This has led to an increase in the imports of energy during this period.

Energy Imports

As the gap between energy production and consumption is widening, the imports of energy started rising in India. This is apparent from the below mentioned table. The imports of energy in India, though they expanded at a negative growth rate during the first sub-period, have started rising at 11.84 per cent during the second sub-period, and correspondingly in the third sub-period, they have risen by 7.19 per cent.

Table 3 Trends in Energy consumption, Production and Imports

	1981 to1990	1991 to 2000	2001 to 2010
Energy Consumption	3.9	8.14	4.5
Energy production	4.82	7.51	3.72
Energy Imports	-12.73	11.84	7.19

Source: Computed by authors

4.3 Energy Elasticity and Efficiency in India

Total Energy

Below we present the trends in the elasticity for the sub-periods as mentioned above. This elasticity is energy elasticity which measures percentage change of GDP produced for a given one percentage change in energy consumption. Obviously an increase in this ratio indicates an increase in the energy productivity, i.e. energy efficiency. Thus energy elasticity is used to measure energy efficiency. The linear trend model with intercept and slope dummies has been used as follows:

$$L_n Y_t = \alpha + \beta L_n EC_t + (\alpha_1 - \alpha)D_1 + (\alpha_2 - \alpha_1)D_2 + (\beta_1 - \beta)D_1 L_n EC_t + (\beta_2 - \beta_1)D_2 L_n EC_t$$

Where, $L_n Y_t$ is the natural log of GDP, $L_n EC$ is the natural log of energy component. The remaining coefficients have the same meaning (in terms of elasticity) as explained earlier.

Table 4 Energy elasticity and Efficiency in India

Energy source	1981 to 1990	1991 to 2000	2001 to 2010
Coal	1.04	1.61	1.38
Lignite	-0.57	0.93	1.76
Oil	-0.49	3.66	4.26
Petroleum	-0.55	1.18	2.28
Natural Gas	0.26	0.79	0.84
Hydro Power	1.31	1.12	0.79
Nuclear Power	1.02	0.43	-0.21
Wind Power	---	0.39	0.30
Com. Energy	0.26	1.11	1.47
Non Com. Energy	1.16	5.17	3.96
Total Energy	-1.31	0.45	1.78

Source: Computed by the authors.

Note: For wind power, the data are not available for the first sub-period.

The above table indicates that the energy efficiency has increased in India during the study period. Though it was negative during the first sub-period, it has increased to 0.68 during the second sub-period and further to 1.79 during the third sub-period, which clearly indicates an increase in energy efficiency in India. The energy elasticities are also computed for the different sources of energy and are presented in the following tables:

The elasticity of commercial energy was 1.0 in the first sub-period. It has increased to 1.15 during the second sub-period and it further increased to 1.47 during the third sub-period. Thus, the commercial energy in India has been efficient in all sub-periods during the study period.

The elasticity of non-commercial energy was 1.16 in the first sub-period. It has increased to 5.17 during the second sub-period and it has fallen to 3.96 during the third sub-period. Thus, the non-commercial energy in India shows a heightening in efficiency for the first two sub-periods though there was a decline during the third sub-period.

The Energy Efficiency of different sources of Energy

In this section, we present the energy elasticity for various sources of energy to verify whether it has been is rising for the above mentioned sub-periods.

The elasticity of coal was 1.04 during the first sub-period. It has increased to 1.61 during the second sub-period and dwindled slightly to 1.39 during the third sub-period. It is evident that coal has been efficient during the study period though the efficiency has declined during the third sub-period. The elasticity of lignite was negative during the first sub-period. It has increased to 0.93 during the second sub-period and has slightly increased to 1.76 per cent during the third sub-period. It is evident that lignite has been efficient during all the sub-periods and the efficiency has increased constantly.

The elasticity of natural gas was 0.20 during the first sub-period. It has increased to 0.93 during the second sub-period and further increased to 1.76 during the third sub-period. The natural gas has been efficient during the study period and the efficiency has increased in all the sub-periods.

The elasticity of oil was -0.49 in the first sub-period. It has increased to 3.66 during the second sub-period and has further increased to 4.34 during the third sub-period. Thus, the oil energy in India shows a rise in elasticity during the second and third sub-periods. The elasticity of petroleum was -0.55 in the first sub-period. It has increased to 1.18 during the second sub-period and further to 2.28 during the third sub-period. Thus, the petroleum energy in India shows an increase in efficiency during the second and third sub-periods. The elasticity of hydropower was 1.32 in the first sub-period and has fallen both in the second and sub-periods by 1.12 and 0.79, respectively implying a decline in efficiency during the second and third sub-periods. Similarly, the elasticity of nuclear power was 1.02 in the first sub-period and has declined both in the second and sub-periods by 0.43 and -0.21, respectively.

The elasticity of wind power during the first sub-period has not been computed owing to non-availability of the data. Therefore, the model has been adjusted to compute the elasticities for the remaining two sub-periods. The elasticity of wind power in India was 0.04 during the second sub-period and it has increased to 0.30

during the third sub-period indicating an increase in the efficiency. From the above discussion, it is clear that energy efficiency in India is rising except a few energy sources such as coal and nuclear power.

4.4 Energy Elasticity, Energy Growth and Economic Growth

We have made an endeavour in this section to project the required energy consumption growth for sustaining a 10 per cent economic growth for the coming years in India. The projection is centred on the energy data collected from the Planning Commission of India. The energy data are in MTOE and the GDP data are in constant prices. The projection is based on the assumption that the energy elasticities remain stable and the projected economic growth would be around 10 per cent in coming years. India has experienced a decline in the growth rate in the recent years due to global slowdown. However a recovery has started by now. A constant elasticity functional form (double-log functional form) has been used taking energy consumption as the dependent variable and the GDP as the independent variable. Energy growth projection is made using the product of energy elasticity (ratio of % change in energy consumption to the % change in GDP) and economic growth. The following table presents these results:

Table 5: Energy Elasticity, Economic Growth and Energy Growth in India

Energy Component	**1981 to 1990**	**1991 to 2000**	**2001 to 2010**	**GDP Growth**	**Energy Consumption Growth**	**Projected Energy Demand (MTOE)***
Total Energy Consumption	0.09	1.47	0.56	10%	0.56*10%=5.6%	685.45
Commercial Energy	0.87	0.87	0.68	10%	0.68*10%=6.8%	520.29
Non-Commercial Energy	0.86	0.19	0.25	10%	0.25*10%=2.5	165.98
Coal	0.96	0.62	0.72	10%	0.72*10%=7.2	234.77
Lignite	-	1.07	0.57	10%	0.57*10%=5.7	9.59
Natural Gas	5.0	1.26	1.19	10%	1.19*10%=11.9%	55.42
Oil	-	0.27	0.23	10%	0.23*10%=2.3%	153.45
Petroleum	-	0.85	0.44	10%	0.44*10%=4.4%	354.83
Hydro Power	0.76	0.89	1.26	10%	1.26*10%=12.6%	4.72
Nuclear Power	0.98	2.32	-	10%	2.32*10%=23.2%	10.04
Wind Power	-	25.64	3.33	10%	3.33*10%=33.3%	1.16

Note: Energy demand is projected based on 10 per cent GDP growth and the energy consumption growth for the period, 2001 to 2010.

The above table indicates two things: 1) An increasing efficiency in India's energy sector that may be due to several factors, some of them being demographic shifts from rural to urban areas, structural economic changes towards lesser energy intensive industry, impressive growth of services, improvement in efficiency of energy use, and inter-fuel substitution and 2) A required energy growth of 5.6 per cent to sustain 10 per cent rate of India's growth in the coming years.

4.5 Causality between Energy Consumption and GDP

Energy growth is one of the important arguments for economic growth. The sustainability of economic growth obviously depends on achieving energy security. The growth in energy consumption sets a limit for achieving sustainable economic growth. Studying the causal relationship between energy consumption and economic growth is important particularly for a country like India, as it is growing around 6 per cent and expected to grow around 10 per cent in coming years. In order to acquire and sustain such high levels of growth, achieving energy security is very important. This also should result in pollution free economic growth.

The results of the Philips-Perron unit root test for levels and first difference of the variables are presented in the following tables. As the table shows, all variables are non-stationary in levels (except petroleum) and stationary in first difference. Thus, they are integrated with order 1 (I (1).

Table 6: Results of Phillips-Perron Unit Root Test

Variables	Levels	First Difference
LGDP	-0.30	-5.02*
LTOTAL ENERGY	-5.39	-13.17*
LCOM ENERGY	-3.05	-7.59*
LCOAL	-2.12	-4.58*
LNGAS	-2.67	-4.73*
LHP	-1.54	-4.42*
LNP	-2.88	-6.718*
LOIL	-2.09	-2.87***
LPET	-3.14	-5.27*

Source: Authors' Calculations. *= Significant at 1 per cent; **= Significant at 5 per cent; ***= significant at 10 per cent.

Table 7: Johansen Cointegration Test results: Trace Test and Max Eigen-value Test

Series	λ Trace Statistic	λ Max Eigen-Value
LGDP,LTOTAL ENERGY	27.00	18.39
LGDP,LCOMENERGY	23.79	20.28
LGDP,LCOAL	18.33	19.29
LGDP,LNGAS	29.81	20.58
LGDP,LHP	30.94	28.59
LGDP,LNP	25.46	23.47
LGDP,LOIL	24.58	19.51
LGDP,LPET	39.79	30.61

Note: The Trace and Max Eigen value statistics are significant at 0.05 probability level rejecting the null hypothesis of no cointegration (r=0). Thus there is at least one cointegrating equation

The above Table shows the co integration test results. According to Johansen's cointegration test the value of the calculated Maximum Eigen-value and Trace test statistics are greater than their critical values which denote the rejection of the

hypothesis of non-cointegration as well as long-run neutrality hypothesis. This clearly shows that, all the energy components and the GDP are in long run equilibrium. There exists a long run equilibrium relationship between these variables.

The results of the VECM model estimation have been shown in the following tables for the causality relationship between real GDP and energy and for components of energy consumption separately. For the brevity, only the coefficients of lagged variables with their t values in the brackets are presented.

Table 8: Vector Error Correction Estimates: LGDP, LTOTALENERGY

	D(LGDP)	D(LTOTAL ENERGY)
Cointegration equation 1	0.029416 (1.57)	-0.542901(-2.61)*
D(LGDP(-1)	0.009197(0.04)	5.10114(2.15)*
D(LGDP(-2)	0.125670(0.20)	6.535582(2.23)*
D(LTOTAL ENERGY(-1)	-0.037771(-2.18)*	-0.645204(-3.37)*
D(LTOTAL ENERGY(-2)	-0.018637(0.01)	-0.090215(0.12)
Constant	0.056347(3.07)*	-0.535115(0.20)

Note: *indicates the significance at 0.05 probability level. Figures in the parentheses are corresponding t values and LGDP is log of GDP, LTOTAL ENERGY is log of total energy Consumption respectively.

As most of the lagged variables of GDP and the total energy consumption (-1) are statistically significant, it may be concluded that energy consumption and GDP of India are mutually causally connected. This is understandable because energy consumption is one of the variables influencing GDP from the demand side and sustenance of economic growth requiring certain amounts of energy consumption growth.

Table 9: Vector Error Correction Estimates: LGDP, LCOMENERGY

Error Correction	**D(LGDP)**	**D(LCOM ENERGY)**
Cointegration equation 1	0.011889 (1.37)	-0.103298(-2.63)*
D(LGDP(-1)	-0.028120(-0.14)	1.487645(1.62)
D(LGDP(-2)	0.133310(0.64)	2.107389(2.23)*
D(LCOMENERGY(-1)	-0.087849(-2.03)*	-0.142001(-0.72)
D(LCOM ENERGY(-2)	-0.032228(-1.07)	0.073755(0.54)
Constant	0.062325(3.52)*	-0.131233(-1.64)

Note: * indicates the significance at 0.05 probability level. Figures in the parentheses are corresponding t values and LGDP is log of GDP, LCOM ENERGY is log of Commercial energy Consumption respectively.

The results indicate that some of the lagged variables of commercial energy consumption and GDP are statistically significant indicating bidirectional causality between commercial energy and GDP of India. We have studied the causality between energy consumption and GDP using other energy components. As most of the lagged variables for these variables are statistically insignificant at 0.05 probability level, we conclude that they are independent of each other. Below we present the results for the other components of energy:

Table 10: Vector Error Correction Estimates: LGDP, LCOAL

Error Correction	**D(LGDP)**	**D(LCOAL)**
CointEq1	0.024018 (0.01594)	0.200763 (0.08043)
D(LGDP(-1))	-0.086676 (0.21058)	-0.014881 (1.06234)
D(LGDP(-2))	0.032614 (0.19592)	1.424858 (0.98839)
D(LCOAL(-1))	-0.092091 (0.05473)	0.036308 (0.27612)
D(LCOAL(-2))	-0.097977 (0.05868)	0.139788 (0.29602)
C	0.081831 (0.02100)	0.004813 (0.10594)

Note: Figures in the parentheses are t values and LGDP is log of GDP, LCOAL is log of Coal Consumption respectively.

Table 11: Vector Error Correction Estimates: LGDP, LOIL

Error Correction	**D(LGDP)**	**D(LOIL)**
CointEq1	-0.000313 (0.00027)	0.001352 (0.00067)
D(LGDP(-1))	-0.234999 (0.30642)	-0.134462 (0.75184)
D(LGDP(-2))	-0.051911 (0.29534)	-0.456719 (0.72465)
D(LOIL(-1))	0.027927 (0.07953)	0.399554 (0.19515)
D(LOIL(-2))	0.033970 (0.06681)	-0.217527 (0.16392)
C	0.071514 (0.02683)	0.043282 (0.06584)

Note: Figures in the parentheses are t values and LGDP is log of GDP, LOIL is log of oil Consumption respectively.

Table 12: Vector Error Correction Estimates: LGDP, LPET

Error Correction:	**D(LGDP)**	**D(LPET)**
CointEq1	-0.000313[-1.14380]	0.001352[2.01132]
D(LGDP(-1))	-0.234999[-0.76693]	-0.134462[-0.17884]
D(LGDP(-2))	-0.051911[-0.17577]	-0.456719[-0.63026]
D(LPET(-1))	0.027927[0.35114]	0.399554[2.04743]*
D(LPET(-2))	0.033970[0.50849]	-0.217527[-1.32704]
C	0.071514 (0.02683)	0.043282 (0.06584)

Note: * indicates the significance at 0.05 probability level. Figures in the parentheses are t values and LGDP is log of GDP, LPET is log of petrol consumption respectively.

Table 13: Vector Error Correction Estimates: LGDP, LNGAS

	D(LGDP)	**D(LNGAS)**
CointEq1	0.024018[1.50649]	0.200763[2.49616]*
D(LGDP(-1))	-0.086676[-0.41160]	-0.014881[-0.01401]
D(LGDP(-2))	0.032614[0.16646]	0.033482[1.44159]
D(LNGAS(-1))	-0.092091[-1.68249]	0.036308[0.13149]
D(LNGAS(-2))	-0.097977[-1.66969]	0.139788[0.47222
C	0.081831[3.89668]*	0.004813[0.04543]

Note: * indicates the significance at 0.05 probability level. Figures in the parentheses are t values and LGDP is log of GDP, LNGAS is log of natural gas consumption respectively.

Table 14: Vector Error Correction Estimates: LGDP, LHP

Error Correction	D(LGDP)	D(LHP)
CointEq1	-0.012600[-0.73489]	0.200155[2.27206]*
D(LGDP(-1))	0.165110[0.76433]	1.322794[1.19178]
D(LGDP(-2))	0.082775[0.39132]	-0.045408[-0.04178]
D(LHP(-1))	0.073524[1.67475]	0.220451[0.97730]
D(LHP(-2))	-0.042364[-0.85841]	0.192345[0.75854]
C	0.044820 (0.01773)	-0.055976 (0.09108)

Note: * indicates the significance at 0.05 probability level. Figures in the parentheses are t values and LGDP is log of GDP, LHP is log of Hydro power Consumption respectively.

5. Conclusions and policy implications

1. Econometric estimation for the energy sector in India reveals that all the variables such as production, consumption, and imports have been growing for all the subsectors. However, the gap between energy consumption and production has widened leading to net imports. There is an evidence of increasing energy import dependence in India leading to energy insecurity. The energy insecurity has increased in the second sub-period and remained more or less the same during the third period.

2. The growth trends of energy at the sub group level have shown mixed trends with a faster trend during the decade immediately after the advent of economic reforms in India. Total energy consumption in India has grown at 3.9 per cent during the first sub-period and further by 8.14 per cent during the second sub-period. However, it came down to 4.5 per cent during the third sub-period. While, the commercial energy has grown at 4.06 per cent in the first sub period, and continued to grow at 5.08 per cent in the subsequent period. Energy production in India has grown at 4.82 per cent during first sub-period and has risen to 7.51 per cent and at 3.72 per cent during the subsequent periods.

3. The gap in the growth rates of energy consumption and production led to an increase the growth of energy imports in India. The growth of energy imports rose to 24.57 per cent during the second sub-period and similarly in the later period, they rose by 20 per cent. From the empirical results, it can be concluded that energy consumption, production in India have been growing, but the gap between these two has widened.

4. The energy efficiency has been increasing in India during the study period. The elasticity, though it was insignificant during the first sub-period, has increased to 0.45 during the second sub-period and further to 1.78 during the third sub-period, which clearly indicates an increase in energy efficiency in India after economic reforms have been introduced. The commercial energy in India has been efficient in all sub-periods during the study period. The non- commercial energy in India has shown an increase in efficiency for the first two sub-periods though there was an evidence of decline during the third sub-period.

5. Johansen's cointegration test denotes the rejection of the null hypothesis of non-cointegration between the variables and thus supports the long-run neutrality hypothesis. Thus GDP and energy consumption including the disaggregated components

of energy are cointegrated. Considering the lagged explanatory variables T-statistics and their significance levels, it can be seen that in the short-run, there is bidirectional Granger causality running from energy consumption to real GDP at the aggregate level.

6. There is an evidence of bidirectional causality between energy consumption and GDP of India. Due to the significance of error correction coefficients in energy consumption equations, a deviation in energy consumption will be adjusted to equilibrium value in the long-run. In view of these empirical findings the following policy measures may be suggested.

Policy implications

1. Achieving energy security and its sustainability need a holistic approach in which development needs and environmental implications have to be integrated. The linkages between energy, environment and economic development are important in framing the policies of achieving and sustaining energy security. India should evolve strategies of sustaining energy security leading to inclusive economic growth with least environmental hazards.

2. Increase in the efficiency of energy consumption is important in attaining energy security. India should aggressively pursue cost-effective opportunities to improve energy efficiency and reduce energy intensity. A competitive market without any entry barriers is the most efficient way of attaining energy security.

3. The bidirectional causation between energy consumption and GDP has several implications. India should attain energy security to sustain its economic growth. At the same time, proper energy conservation policies are also needed which do not hamper the attained economic growth. In the process, it should reduce carbon related problems with proper energy mix and by reducing its dependence on fossil fuels.

4. Appropriate investment climate is an important element of energy security. A continuous flow of investment and technology to discover, develop and exploit new resources; and technology transfer from industrialized countries is necessary. There is an urgent need for increased technological research.

5. The strategies to attain the energy security are constrained by the country's energy resources. India needs to diversify energy supplies in order to insulate the economy from any future shock on the energy front. Fossil fuels provide dependability and grid stability right through the year and will form the backbone of the energy supply chain.

6. In the medium-term, India should achieve higher efficiencies of energy utilization, reduction of distribution losses, up gradation of grid stability for absorbing increased quantum of renewables and promotion of renewables. The country should also engage itself in the development of emerging fuels such as hydrogen, storage devices, and nano- technologies.

7. In the long-term, India should start cutting back on the fossil fuels and improve the production in favor of clean renewables such as, solar, wind, tidal, hydro, plug in vehicles, bi-fuel engines (hydrogen plus diesel, hydrogen plus natural gas), nuclear, etc.

Thus, India's strategy should move towards expanding the energy baskets, neutralizing the flip side aspects of fossil fuels and other energy forms, priority to clean and energy sources and finally a total shift to clean and renewable energy by making it affordable.

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SHORT-RUN REACTION TO NEWS ANNOUNCEMENTS: UK EVIDENCE

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Abstract. In this paper we aim to investigate the behaviour of returns around corporate news announcements. The motivation of the paper is that neither the broad classification of news into "good" and "bad" in many previous studies, nor the focus on only one news announcement type such as earnings announcements, allows us to determine whether returns patterns are in general consistent with efficient markets explanations or behavioural finance models. We study a unique dataset of more than 8,000 news announcements collected for 100 UK companies over a period of 10 years. We compute both daily and cumulative abnormal returns over a 27 day event window to enable the observation not only of event day returns reactions but also pre- and post-event day returns. The results reveal that corporate events convey important economic information to investors. One interesting implication of this is an aggregated holistic approach towards firm events may not be appropriate. Some of the evidence found in this paper is not consistent with the efficient market expectations. Asymmetric reaction, sluggishness, over and under-reaction, and leakage are found in many types of news announcements.

JEL Classification: G10, G14

Keywords: news announcements, event study, abnormal returns, Efficient Market Hypothesis

1. Introduction

This paper investigates the behaviour of returns around news announcements for UK quoted companies. More specifically we test the hypothesis that, on average, company news announcements have no impact on the behaviour of stock returns using an event study approach. There is surprisingly little consideration in the existing literature of the topic of very short term returns reaction to corporate news announcements. Because the vast majority of empirical research focuses on the long run behaviour of price reaction, many questions on short term reaction remain largely unanswered. Some of these include the institutional economics of key agents responding to the release of new company information; whether asymmetric trading responses to

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"good" and "bad" news exist; whether investors discriminate between the different types of news; and whether there are post-event continuations or reversals.

The efficient market hypothesis (EMH) states that stock prices fully reflect all publicly available information, and that no information or analysis can provide investors with the opportunity to outperform the market. As a result, any news announcement concerning a company is rapidly subsumed within its stock price, and announcements will on average not affect stock prices beyond a very short period of time. The EMH holds that individual agents act rationally and therefore correctly interpret all available information, and so we should not observe a series of abnormal returns following the publication of company news. However, if we were to observe a returns drift and/or a reversal pattern after a news announcement then proponents of the EMH explain these regularities away as nothing more than random disturbances from efficient prices.

An alternative explanation is provided by proponents of behavioural finance, who instead point to the presence of systematic deviations of returns from expected prices. Are investors therefore rational as EMH predicts, or are they driven by heuristic bias? Here again, most of the empirical work has been undertaken on long run patterns. While it is interesting to assess asset price behaviour in the long run, the short term behaviour is no less important. If anything, market efficiency is about instantaneous adjustment of prices to new and random information. So, by simple aggregation argument, if there is exactly zero abnormal effect in the short term, there will be exactly zero abnormal effect in any longer term. True, there is a possibility that short term abnormal effects are too small to be detected statistically. But this limitation should drive research towards improving statistical methodologies rather than dropping the more interesting short term in favour of the long term. This is exactly the approach we adopt. We use a more appropriate econometric methodology that provides a more accurate inference. We are able, therefore, to study a relatively short event window which includes pre-event and post-event days. Arguably, given the frequent release of company, industry and country-specific news, a long event window will be increasingly susceptible to news events other than those included in the sample. Overlapping of news announcement may also be problematic in long even windows. The relatively short 27 day window should therefore mitigate these effects. The inclusion of pre-event and post-event returns in the event window enables potential information leakage prior to news events as well as possible post-event drift.

We use a unique data set which spans a 10 year period for 100 UK quoted companies. For the 10 year period, every single news item on these companies was collected on a daily basis. These company news announcements were then classified into 30 different types. This approach has two advantages. First, it enables a detailed examination of each news type rather than a more simplistic aggregate study of 'good' and 'bad' news. For example, Äijö (2008) classifies macroeconomic announcements into positive and negative and is therefore only able to assess the unconditional effect of information. Our approach allows for more specific conditioning, and we are therefore able to discriminate between various types of news within the same group of, say, positive news. Second, most studies focus only on one or a few types of news. For example, Ryan and Taffler (2006) look at the impact of analyst forecast revisions, Donnelly (2008) investigates the impact of negative press comments, and Otchere and Ross (2002) study the

buyback announcement effect. This seems to be driven both by the need to increase the number of test firms, the ease of data collection, and the low cost of obtaining such data. The problem with these approaches is that the conclusions are dependent on the specific type of news studied. Conclusions emanating from such studies are hardly generaliseable to the whole information set. Our approach, however, enables us to look into the whole set of available information. We are able to look both at the aggregate and disaggregate behaviour of all types of news. In particular, we are able to test Fama's (1998) argument that over and under-reaction findings are consistent with efficient markets. Since under-reaction findings are as common as over-reaction findings, these so called anomalies are simply "chance results" (p.304).

Previous tests have encountered intrinsic difficulty in addressing this argument. The reason is simple: you cannot formally test different and unrelated samples. Our data, on the other hand, enable testing across all available news types because they are from the same sample.

One important feature of this study is that reaction to news is considered at the firm level. Analysing the reaction of an aggregate index misses crucial firm level behaviour. Studies like Nikkinen and Sahlström (2004) do offer some insight into the market reaction to a collection of news items, but they are only applicable to the index and may therefore be hard to replicate when a profitable anomaly is found. For example, one might find no over-reaction in the index, but that could be due to half the stocks under-reacting while the other half are over-reacting, thereby cancelling the effect of the first half. If such an effect exists, say because of an industry or size effect, there would indeed be profitable strategies that would short the over-reacting stocks and long the under-reacting stocks. An index based analysis would miss such an opportunity.

The remainder of the paper is organised as follows. The event study approach is explained in Section 2. Section 3 briefly outlines the data collection and the econometric methodology. The fourth section provides a detailed discussion of the results on each type of news, which are grouped into six categories for convenience. The last section discusses the implications of the results for market efficiency and concludes.

2. The event study approach

To test the central hypothesis of this paper, that, on average, company news announcements have no abnormal impact on the behaviour of stock returns, we employ an event study approach with a 27 day event window. We study the behaviour of estimated regression residuals for daily abnormal returns (ARs) and cumulative abnormal returns (CARs) over 25 trading days. Consistent with Fama, Fisher, Jensen, and Roll (1969), ARs are daily average returns deviations of securities with news announcements from their normal relationship with the market, whereas CARs are the cumulative average returns effects of an announcement.

In this study, time is measured in terms of the number of trading days. The 27 trading day window consists of five trading days before the event, two days for the event 'day', and 20 days thereafter. The event day for a given news announcement is defined as day zero (t=0). Note that the time subscript refers to event-time rather than calendar-time. Importantly, the event date includes both the announcement day and the day after. This is to address the fact that announcements are

sometimes issued after trading hours or towards the end of a trading day. In addition to the 27 day event window, we use a further 50 day pre-event period to estimate the model. This gives a total of 76 day-observations for each estimation. Specifically, for an announcement that is made at time t, the estimation window will be t-55 to t+21, while abnormal returns will be estimated for t-5 to t+21.

We group our 30 news announcement types into six categories: profit announcements; corporate restructuring; market sentiment; growth and investment; dividends and financing; and miscellaneous news. Whilst any grouping will necessarily be imperfect, the categories chosen provide for a discussion of news types which demonstrates some commonality of both nature and effect. Testing the no-abnormal return hypothesis across a selection of different corporate announcements helps determine whether there is a common behavioural explanation for the anomalous return pattern following the news (Kadiyala and Rau, 2004).

The result tables are presented in a common three column format for each news type: the first shows the average abnormal return (AAR) for a given day; the second gives the t-statistic for that particular AAR; and the third gives the average cumulative abnormal return (ACAR), the t-statistics for which are presented at the bottom of each table.

One difficulty with presenting a study of this nature is the large number of t-tests required: 28 tests for each of the 30 news types. Further, given the number of tests, the study is susceptible to data mining biases. We know, for example, that at the 5% level, one in 20 tests might be significant by chance alone, even when a test is well specified. To counter this limitation, we take two actions: firstly, we employ only conservative levels of significance, that is, the 5% and 1% levels; secondly, we consider incidences of only one significant result in 20 (at the 5% level) to be the result of data mining, and thereby interpret our results accordingly.

3. Data and methodology

3.1 Event study approach

Because we are collecting a large number of announcements, resource limitation dictated that we restrict our sample of firms to 100. These firms were selected as follows. The list of all companies that traded in the London Stock Exchange between 1992 and 2002 was divided into three size groups. We then randomly drew 33 companies from the large size group, 33 from the medium size group and 34 from the small size group. The firms were then tracked for every news item that was disclosed via Bloomberg between July 1992 and December 2002. This gave a total of 8,155 news announcements. These were then categorised into 30 different types of announcement.

While there is a variety of techniques with which one can estimate abnormal returns, in this paper we adopt the dummy variable approach proposed by Thompson (1985) and Salinger (1992). The model for risk adjustment is the standard Capital Asset Pricing Model (CAPM). We use the market model to obtain abnormal returns.

$$R_{it} - r_{ft} = \gamma_i + \beta_i \left(R_{mt} - r_{ft} \right) + \varepsilon_{it} \quad (1)$$

where $R_{it} - r_{ft}$ is the actual return on asset *i* in excess of risk-free rate at time t, γ_i is the intercept or a constant of the regression line, β_i is the market beta coefficient for security i, assumed stationary conditional on the risk-free return, $R_{mt} - r_{ft}$ is the market return in excess of the risk-free rate at time t, and ε_{it} is a zero mean, independent, disturbance term in period t for security i.

Abnormal returns are obtained as $AR_{it} = (R_{it} - r_{ft}) - \hat{\beta}_i \left(R_{mt} - r_{ft} \right)$ where the beta is estimated from the market model (1). One possible concern in using the market model for small firms is the non-trading bias. Clare et al. (2002), for example, found that non-trading in the London Stock Exchange is substantial (see also Foerster and Keim (1993) for evidence on US market). However, while non-trading bias is real, it only impacts the estimation of systematic risk. It is therefore a major concern for those directly interested in estimating the slope but not the intercept. One common solution to this problem is to calculate abnormal returns as a simple difference between a stock's return and the market return. Another solution is to ignore the market return altogether and use stock returns as abnormal returns. However, both of these solutions would entail the assumption that all stocks have a beta of either one or zero. This is likely to be unrealistic. Furthermore, by imposing either constraints (i.e. unit or zero beta), the intercept will generally be biased. It will only be unbiased and efficient if one of these constraints is true. On the other hand, it is well known in econometrics that adding an irrelevant variable would lead to an unbiased though inefficient intercept. As our concern is the intercept rather than the slope, a market model is a preferred option as it is more likely to lead to unbiased abnormal returns than a zero or unit beta based abnormal return. Moreover, it is often argued that short term returns are likely to have an expected value of zero (Fama, 1998). In such a case, the model used to compute abnormal returns becomes irrelevant. In fact, Campbell, Lo and Mackinlay (1997, pp.154-156) contend that there is little difference between using a zero beta model, a market model or a multifactor model.

The standard procedure in event studies is to first compute abnormal returns, AR_{it}, using an assumed model for normal returns. Then, in the second pass, abnormal returns are averaged or cumulated and tested. However, this method may yield spurious results (Salinger, 1992). Instead, we adopt a dummy variable approach.

The primary advantage of the dummy variable approach is that both prediction errors and test statistics are conveniently obtained from any standard regression package. Moreover, Salinger shows that the standard errors obtained from averaging individually estimated abnormal returns are incorrect. The reason is that such an approach ignores the intertemporal correlation of individually estimated abnormal returns. The two step approach also ignores the contemporaneous correlation of estimated cumulative abnormal returns.

The dummy approach, however, provides correct standard errors. Unlike the two-step procedures, the dummy approach estimates both the model and abnormal returns in a single step. Thus, not only do we obtain the correct standard

error for each individual abnormal return, but we also obtain the correct estimate of the covariance between successive abnormal returns. This is crucial in obtaining the correct standard error of the average cumulative abnormal return.

The dummy model is simply obtained by appending a vector of dummy variables to the right-hand side of the conventional equilibrium model given in equation (1). Thus, for each news announcement, *i*, abnormal returns are estimated from the following model:

$$R_{it} - r_{ft} = \gamma_i + \beta_i \left(R_{mt} - r_{ft} \right) + \sum_{\tau=1}^{27} \alpha_{i\tau} D_{i,\tau,t} + \varepsilon_{it} \qquad (2)$$

where $\alpha_{i\tau}$ is the abnormal return for period τ, and $D_{i,\tau,t}$ is a dummy variable that takes a value of 1 for period τ and zero otherwise. For example, $D_{i,1,t}$ equals 1 five days before the news announcement, $D_{i,6,t}$ equals 1 on the first event day, and $D_{i,27,t}$ equals 1 on the 20th day of the post-event window. In this way, abnormal returns are distinguished from the residuals and contain the correct standard errors. Because the event window consists of two event days, the abnormal returns on the day of announcement and the following day ($\tau = 6,7$) are then averaged to get a single value for event day abnormal returns. This reduces the number of event 'days' to 26.

3.2 Testing abnormal returns

Suppose there are *N* news items for each announcement category. Then, 26×*N* abnormal returns ($\hat{\alpha}_{i\tau}$, $i = 1,\cdots,N$; $\tau = 1,\cdots,26$) are obtained. A given abnormal return, $\hat{\alpha}_{i\tau}$, has variance $\hat{\sigma}^2_{i\tau}$. Thus, for each event day, τ, the average abnormal return, AAR_τ, its variance, and the t-statistic are given, respectively, by

$$AAR_\tau = \overline{\alpha}_\tau = \frac{1}{N} \sum_{i=1}^{N} \hat{\alpha}_{i\tau}$$

$$Var(AAR_\tau) = \frac{1}{N^2} \sum_{i=1}^{N} \hat{\sigma}^2_{i\tau}$$

$$t_\tau = \frac{AAR_\tau}{SD(AAR_\tau)}$$

The t-statistic tests the null hypothesis, H_0, whether, on average, the event has no impact on the behaviour of returns. The above t-statistic assumes that abnormal returns are independent in the cross-section. This is not unrealistic since news announcements take place randomly.

3.3 Testing cumulative abnormal returns

On any given event day, cumulative abnormal return before or after the announcement is obtained by accumulating the estimates of $\alpha_{i\tau}$. Let $\hat{\alpha}_i = (\hat{\alpha}_{i1} \quad \hat{\alpha}_{i2} \quad \cdots \quad \hat{\alpha}_{i27})'$ denote the vector of estimated abnormal returns, and let $\hat{V}_i$ denote the estimated variance covariance matrix of these estimates. Define a 27 element vector δ having ones in pre- or post-event window and zero elsewhere. For example, if we wish to evaluate cumulative abnormal returns on the five-day pre-event period, only the first five elements of δ are set to one. For the 20 days post-event period, only the last 20 elements are set to one.

The estimated cumulative abnormal return for any arbitrary window in an event *i* and the variance of this estimate are given by

$$\hat{CAR}_i(\delta) = \delta' \hat{\alpha}_i$$

$$\hat{\sigma}_i^2(\delta) = \delta' \hat{V}_i \delta$$

To test whether the cumulative abnormal event is, on average, significant across all *N* events, a simple t-test based on the average values is performed. Specifically,

$$t(\delta) = \frac{ACAR(\delta)}{\bar{\sigma}(\delta)}$$

where

$$ACAR(\delta) = \frac{1}{N} \sum_{i=1}^{N} \hat{CAR}_i(\delta)$$

$$\bar{\sigma}^2(\delta) = \frac{1}{N^2} \sum_{i=1}^{N} \hat{\sigma}_i^2(\delta)$$

If the estimation window is large, the statistic $t(\delta)$ is well approximated by the standard normal. Again, it is reasonable to assume cross-sectional independence since the announcements occur randomly both across time and across firms.

4. Results

In this section we examine the results of the event study tests by testing the event day returns reaction, followed by pre-event and post-events returns patterns. When discussing the results, the term “investors” is used to signify all categories of market participants. The results are summarised in Tables 1 to 12. To save space, the tables contain abnormal returns for five days before and after the event regardless of the significance of those abnormal returns. Abnormal returns beyond the 5 day window are only shown when they are statistically significant.

4.1 Announcements

The first news category, profit announcements, includes final and interim profit announcements, and all other ad-hoc announcements. Tables 1 and 2 show the abnormal returns from final and interim profit announcements, including profit up, profit down and loss. A number of interesting results are evident.

Table 1 Final profit announcement

	Final Profit up				Final Loss					
Day	AAR	T-Stat		ACAR	AAR	T-Stat	ACAR	AAR	T-Stat		ACAR
-5	0.05%	0.582		0.05%	-0.07%	-0.377	-0.07%	-0.60%	-1.554		-0.60%
-4	0.06%	0.767		0.11%	0.08%	0.435	0.01%	0.45%	1.151		-0.15%
-3	0.09%	1.091		0.20%	-0.01%	-0.072	0.00%	-0.19%	-0.505		-0.35%
-2	0.10%	1.300		0.30%	0.12%	0.658	0.11%	0.64%	***1.652***		0.29%
-1	0.10%	1.303		0.41%	0.17%	0.973	0.29%	0.59%	1.531		0.88%
0	***1.34%***	***23.347***	**		***0.23%***	***1.845***		***-1.40%***	***-5.081***	**	
1	0.02%	0.193		0.02%	0.24%	1.339	0.24%	0.37%	0.962		0.37%
2	-0.10%	-1.187		-0.08%	0.20%	1.133	0.44%	1.06%	***2.740***	**	1.43%
3	-0.17%	***-2.170***	*	-0.25%	-0.05%	-0.302	0.38%	0.48%	1.251		1.91%
4	-0.10%	-1.193		-0.35%	0.21%	1.169	0.59%	0.68%	***1.770***		2.60%
5	-0.25%	***-3.156***	**	-0.60%	-0.08%	-0.461	0.51%	0.51%	1.336		3.11%
12	-0.21%	***-2.665***	**	-1.32%	-0.08%	-0.457	-0.09%	0.16%	0.421		2.88%
14	-0.21%	***-2.562***	**	-1.62%	-0.24%	-1.364	-0.13%	0.13%	0.342		3.54%
	ACAR	T-Stat			ACAR	T-Stat		ACAR	T-Stat		
	(-1, -5)	***2.170***	*		(-1, -5)	0.699		(-1, -5)	0.983		
	(1, 20)	***-4.636***	**		(1, 20)	-0.288		(1, 20)	***2.678***	**	

Notes: This table presents the price reaction to each announcement. AAR is the Average Abnormal Return, and ACAR is the Average Cumulative Abnormal Return. Averaging was carried out across event firms. The event window extends from five days before the event to 20 days following the news announcement. The event day consists of two trading days. The significance of the t-statistics for the null hypothesis that AAR is zero is indicated by ** and * for the 1% and 5% levels of significance respectively which are also shown in italicized bold. Returns which are significant only at the 10% level are simply shown in italicized bold type alone.

Table 2 Interim profit announcement

	Interim Profit up				Interim Profit Down				Interim Loss			
Day	AAR	T-Stat		ACAR	AAR	T-Stat		ACAR	AAR	T-Stat		ACAR
-5	0.06%	0.705		0.06%	0.08%	0.451		0.08%	0.01%	0.044		0.01%
-4	0.13%	1.547		0.19%	0.04%	0.217		0.12%	0.38%	1.240		0.40%
-3	0.09%	1.022		0.28%	0.09%	0.485		0.20%	-0.01%	-0.048		0.38%
-2	0.01%	0.124		0.29%	0.10%	0.559		0.30%	0.25%	0.810		0.63%
-1	0.16%	***1.842***		0.44%	0.04%	0.231		0.34%	0.24%	0.773		0.86%
0	***0.79%***	***12.983***	**		***-1.04%***	***-8.234***	**		***-1.36%***	***-6.299***	**	
1	-0.04%	-0.425		-0.04%	-0.16%	-0.890		-0.16%	-0.23%	-0.742		-0.23%
2	0.09%	1.078		0.05%	0.01%	0.065		-0.14%	0.14%	0.467		-0.08%
3	-0.24%	***-2.812***	**	-0.18%	-0.09%	-0.521		-0.24%	0.04%	0.136		-0.04%
4	-0.13%	-1.504		-0.31%	0.09%	0.502		-0.15%	0.27%	0.895		0.23%
5	-0.09%	-1.076		-0.40%	0.05%	0.305		-0.09%	0.47%	1.558		0.70%
9	-0.17%	***-1.967***	*	-0.93%	0.01%	0.070		-0.49%	0.40%	1.310		1.42%
18	-0.09%	-1.117		-1.58%	-0.24%	-1.394		-0.85%	-0.61%	***-2.018***	*	1.97%
	ACAR	T-Stat			ACAR	T-Stat			ACAR	T-Stat		
	(-1, -5)	***2.255***	*		(-1, -5)	0.831			(-1, -5)	1.227		
	(1, 20)	***-3.548***	**		(1, 20)	-1.147			(1, 20)	1.549		

Notes: This table presents the price reaction to each announcement. AAR is the Average Abnormal Return, and ACAR is the Average Cumulative Abnormal Return. Averaging was carried out across event firms. The event window extends from five days before the event to 20 days following the news announcement. The event day consists of two trading days. The significance of the t-statistics for the null hypothesis that AAR is zero is indicated by ** and * for the 1% and 5% levels of significance respectively which are also shown in italicized bold. Returns which are significant only at the 10% level are simply shown in italicized bold type alone.

Firstly, all of the news types for both interim and final results evidence a highly significant returns reaction on the event day, except for final profit down. This exception might be explained by investors using the interim announcement to predict the outcome of the final announcement (Pincus, 1983). Indeed, Shores (1990) suggests that interim information can reduce the absolute value of the market's unexpected earnings at the final earnings announcement date.

Secondly, the significant positive returns reaction to a final profit up (1.34%) greatly exceeds the insignificant positive returns reaction to final profit down (0.23%), but is almost exactly mirrored by the significant negative returns reaction to a final loss (-1.40%). The insignificant reaction to final profit down, might also be explained by the mixed signal effect: bad news (profit is down) is partly offset by good news (there is some profit after all). With regard to interim event day reactions, the profit up produces a significant but smaller than final positive reaction (0.79%) whereas the loss produces a significant negative reaction (-1.36%) of similar size to the final announcement. Interestingly, the interim profit down produces a significant

negative reaction (-1.04%) in contrast to the final profit down. Evidently, once investors observe an interim profit down signal, they assume that it is unlikely that the profit trend will be reversed before the final announcement date: investors are less surprised by final profits down than by other profit announcements.

Thirdly, in the pre-event period, only interim and final profits up announcements appear to be anticipated by investors. The ACARs for the pre-announcement interval are significant at the 5% level for both profit announcements, with cumulative pre-event effects of 0.41% for the final profit up and 0.44% for interim profit up. Clearly, good news are leaked to the market whereas mixed news (profit down) and bad news (loss) are not. One explanation is that some clue of the financial report outcome has been received by the market (Morse, 1981). Alternatively, it might be that: sources of information other than the annual income statement cause investors to adjust stock prices in advance (Ball and Brown, 1968); the interim report pre-empts insider trading by disseminating information which is otherwise only subjectively held (Opong, 1995); or the most surprising important announcements are released to the public prior to the official announcement, perhaps even by conveying a hidden message to the press and analysts (Skinner, 1994; Elton and Gruber, 1995). Our results therefore provide evidence against the strong form of the EMH.

Fourthly, in the post-event period there is a significant reversal pattern (significant ACARs at the 1% level) for final and interim profit up and for final loss. The ACAR for the 20 day post event window is -1.57% for the interim profit up and -1.95% for the final profit up, whilst for the final loss the ACAR is 5.41%. Thus we observe initial investor over-reaction followed by a correction, all within a short-term window. Contrary to the EMH, which predicts an equal balance of over and under-reaction across news events, the significant post-event reactions are all over-reactions followed by reversal corrections, the large part of these typically occurring within the first five days, consistent with the findings of Daniel, Hirshleifer, and Subrahmayam (1998).

The abnormal return results for the ad-hoc profit announcements, which are often qualitative in nature and occur irregularly, are given in Table 3. The patterns of returns for positive and negative announcements differ greatly from the more formal financial statement related announcements.

Table 3 Ad-hoc profit announcement

	Positive Profit Announcement				Negative Profit Announcement			
Day	AAR	T-Stat		ACAR	AAR	T-Stat		ACAR
-5	0.03%	0.194		0.03%	0.05%	0.232		0.05%
-4	0.05%	0.293		0.08%	0.16%	0.697		0.22%
-3	-0.04%	-0.235		0.04%	-0.05%	-0.232		0.16%
-2	0.33%	***2.014***	*	0.38%	-0.08%	-0.339		0.08%
-1	-0.12%	-0.709		0.26%	-0.46%	***-1.972***	*	-0.38%
0	***0.87%***	***7.306***	**		***-4.78%***	***-28.329***	**	
1	-0.19%	-1.116		-0.19%	0.10%	0.445		0.10%
2	-0.10%	-0.602		-0.29%	0.11%	0.444		0.21%

	Positive Profit Announcement			Negative Profit Announcement		
Day	AAR	T-Stat	ACAR	AAR	T-Stat	ACAR
3	0.17%	0.993	-0.12%	-0.02%	-0.091	0.19%
4	-0.14%	-0.853	-0.26%	0.15%	0.648	0.34%
5	-0.03%	-0.184	-0.29%	-0.02%	-0.086	0.32%
	ACAR	T-Stat		ACAR	T-Stat	
	(-1, -5)	0.672		(-1, -5)	-0.693	
	(1, 20)	***-2.383***	**	(1, 20)	0.616	

Notes: This table presents the price reaction to each announcement. AAR is the Average Abnormal Return, and ACAR is the Average Cumulative Abnormal Return. Averaging was carried out across event firms. The event window extends from five days before the event to 20 days following the news announcement. The event day consists of two trading days. The significance of the t-statistics for the null hypothesis that AAR is zero is indicated by ** and * for the 1% and 5% levels of significance respectively which are also shown in italicized bold. Returns which are significant only at the 10% level are simply shown in italicized bold type alone.

Firstly, there is a marked reaction asymmetry in that the returns reaction to negative news is greater (-4.78%) than the reaction to positive news (0.87%), whilst both reactions are highly significant. One explanation may be that, cognisant of litigation threats and the need for investor transparency, company directors would rather under-emphasise good news and over-emphasise bad news. This result is consistent with the findings of Skinner (1994) who noted that good news is released by companies more frequently than bad news as a means of addressing short-term mispricing, with bad news being released more discretely as a means of avoiding large negative earnings surprises. Indeed, Beaver (1968) notes that profit warnings diminish in their impact with the frequency of announcements. Secondly, there is little evidence of pre-event leakage as the ACAR in both cases is insignificant, even though there is an isolated significant ARR in each case. Thirdly, and somewhat unexpectedly, we do not observe post-event correction to the sizeable reaction to negative profit news, whereas we do observe a significant correction at the 1% level when a positive profit announcement is made (with a ACAR of -2.08%). Perhaps this over-reaction is again symptomatic of the greater frequency of positive profit news announcements and their reduced true economic impact as a result.

4.2 Corporate restructuring

The first news announcement type in this category, corporate mergers, includes mergers with the company as bidder, mergers with the company as target, and terminated merger negotiations. Table 4 shows the abnormal returns patterns associated with these news announcements. We begin here with a comparison of the abnormal returns associated with merger deal announcements.

Table 4 Mergers

	With company as a bidder				With company as a target				Terminated negotiation		
Day	AAR	T-Stat		ACAR	AAR	T-Stat		ACAR	AAR	T-Stat	ACAR
-5	0.11%	1.378		0.11%	0.01%	0.019		0.01%	0.02%	0.052	0.02%
-4	0.03%	0.424		0.15%	-0.16%	-0.286		-0.15%	0.48%	1.332	0.50%
-3	0.04%	0.474		0.19%	1.65%	***2.896***	**	1.50%	-0.35%	-0.979	0.15%
-2	0.14%	***1.673***		0.32%	0.35%	0.602		1.85%	0.62%	***1.692***	0.76%
-1	0.19%	***2.266***	*	0.51%	-1.05%	***-1.852***		0.79%	-0.21%	-0.573	0.56%
0	***0.32%***	***5.378***	**		***2.91%***	***7.180***	**		***-0.12%***	***-0.470***	
1	0.05%	0.665		0.05%	0.16%	0.274		0.16%	0.08%	0.224	0.08%
2	-0.06%	-0.775		-0.01%	-0.08%	-0.132		0.08%	-0.18%	-0.510	-0.10%
3	0.02%	0.252		0.01%	-0.11%	-0.195		-0.03%	0.67%	***1.848***	0.56%
4	-0.06%	-0.791		-0.05%	-0.14%	-0.251		-0.17%	-0.06%	-0.159	0.51%
5	-0.04%	-0.492		-0.09%	-0.33%	-0.573		-0.50%	-0.05%	-0.139	0.46%
8	0.22%	***2.668***	**	0.05%	0.90%	1.586		-0.12%	0.18%	0.493	0.53%
9	0.23%	***2.775***	**	0.27%	-0.95%	***-1.654***		-1.07%	-0.37%	-1.011	0.17%
	ACAR	T-Stat			ACAR	T-Stat			ACAR	T-Stat	
	(-1, -5)	***2.679***	**		(-1, -5)	0.595			(-1, -5)	0.664	
	(1, 20)	0.506			(1, 20)	-1.089			(1, 20)	0.131	

Notes: This table presents the price reaction to each announcement. AAR is the Average Abnormal Return, and ACAR is the Average Cumulative Abnormal Return. Averaging was carried out across event firms. The event window extends from five days before the event to 20 days following the news announcement. The event day consists of two trading days. The significance of the t-statistics for the null hypothesis that AAR is zero is indicated by ** and * for the 1% and 5% levels of significance respectively which are also shown in italicized bold. Returns which are significant only at the 10% level are simply shown in italicized bold type alone.

Firstly, regardless of whether bidder or target, there is a highly significant positive returns reaction on the event day, though the reaction has a greater magnitude for the target firm (2.91%) than the bidder firm (0.32%). The result that target shareholders receive economically larger wealth gains is consistent with Mandelker (1974), Asquith (1983), and Cheung and Shum (1993). Roll (1986) suggests that the implicit overpayment on the target's shares is motivated by managerial hubris, as their overconfidence leads to an inaccurate estimation of both their ability and the target's economic value. Shefrin (2002) argues that bidder shareholders invariably suffer from the "winner's curse", and further Burkart (1995) suggests that this curse will still occur, even if managers are free from individual biases due to the competitive situation they find themselves in or even their partial ownership of the target firm.

Secondly, in the pre-event period, there is significant leakage in bidder returns, but not in target returns. The ACAR for the pre-announcement interval are significant at the 1% level for bidder returns, with cumulative pre-event effects of 0.51%. Leakage is particularly marked in the last two days before announcement (0.14% and 0.19%, respectively). Halpern (1982) argued that such leakage may be the result of insider trading or the signal provided by previous successful tender offers, thereby increasing the likelihood of future merger plans. Alternatively, Seyhun (1990) argues that such leakage is a result of hubris bias and thus overconfidence, leading to a systematic overestimation of merger synergy gains, a reluctance to issue new equity, and a tendency for repurchases leading up to the announcement date. For the target firm, day -3 returns are significant at the 1% level, but not the ACAR for the overall pre-announcement period. Further evidence supporting the no-leakage hypothesis is provided by the large negative return the day before announcement, which is significant at the 10% level.

Thirdly, in the post-event period, the bidder company's abnormal returns tend to drift upwards whilst the target's drift downwards. Whilst days 8 and 9 evidence significant abnormal returns at the 1% level, for the bidder the 20 day ACAR is insignificant in this case and in the case of the target. Thus, there is no evidence of significant post-announcement correction, contrary to the experimental findings of Wansley, Roenfeldt, and Cooley (1983).

Table 4 shows the abnormal returns associated with news of a terminated merger negotiation. Clearly, the results show little abnormal return impact of this news, either on the event day or in anticipation or following the news. This result is perhaps surprising given the at times significant costs associated with a terminated negotiation, though termination fee provisions may well alleviate these costs in practice (Officer, 2003; Bates and Lemmon, 2003).

The second news announcement type in this category is restructuring, and includes the announcement of a joint venture/strategic alliance, a company reorganisation, and the appointment of an investment banker. Table 5 shows the abnormal returns patterns associated with these news announcements.

Table 5 Restructuring

	Joint venture/ Strategic alliances			Company reorganisation			Investment banker appointment			
Day	AAR	T-Stat	ACAR	AAR	T-Stat	ACAR	AAR	T-Stat		ACAR
-5	0.05%	0.271	0.05%	0.05%	0.203	0.05%	-0.08%	-0.217		-0.08%
-4	-0.04%	-0.219	0.01%	0.07%	0.284	0.11%	-0.07%	-0.191		-0.15%
-3	0.06%	0.338	0.07%	0.04%	0.179	0.15%	-0.57%	-1.583		-0.71%
-2	0.00%	0.008	0.07%	0.06%	0.254	0.21%	-0.38%	-1.063		-1.09%
-1	0.20%	1.089	0.27%	0.29%	1.264	0.51%	0.28%	0.786		-0.81%
0	***0.23%***	***1.760***		***0.00%***	***0.020***		***0.71%***	***2.765***	**	
1	-0.20%	-1.072	-0.20%	0.29%	1.247	0.29%	-0.66%	***-1.844***		-0.66%
2	0.17%	0.905	-0.03%	-0.10%	-0.444	0.19%	0.23%	0.648		-0.42%
3	-0.28%	-1.501	-0.31%	-0.21%	-0.925	-0.03%	-0.52%	-1.457		-0.95%

	Joint venture/ Strategic alliances				Company reorganisation				Investment banker appointment			
Day	AAR	T-Stat		ACAR	AAR	T-Stat		ACAR	AAR	T-Stat		ACAR
4	0.19%	1.038		-0.12%	-0.07%	-0.294		-0.09%	-0.21%	-0.599		-1.16%
5	-0.24%	-1.296		-0.36%	0.30%	1.309		0.21%	0.22%	0.628		-0.94%
10	-0.04%	-0.241		-0.64%	0.47%	***2.039***	*	0.99%	0.20%	0.565		-0.79%
11	0.42%	***2.259***	*	-0.22%	0.30%	1.305		1.29%	-0.50%	-1.399		-1.29%
20	-0.09%	-0.477		-0.08%	-0.06%	-0.272		0.69%	-1.00%	***-2.755***	**	-0.79%
	ACAR	T-Stat			ACAR	T-Stat			ACAR	T-Stat		
	(-1, -5)	0.640			(-1, -5)	0.945			(-1, -5)	-0.978		
	(1, 20)	-0.080			(1, 20)	0.564			(1, 20)	-0.425		

Notes: This table presents the price reaction to each announcement. AAR is the Average Abnormal Return, and ACAR is the Average Cumulative Abnormal Return. Averaging was carried out across event firms. The event window extends from five days before the event to 20 days following the news announcement. The event day consists of two trading days. The significance of the t-statistics for the null hypothesis that AAR is zero is indicated by ** and * for the 1% and 5% levels of significance respectively which are also shown in italicized bold. Returns which are significant only at the 10% level are simply shown in italicized bold type alone.

Joint ventures and strategic alliances differ from mergers in the respect that the parental management remains intact and independent from the other party (Chan, Kensinger, Keown, and Martin, 1997). We should expect the market to reward such ventures where they are perceived to deliver valuable investment opportunities and punish them otherwise (Mohanram and Nanda, 1998; Chen, Ho, Lee, and Yeo, 2000). Further, shareholders of the smaller party tend to gain more than those of the bigger party (McConnell and Nantell, 1985; Mohanram and Nanda, 1998). Restructuring, on the other hand, encompasses any news regarding the revision of the firm's business structure, including financial or asset restructuring, refocusing, relocation, operating level reduction, spin-offs, and so on. Here, it is the managerial motivation and associated prospects of the action which are important, rather than the action itself (Chan, Gau, and Wang, 1995). Whilst managers would like to signal value creation as their motivation (Pike and Neale, 2003), where intentions are unclear we might expect a negative price response (Khurana and Lippincott, 2000).

Table 5 reveals that there is little market reaction to news of joint ventures/ strategic alliances or to company reorganisation. Event day abnormal returns are small and insignificant at 0.23% and 0.00%, respectively. There are significant abnormal returns at the 5% level on day 11 for the former and day 10 for the latter, though we can ignore there as isolated cases. Either markets do not appear to value the synergistic efficiency or other gains at the news announcement date, or perhaps consider these to be difficult to quantify at the outset. The result contrasts greatly with the earlier results for mergers. Perhaps markets consider that a certain

proportion of joint ventures/strategic alliances are driven by managerial misalignment (Mohanram and Nanda, 1998), or the lack of synergy gains or the focus-diminishing nature of many vertical or conglomerate ventures (Johnson and Houston, 2000). The lack of small but positive market reaction to company reorganization also runs counter to expectations (Burch and Nanda, 2003; Chemmanur and Yan, 2004; Veld and Veld-Merkoulova, 2004).

It is possible that a finer division of news events within each category would lead to more significant results, particularly if analysed in conjunction with further information concerning underlying firm performance. For example, joint ventures/ strategic alliances and reorganisation in firms which are performing well may give rise to a positive market reaction whereas the same strategies for firms performing badly may give rise to a negative reaction. In this study we observe only the average reaction across all firms, which may give rise to the zero or near zero net reaction.

Table 5 shows the significant positive abnormal returns reaction to the appointment of an investment banker. On the announcement day, there is a returns reaction of 0.71%, significant at the 1% level. This is perhaps a surprising result given the routine nature of the news. Whilst we cannot draw upon previous studies in this area, we know that markets react positively to the news of accounting and finance officer appointments (Geiger, Lennox, and North, 2008), and the appointment of prestigious investment bankers in initial public offerings (Michaely and Shaw, 1994; Carter, Dark, and Singh, 1998). In our study, pre-event and post-event reactions are insignificant, except for a single day 20 abnormal return which is significant at the 1% level.

The final news type in the corporate restructuring category that we examine here is divestment or contraction. Further, we distinguish here between internal divestment, where the firm reduces its productive asset base through closing divisions or plants, and external divestment, where the firm reduces its holdings of other firm's financial assets. In recent decades western economies have experienced a reduction in diversification activity as firms focus more on core activities – economies of scope were seen as no longer worth pursuing (Comment and Jarrell, 1995; John and Ofek, 1995). Such economies entered into a period of revenue-focusing (Chalos and Chen, 2002). If the market perceives that a divestment will be favourable in that it will generate tangible cost savings then it will react positively, whereas if the divestment is expected to merely lead to an unfavourable reduction in productive capacity then it will react negatively. Statman and Sepe (1989) propose a positive market reaction to the release of funds for alternative projects with better prospects or for purposes of cost reduction. Table 6 enables the comparison of the abnormal returns associated with each news type.

Table 6 Divestment

	Internal			External		
Day	AAR	T-Stat	ACAR	AAR	T-Stat	ACAR
-5	0.07%	0.531	0.07%	-0.10%	-0.426	-0.10%
-4	-0.12%	-0.887	-0.05%	-0.07%	-0.306	-0.17%
-3	0.19%	1.443	0.14%	0.15%	0.635	-0.02%

	Internal				External		
Day	AAR	T-Stat		ACAR	AAR	T-Stat	ACAR
-2	-0.01%	-0.075		0.13%	0.05%	0.195	0.02%
-1	0.15%	1.123		0.28%	-0.13%	-0.562	-0.11%
0	***0.41%***	***4.429***	**		***0.21%***	***1.243***	
1	0.10%	0.774		0.10%	-0.33%	-1.384	-0.33%
2	-0.04%	-0.321		0.06%	0.27%	1.131	-0.06%
3	0.11%	0.814		0.17%	-0.31%	-1.312	-0.37%
4	0.05%	0.380		0.21%	-0.06%	-0.246	-0.43%
5	-0.02%	-0.145		0.20%	-0.34%	-1.458	-0.77%
10	0.26%	***1.985***	*	0.29%	-0.14%	-0.607	-1.74%
	ACAR	T-Stat			ACAR	T-Stat	
	(-1, -5)	0.919			(-1, -5)	-0.198	
	(1, 20)	0.065			(1, 20)	-1.181	

Notes: This table presents the price reaction to each announcement. AAR is the Average Abnormal Return, and ACAR is the Average Cumulative Abnormal Return. Averaging was carried out across event firms. The event window extends from five days before the event to 20 days following the news announcement. The event day consists of two trading days. The significance of the t-statistics for the null hypothesis that AAR is zero is indicated by ** and * for the 1% and 5% levels of significance respectively which are also shown in italicized bold. Returns which are significant only at the 10% level are simply shown in italicized bold type alone.

There is a positive abnormal returns response of 0.41% to internal divestment which is significant at the 1% level, whereas the response to external divestment is insignificant. Thus, the market typically views internal divestment positively, assuming that firm managers have arrived at the divestment decision by means of an objective abandonment option NPV analysis. This result contrasts with the findings of Blackwell, Marr, and Spivey (1990) and Gombola and Tsetsekos (1992), where a negative market reaction was found, as markets observe a negative signal often associated with reduced demand for the firm's products, declining profitability, and treat the news as symptomatic of wider firm concerns.

The lack of market reaction to the divestment of financial assets, external divestment, is entirely expected as firms routinely increase or decrease external investments as their working capital requirements change. Indeed, this finding is consistent with the assertion of Jain (1985) and John and Ofek (1995), that after external divestment the firm's operations are unaffected. With regard to both internal and external divestment, neither pre-event nor post-event ACARs prove to be significant.

4.3 Market sentiment

The third news category, market sentiment includes investment analyst positive (buy), negative (sell) and neutral (hold) recommendations. Such analysts research individual shares and produce reports for their clients such as fund managers. In so doing, they not only provide detailed information on a share, but also information on their sentiment regarding the share's intrinsic value in relation to the current market price (Francis and Soffer, 1997). If markets are efficient, then all publicly available information relevant to intrinsic share value should at all times be subsumed within price. Thus analyst recommendations should not give rise to abnormal returns patterns. However, we know that in practice investment banks maintain expensive security analysis teams and also that investors consider analyst advice an important information source when making their investment decisions (Hirst, Koonce, and Simko, 1995). Ivkovic and Jegadeesh (2004) suggest that the value of analyst recommendations may lie either in their special skill at analysing available information or in their ability to discover insider information. Table 7 shows the abnormal returns associated with each analyst recommendation announcement.

Table 7 Analyst recommendations

	Positive recommendation			Negative recommendation			Neutral recommendation		
Day	AAR	T-Stat	ACAR	AAR	T-Stat	ACAR	AAR	T-Stat	ACAR
-5	-0.16%	-1.439	-0.16%	-0.07%	-0.471	-0.07%	-0.67%	***-1.751***	-0.67%
-4	-0.04%	-0.366	-0.20%	-0.11%	-0.728	-0.19%	0.03%	0.070	-0.64%
-3	-0.23%	***-1.987*** *	-0.43%	-0.15%	-0.984	-0.34%	-0.01%	-0.032	-0.65%
-2	0.02%	0.168	-0.41%	-0.50%	***-3.217*** **	-0.84%	-0.08%	-0.202	-0.73%
-1	0.35%	***3.068*** **	-0.06%	-0.74%	***-4.760*** **	-1.59%	-0.03%	-0.071	-0.76%
0	***0.93%***	***11.424*** **		***-0.52%***	***-4.700*** **		***-0.28%***	***-1.028***	
1	0.10%	0.925	0.10%	-0.37%	***-2.341*** **	-0.37%	-0.43%	-1.128	-0.43%
2	-0.03%	-0.291	0.07%	-0.24%	-1.528	-0.60%	0.11%	0.294	-0.32%
3	-0.11%	-1.003	-0.04%	-0.02%	-0.116	-0.62%	-0.28%	-0.737	-0.60%
4	0.18%	1.582	0.14%	-0.13%	-0.814	-0.75%	-0.26%	-0.679	-0.86%
5	-0.01%	-0.105	0.13%	0.01%	0.054	-0.74%	0.45%	1.181	-0.41%
	ACAR	T-Stat		ACAR	T-Stat		ACAR	T-Stat	
	(-1, -5)	-0.239		(-1, -5)	***-4.377*** **		(-1, -5)	-0.856	
	(1, 20)	0.414		(1, 20)	***-1.854***		(1, 20)	1.488	

Notes: This table presents the price reaction to each announcement. AAR is the Average Abnormal Return, and ACAR is the Average Cumulative Abnormal Return. Averaging was carried out across event firms. The event window extends from five days before the event to 20 days following the news announcement. The event day consists of two trading days. The significance of the t-statistics for the null hypothesis that AAR is zero is indicated by ** and * for the 1% and 5% levels of significance respectively which are also shown in italicized bold. Returns which are significant only at the 10% level are simply shown in italicized bold type alone.

On the event day, we observe significant returns reactions at the 1% level for both positive and negative recommendations with abnormal returns of 0.93% and -0.52% respectively, but an insignificant response to a neutral recommendation. These results clearly suggest that the market is far from efficient in its reaction to recommendation news.

In the pre-event period, we observe a significant negative ACAR at the 1% level for negative recommendations, with significant negative abnormal returns in the two days leading up to announcement. Therefore there is significant leakage associated with a negative recommendation. With regard to positive recommendations there is a significant positive abnormal return one day before the event at the 1% level, though the pre-event ACAR is not significant. There is thus evidence of significant leakage in respect of both positive and negative recommendation news. We observe no significant leakage for a neutral recommendation.

In the post-event period, whilst there is no mis-reaction after the event day for the positive recommendation news, for the negative recommendation we observe an abnormal return of -0.37% for the day after the announcement which is significant at the 1% level, consistent at least in part with the post earnings announcement drift anomaly established by Bernard and Thomas (1989, 1990). There is thus significant under-reaction to negative recommendations which is corrected after the event.

The results taken as a whole reveal an interesting abnormal returns pattern. Consistent with Skinner (1994) and Ryan and Taffler (2006), negative news generates a more pronounced and enduring price effect than positive news. Indeed, in our study we observe a four day cumulative abnormal returns of -2.13% associated with the negative recommendation, whereas there is only a two day positive abnormal returns totalling 1.28% associated with the positive news. Given that investment bankers rely on commissions from their large corporate clients, they are more likely to give buy recommendations than sell recommendations on the shares of their clients. Indeed, Shefrin (2002) found that in 2000, more than 70% of all US analyst recommendations were “buys”, Ryan and Taffler (2006) find that the sell-to-buy recommendation ratio is even higher for the UK, and Shiller (2005) also notes that analyst recommendations have been subject to some inflation in recent years. As a result, sell recommendations are more “visible” (Shefrin, 2002) and investors are likely to react to them in a more pronounced manner.

We should also expect neutral recommendations to exert a significant negative influence on abnormal returns. However, whilst the reaction here is negative, it is not significant.

In sum, the returns reaction to analyst recommendations is inconsistent with the EMH in that analyst recommendations contain economically valuable information, there is pre-event leakage for both positive and negative recommendations, and post-event under-reaction for negative recommendations. One important caveat here is that there may be a lag between an analyst making a recommendation and that news being recorded on Bloomberg. This could explain the significant abnormal returns reactions for positive and negative recommendations the day before the event day in each case.

4.4 Growth and investment

The fourth news category of growth and investment includes both internal and external expansion, and new product (or service) and new customer (or contract). As discussed in the corporate restructuring category, a firm can invest or divest either internally, by increasing or reducing real productive capacity; or externally, by increasing or decreasing their holdings of the financial assets of other companies. Internal investment is likely to be well regarded by the market, except where it involves unrelated diversification (Rumelt, 1982; Comment and Jarrell, 1995). Table 8 shows the abnormal returns associated with internal and external expansion news.

Table 8 Investment or expansion

	Internal				External			
Day	AAR	T-Stat		ACAR	AAR	T-Stat		ACAR
-5	0.10%	0.671		0.10%	0.10%	0.589		0.10%
-4	0.06%	0.403		0.16%	0.16%	0.949		0.26%
-3	0.18%	1.198		0.34%	0.03%	0.169		0.29%
-2	0.17%	1.122		0.51%	-0.07%	-0.394		0.22%
-1	0.26%	***1.756***		0.77%	0.20%	1.171		0.42%
0	***0.49%***	***4.559***	**		***0.29%***	***2.406***	**	
1	-0.10%	-0.677		-0.10%	-0.18%	-1.094		-0.18%
2	0.03%	0.177		-0.08%	-0.22%	-1.323		-0.41%
3	0.37%	***2.470***	**	0.30%	0.41%	***2.405***	**	0.00%
4	-0.16%	-1.052		0.14%	0.04%	0.258		0.04%
5	-0.01%	-0.050		0.13%	-0.17%	-1.013		-0.13%
10	0.31%	***2.030***	*	0.26%	-0.01%	-0.049		-0.44%
	ACAR	T-Stat			ACAR	T-Stat		
	(-1, -5)	***2.219***	*		(-1, -5)	1.071		
	(1, 20)	0.151			(1, 20)	-0.815		

Notes: This table presents the price reaction to each announcement. AAR is the Average Abnormal Return, and ACAR is the Average Cumulative Abnormal Return. Averaging was carried out across event firms. The event window extends from five days before the event to 20 days following the news announcement. The event day consists of two trading days. The significance of the t-statistics for the null hypothesis that AAR is zero is indicated by ** and * for the 1% and 5% levels of significance respectively which are also shown in italicized bold. Returns which are significant only at the 10% level are simply shown in italicized bold type alone.

Clearly, both internal and external expansions produce a significant positive abnormal returns response on the event day. Internal expansion news generates a 0.49% response whereas external expansion news generates a smaller 0.29% response, both of which are significant at the 1% level. The results are somewhat surprising as whilst we might expect a significant market response to internal investment news, external investment may be merely the result of short-term working capital

requirements (transitory excess liquidity) and therefore should not have a significant returns impact as the firm's productive capacity remains unchanged.

In the pre-event period, we observe some weak evidence of leakage in relation to internal investment news, with five successive positive abnormal return days leading up to the event day. Whilst these abnormal returns are individually insignificant, the ACAR is significant at the 5% level. In the post-event period, there are positive abnormal returns on day 3 for each news type. However, there is no apparent explanation for this and neither post-event ACAR is significant.

In sum, there is some evidence of pre-event leakage with investment news. Perhaps 'more informed investors' trade the share intensively in anticipation of this important corporate disclosure, consistent with John and Mishra (1990), Giammarino, Heinkel, and Hollifield (1994), and Del Brio, Perote, and Pindado (2003).

The second news type within this category is the announcement of new product (or service) and new customer (or contract). A well-accepted means of achieving corporate competitiveness is to set in place continual innovation strategies (Chan, Martin and Kensinger, 1990). Table 9 gives the abnormal returns from these two news types.

Table 9 New product or customer

	New product (service)				New customer (contract)			
Day	AAR	T-Stat		ACAR	AAR	T-Stat		ACAR
-5	0.30%	1.353		0.30%	-0.29%	***-2.043***	*	-0.29%
-4	-0.16%	-0.700		0.15%	-0.08%	-0.598		-0.37%
-3	0.07%	0.299		0.21%	-0.36%	***-2.538***	**	-0.73%
-2	0.40%	***1.774***		0.61%	0.16%	1.132		-0.57%
-1	0.22%	0.976		0.83%	0.34%	***2.399***	**	-0.23%
0	***0.76%***	***4.747***	**		***0.86%***	***8.595***	**	
1	0.08%	0.375		0.08%	0.13%	0.930		0.13%
2	-0.10%	-0.455		-0.02%	0.07%	0.470		0.20%
3	-0.34%	-1.504		-0.35%	0.07%	0.503		0.27%
4	0.17%	0.740		-0.19%	-0.15%	-1.089		0.11%
5	-0.25%	-1.097		-0.43%	0.06%	0.419		0.17%
17	0.45%	***2.004***	*	1.28%	0.13%	0.925		-0.09%
	ACAR	T-Stat			ACAR	T-Stat		
	(-1, -5)	1.597			(-1, -5)	-0.714		
	(1, 20)	0.918			(1, 20)	-0.263		

Notes: This table presents the price reaction to each announcement. AAR is the Average Abnormal Return, and ACAR is the Average Cumulative Abnormal Return. Averaging was carried out across event firms. The event window extends from five days before the event to 20 days following the news announcement. The event day consists of two trading days. The significance of the t-statistics for the null hypothesis that AAR is zero is indicated by ** and * for the 1% and 5% levels of significance respectively which are also shown in italicized bold. Returns which are significant only at the 10% level are simply shown in italicized bold type alone.

The market reacts positively to each news type. The returns reactions are 0.76% for a new product (service) and 0.86% for a new customer (contract), both of which are significant at the 1% level. It is perhaps not surprising that markets react favourably to the news of potentially higher future cash flow streams, as these feed directly into intrinsic share value.

In the pre-event period, there is some abnormal returns volatility in the case of new customer (contract) news, with significant abnormal returns at the 1% for days -3 and -1. However, neither pre-event ACAR is significant. One explanation is that whilst news of a new product or service is highly confidential and therefore leakage is far less likely, news of a new customer or contract deal is more likely to be in the public domain. Further, until that deal is agreed, the uncertainty may give rise to abnormal return volatility, in this case swinging between negative and positive abnormal returns. In the post-event period, ACARs are insignificant for both news types.

In sum, the market regards announcements of new product/service or new customer/contract as positive, giving rise to a potentially higher future stream of cash flows to the firm and its investors. This information is reflected rapidly in share price, with little evidence of pre-event leakage and no evidence of post-event correction.

Overall, the results for the growth and investment category are broadly consistent with the positive abnormal returns of previous studies such as Woolridge and Snow (1990), Chaney and Devinney (1992), Chan, Gau, and Wang (1995), and Chen et al. (2000).

4.5 Dividends and financing

The fifth category includes dividend announcements and equity financing announcements. Dividend announcements, in turn, are divided into regular dividend announcements and special dividend announcements. However, it is noted that regular dividend announcements here are those which are not announced in conjunction with profit announcements. The signalling hypothesis proposes that managers use dividend payments as a signalling mechanism to communicate private information to help investors to value the prospective earnings of the firm. Markets tend to react positively to dividend information as knowledge of dividends lowers the variability of returns and produces a useful signal regarding subsequent reinvestment policy (Asquith and Mullins, 1983; Sant and Cowan, 1994). Whilst regular dividends represent an implicit commitment to maintain a given payout ratio, special dividends represent a one-off reward distribution and entail no such commitment. Managers will not increase their dividend payout ratio unless future cash flows allow (Petit, 1972; Healy and Palepu, 1988). Whilst special dividends cause a transitory signal about future profitability, regular dividends convey a more permanent signal (Brickley, 1983; Gombola and Liu, 1999; and DeAngelo, DeAngelo, and Skinner, 2000). We should therefore expect both types of dividend signal to give rise to positive market reactions. Table 10 shows the abnormal returns from the two types of dividend announcement.

Table 10 Dividend announcement

	Regular dividend			Special dividend		
Day	AAR	T-Stat	ACAR	AAR	T-Stat	ACAR
-5	-0.40%	-1.296	-0.40%	-0.59%	-1.018	-0.59%
-4	-0.21%	-0.661	-0.60%	0.33%	0.576	-0.25%
-3	0.17%	0.549	-0.43%	0.39%	0.677	0.14%
-2	-0.18%	-0.592	-0.61%	0.18%	0.311	0.32%
-1	0.31%	1.016	-0.30%	0.59%	1.015	0.90%
0	***0.02%***	***0.112***		***0.12%***	***0.289***	
1	0.32%	1.032	0.32%	-0.06%	-0.101	-0.06%
2	0.07%	0.247	0.39%	-0.20%	-0.352	-0.26%
3	-0.43%	-1.420	-0.04%	-0.75%	-1.310	-1.01%
4	0.59%	***1.936***	0.55%	0.16%	0.272	-0.86%
5	0.12%	0.380	0.66%	0.23%	0.407	-0.62%
	ACAR	T-Stat		ACAR	T-Stat	
	(-1, -5)	-0.426		(-1, -5)	0.674	
	(1, 20)	1.401		(1, 20)	-1.179	

Notes: This table presents the price reaction to each announcement. AAR is the Average Abnormal Return, and ACAR is the Average Cumulative Abnormal Return. Averaging was carried out across event firms. The event window extends from five days before the event to 20 days following the news announcement. The event day consists of two trading days. The significance of the t-statistics for the null hypothesis that AAR is zero is indicated by ** and * for the 1% and 5% levels of significance respectively which are also shown in italicized bold. Returns which are significant only at the 10% level are simply shown in italicized bold type alone.

Interestingly, on the event day, whilst regular dividend and special dividend news gives rise to positive abnormal returns reactions, neither is significant. It is entirely possible that the related economic information content of these announcements has already been subsumed within price following a previous news announcement. With regard to special dividends, DeAngelo et al. (2000) argue that as special dividend announcements have become as predictable as regular dividends over the last 40 years, these news announcements have lost their importance in terms of conveying additional useful information. Neither the pre-event nor the post-event ACARs are significant, and therefore we observe no pre-event leakage or post-event mis-reaction. The market is therefore broadly neutral to these dividend announcements.

Moving on to the equity financing decision, we study both share issues and share repurchases. The information signalling hypothesis suggests that finance managers tend to issue shares when they have a financing requirement and believe the firm's shares to be overvalued, whereas they repurchase shares when they

have excess cash and believe their shares to be undervalued (Loughran and Ritter, 1995; Stephens and Weisbach, 1998; Dittmar, 2000; Ikenberry, Lakonishok, and Vermaelen, 2000; Montier, 2004; and Zhang, 2005). Dierkens (1991) argues that new share issues signal unfavourable information about a firm's economic opportunities to the market, thereby leading to a fall in share price thereafter, whereas repurchasing signals favourable information regarding future performance (Lie, 2005) or signals a takeover defence (Vermaelen, 1984). We should thus expect negative abnormal returns to be associated with a share issue and positive returns associated with a share repurchase announcement. If nothing else, the latter is mechanical as the number of shares is reduced, ceteris paribus. Table 11 shows the abnormal returns associated with share issues and repurchases.

Table 11 Share issues and repurchases

	Share issues				Share repurchases			
Day	AAR	T-Stat		ACAR	AAR	T-Stat		ACAR
-5	-0.01%	-0.167		-0.01%	0.12%	0.929		0.12%
-4	0.06%	0.784		0.04%	0.24%	***1.944***		0.36%
-3	-0.09%	-1.288		-0.05%	-0.11%	-0.853		0.25%
-2	0.01%	0.142		-0.04%	-0.21%	***-1.732***		0.03%
-1	-0.06%	-0.882		-0.10%	-0.26%	***-2.096***	*	-0.22%
0	***-0.02%***	***-0.436***			***0.12%***	***1.307***		
1	0.00%	-0.031		0.00%	0.17%	1.365		0.17%
2	-0.20%	***-2.850***	**	-0.20%	0.29%	***2.307***	*	0.46%
3	0.08%	1.156		-0.12%	0.18%	1.430		0.63%
4	0.01%	0.096		-0.11%	0.17%	1.398		0.81%
5	0.02%	0.231		-0.10%	0.11%	0.887		0.92%
7	-0.17%	***-2.464***	**	-0.25%	0.09%	0.738		1.05%
9	-0.15%	***-2.167***	*	-0.44%	0.14%	1.123		1.29%
16	-0.11%	-1.538		-0.67%	0.35%	***2.857***	**	1.87%
	ACAR	T-Stat			ACAR	T-Stat		
	(-1, -5)	-0.608			(-1, -5)	-0.782		
	(1, 20)	***-1.980***	*		(1, 20)	***2.455***	**	

Notes: This table presents the price reaction to each announcement. AAR is the Average Abnormal Return, and ACAR is the Average Cumulative Abnormal Return. Averaging was carried out across event firms. The event window extends from five days before the event to 20 days following the news announcement. The event day consists of two trading days. The significance of the t-statistics for the null hypothesis that AAR is zero is indicated by ** and * for the 1% and 5% levels of significance respectively which are also shown in italicized bold. Returns which are significant only at the 10% level are simply shown in italicized bold type alone.

The event-day response, whilst producing the expected abnormal returns sign, is insignificant for each news type, contrary to the existing literature. Further, although we observe a significant negative abnormal return for share repurchase news at day -1, it is only significant at the 5% level and the sign is contrary to expectations. Interestingly, however, in the case of both share issues and repurchases, there is evidence of significant under-reaction on the event day, as the ACARs in both cases evidence corrections which are significant at the 5% and 1% levels, respectively. For share issues, the initial under-reaction gives rise to subsequent further significant negative correction on days 2, 7 and 9 following the event day. For share repurchases, the initial under-reaction gives rise to subsequent further significant positive corrections on days 2 and 16. Evidently, then, the market reacts relatively slowly to share issues and repurchases, though in the direction expected.

If we compare regular dividend news and share repurchase news announcements, our results suggest that they are not treated by the market as substitute actions. Gelb (2000), Guay and Harford (2000), and Jagannathan, Stephens, and Weisbach (2000) report that firms with large permanent operating cash flows are more likely to issue dividends, whereas firms with large transient non-operating cash flows are more likely to repurchase their shares. Our results confirm that the former are predictable and therefore contain no additional economic information whereas the latter are less predictable and contain useful economic information. In general, then, dividend announcements contain little news which the market does not already have, whereas changing the equity base of the firm is not immediately, but is certainly after some reflection, a newsworthy event of economic consequence.

4.6 Miscellaneous news

The sixth and final news announcement category collects all news not included in the other categories above into good, bad and ambiguous news types. Whilst we clearly expect miscellaneous good news to produce a positive abnormal returns reaction, and miscellaneous bad news to produce a negative abnormal returns reaction, we do not expect ambiguous news to produce a reaction at all. Table 12 shows the abnormal returns arising from the three news announcement types.

Table 12 Miscellaneous news

	Miscellaneous good news				Miscellaneous bad news				Ambiguous news		
Day	AAR	T-Stat		ACAR	AAR	T-Stat		ACAR	AAR	T-Stat	ACAR
-5	0.17%	0.824		0.17%	0.17%	1.116		0.17%	0.04%	0.167	0.04%
-4	-0.10%	-0.488		0.07%	-0.15%	-0.967		0.02%	-0.11%	-0.506	-0.07%
-3	0.10%	0.482		0.17%	-0.02%	-0.161		0.00%	-0.07%	-0.300	-0.14%
-2	0.45%	***2.251***	*	0.62%	0.03%	0.217		0.03%	-0.19%	-0.848	-0.33%
-1	0.50%	***2.498***	**	1.12%	-0.08%	-0.510		-0.05%	0.12%	0.550	-0.21%
0	***1.41%***	***9.789***	**		***-0.57%***	***-5.199***	**		***0.26%***	***1.631***	
1	0.02%	0.112		0.02%	-0.14%	-0.893		-0.14%	-0.21%	-0.927	-0.21%

	Miscellaneous good news			Miscellaneous bad news			Ambiguous news			
Day	AAR	T-Stat	ACAR	AAR	T-Stat	ACAR	AAR	T-Stat		ACAR
2	-0.06%	-0.282	-0.03%	0.11%	0.730	-0.02%	-0.20%	-0.911		-0.41%
3	-0.11%	-0.534	-0.14%	-0.09%	-0.569	-0.11%	-0.05%	-0.237		-0.46%
4	-0.20%	-0.978	-0.34%	0.04%	0.240	-0.08%	0.18%	0.830		-0.28%
5	-0.17%	-0.832	-0.51%	0.00%	0.024	-0.07%	-0.10%	-0.447		-0.37%
13	0.01%	0.052	-0.87%	-0.23%	-1.467	-0.69%	-0.47%	***-2.104***	*	-0.87%
	ACAR	T-Stat		ACAR	T-Stat		ACAR	T-Stat		
	(-1, -5)	***2.399***	**	(-1, -5)	-0.131		(-1, -5)	-0.404		
	(1, 20)	-0.981		(1, 20)	-0.905		(1, 20)	***-1.757***		

Notes: This table presents the price reaction to each announcement. AAR is the Average Abnormal Return, and ACAR is the Average Cumulative Abnormal Return. Averaging was carried out across event firms. The event window extends from five days before the event to 20 days following the news announcement. The event day consists of two trading days. The significance of the t-statistics for the null hypothesis that AAR is zero is indicated by ** and * for the 1% and 5% levels of significance respectively which are also shown in italicized bold. Returns which are significant only at the 10% level are simply shown in italicized bold type alone.

The abnormal returns reaction on the event day is consistent with expectations: miscellaneous good news gives rise to positive returns of 1.41%, whilst miscellaneous bad news gives rise to negative abnormal returns of -0.57%, both of which are significant at the 1% level. Ambiguous news produces an insignificant positive abnormal returns reaction of 0.26% on the event day. Thus, the market clearly acknowledges the economic information content in miscellaneous good and bad news.

In the pre-event period, there is significant evidence of leakage with respect to miscellaneous good news but not miscellaneous bad news. The ACAR for the 5 days leading up to the event day is 1.12% which is significant at the 1% level, with significant leakage evident in the final two days before announcement. In the post-event period, there is no evidence of mis-reaction for either miscellaneous good or bad news. In terms of miscellaneous ambiguous news, there is a single negative correction on day 13, significant at the 5% level, and the ACAR is significant at the 10% level. There is thus some weak evidence that markets are not well suited to gauging the effect of ambiguous news as 'markets hate uncertainty', leading at times to a small correction at a later date once the likely impact of that news has been analysed more thoroughly.

Far from being efficient, this paper demonstrates that investors react to UK stock exchange listed company news announcements in a manner which is somewhat removed from the expectations of an efficient market. We not only observe significant news leakage, but also frequent subsequent correction consistent with an initial share price over-reaction.

5. Conclusion

This paper sought to investigate the behaviour of returns around news announcements for UK quoted companies, testing 30 different news announcement types over 100 UK companies over a 10 year period. The results provide some insight into the efficiency of markets and enable us to consider whether the EMH or behavioural finance best describe the returns reaction of investors to corporate news announcements. If EMH holds and investors react rationally, stock prices will adjust immediately and correctly (on average) to reflect published information – thus we would observe no abnormal returns before or after the event whereas if behavioural finance theories best explain returns reactions then new information will take time to disseminate and be reflected in prices and we will see evidence of drift, reversals, and so on.

Firstly, it is clear that corporate events do convey important economic information to investors. The change in equilibrium stock price around and during the announcements supports the contention that investors have modified their expectations of future firm earnings. Further, market participants do not only acknowledge the news, they appear to understand it in that they react more strongly to news with long-term than transitory implications for the firm, and they do not react where the economic implications are ambiguous.

Secondly, the market response to negative news is generally stronger than its response to positive news in that positive news announcements in general do not generate as large and long-lasting abnormal returns effects as negative announcements. The relative frequency of release of positive news observed in our study tends to diminish its effect, consistent with Skinner (1994).

Thirdly, whilst in general investor responses following corporate events were consistent with the existing literature in terms of direction, the initial response evidenced underreaction (and subsequent drift) or overreaction (and subsequent correction) in certain cases.

The results taken as a whole clearly question some of the central propositions of the Efficient Markets Hypothesis and Fama's more recent defence of it in the light of some challenging empirical evidence. It takes time for news information to be incorporated into the price share, so whilst stock prices correctly (on average) reflect published information they do not always do so immediately as suggested by the EMH. Fama (1998) states that anomalies may occur by chance and thus we should expect an equal probability of under- and over-reaction. However, our results show four significant over-reaction cases and only two cases of significant under-reaction, and 20 per cent of news announcements giving rise to such anomalies. Both the frequency of incidence of anomalies and their mix tends to reject an efficient markets explanation. If markets are efficient in the strong-form then we should not observe a significant reaction to analyst recommendations, whereas we observe significant reactions to both positive and negative recommendations in our study, implying that investors believe they contain valuable economic information. Finally, the incidence of information leakage in a number of news types suggests that markets have mechanisms for the release of private information, again rejecting strong-form efficiency.

If the EMH fails to explain the behaviour of UK investors in response to a wide range of news announcements, what alternative explanations might we explore? The behavioural finance explanations of Daniel et al. (1998) and Barberis, Shleifer

and Vishny (1998) provide us with some insights into over-reaction and under-reaction based on investor psychology. However, as they focus on event windows of up to 5 years, they necessarily fail to provide much insight into behaviour over our post-event window of only 20 days. There is, therefore, a interesting venue for research to explore different behavioural explanations in the very short-term, as concepts such as representativeness in over-reaction and conservatism in under-reaction are clearly longer-term phenomena in the existing empirical literature.

Notes

For robustness we used both unit and zero beta models to compute abnormal returns. The results were very similar to those obtain by the market model.

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E-RETAILING ADOPTION AND INNOVATIVENESS, IMPLEMENTATION CAPACITY AND BUSINESS PERFORMANCE OF SMES

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Abstract. Research on e-retailing in the context of developing countries such as South Africa has remained scarce. In order to fill this gap, the current study is done to explore the relationship of e-retailing adoption, e-retail implementation, e-retail innovativeness, brand recognition and impact on business performance, particularly in this growing South African economic sub-sector. Five hypotheses were posited in this study and in order to test these hypotheses a sample of 273 was used. The findings in this study showed that, e-retailing adoption, mediated by e-retail implementation and innovativeness positively influences brand recognition and consequently business performance in a significant way. Management implications and limitations of the findings are discussed and future research directions proposed. The paper also suggests measures designed to create an enabling and nurturing environment that promotes and accelerates e-retailing adoption within the SMEs sector.

JEL Classification: M30, M31, M37, M38, M39

Keywords: SMEs, Retail innovativeness, E-retailing, Business performance, South Africa

1. Introduction

E-commerce technologies such as e-retailing are becoming increasingly important for South African (SA) SMEs integrating into global value chains, as they become exposed to the demands of more sophisticated markets. The Internet is known to provide businesses with new ways of doing business transactions in an increasingly sophisticated and competitive environment (Rivard, Raymond and Verreault, 2006, Brodie, Winklhofer, Coviello and Johnston, 2007). One such marketing practice that has emerged and benefited from the information technology (IT) revolution is e-retailing (Trainor, Rapp, Beitelspacher and Schillewaert, 2011). It is acknowledged that e-retailing has profound impact on business performance. E-retailing presents an opportunity not only to connect with the global marketplace but also to be competitive within a broader market space. It is argued that e-retailing provides vast opportunities for firms to strategically position themselves in an industry, improve their performance, generate new wealth and transform the way

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they conduct business in an unprecedented ways (Brodie et al. 2007). Increasingly marketing managers today are turning to e-retailing in order to cope with the enduring challenge of getting more from marketing resources while concurrently meeting bigger expectations of establishing long-lasting relationships with customers (Coviello, Milley and Marcolin, 2001, Sarkess, 2011). Bolstering this observation is a growing body of recent empirical interactive marketing literature which suggests that firms can improve customer acquisition and retention by adopting e-retailing practices which foster rich interactions with their customers (Trainor et al. 2011).

The paper is structured in the following manner. The first section presents a review of the literature review on the four constructs of this study to provide a theoretical foundation for the conceptualized research model. The conceptual framework and hypotheses development section follows next - justifying the logic of the practical relationships among the constructs. The research methodology section which includes construct operationalization and measurement follows thereafter. The succeeding sections are the data analysis and results, and discussion and implications of the study findings as well as the limitations of the study along with suggestions for future.

2. Literature Review

Literature on small business indicates that innovativeness is a paramount factor that has characterized the survival and success of many organisations. It is agreed in the existing literatures that when compared to large firms, small businesses tend to be more flexible and quickly adaptable to exploit new business opportunities identified (Chinomona and Pretorius, 2011). E-retailing (e-R) is one such adopted business practice that has presented vast business opportunities for innovative SMEs to exploit in South Africa. It is therefore submitted that e-M in South Africa is improving SMEs' market-sensing ability and innovative capacity, for instance, through the use of intranets and extranets (Trainor et al. 2011).

In particular, intranets and extranets are providing the customers the opportunity to electronically communicate their demands and experience with product usage to the SMEs owners or management (Lawrence, 2009). This form of information sharing plays a critical role in SMEs opportunity identification and innovative responses to customers. Besides, this potentially enables the SMEs to satisfy customer needs and in the process establish a sustaining competitive edge over some large business (Jayachandran, Sharma, Kaufman and Raman, 2005). Some of the SMEs innovative marketing activities that can be supported by e-retailing in South Africa are customer relationship management, sales activities, customer support, marketing research and planning (Brodie et al. 2007). Therefore, the ability of SMEs in South Africa to aptly adapt e-retailing tools and integration with their innovative skills or competences will likely generate for them a sustainable competitive edge over their competitors.

3. Problem Statement

In business, technology is constantly advancing in terms of developing electronic markets, electronic data interchange and Internet commerce (Whiteley, 2000). Contemporary studies have shown that a number of SMEs have not taken advantage of these new modes of carrying out business (Smyth and Ibbotson, 2001), in spite

of the technological advancements that are meant to facilitate improved business practice. Despite this acknowledged importance of e-retailing on transforming the way retail business is done nowadays in retail and marketing management, there is meager empirical evidence that specifically indicate the impact of e-retailing adoption on business performance for SMEs in South Africa. Additionally, the mediating influence of implementation and innovativeness in these relationships has been largely neglected (Chinomona and Cheng, 2013). The general observation is that, most of the prior researches have largely focused on the influence of IT on firm performance (Ortega, 2010, Altshuler and Tarnovskaya, 2010, Clarke, 2008) in developed countries and in the context of large firms.

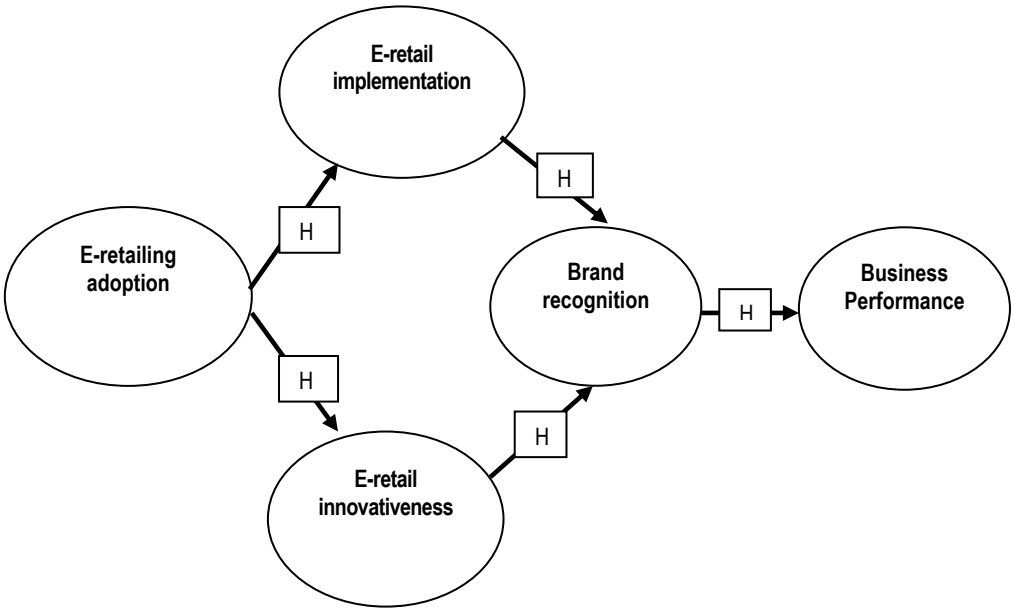
Understanding the mediating influence of these important high order marketing capabilities in the e-retailing adoption and SMEs business performance relationship is critical for marketing managers when designing a differentiation strategy that utilizes IT (Merrilees, Rundle-Thiele and Lye, 2011). Given the envisaged importance of e-retail implementation, e-retailing innovativeness and brand recognition particularly in e-retailing adoption and business performance relationship, it is surprising that researchers have overlooked such crucial research direction (Todd and Javalgi, 2007). Therefore, there remains a fissure in our understanding of how these two high order marketing capabilities mediate the e-retailing adoption and business performance relationship. More so, one can hardly find researches on the same constructs focusing on the small and medium enterprises (SMEs) sector. This is disturbing given that SMEs are venerated as engines of economic growth and employment generation in both developed and developing countries (Chinomona and Pretorius, 2011). Moreover too, empirical researches on e-retailing and firm performance relationship in developing countries in Sub-Saharan Africa have remained scarce. To assume *a- priori* that findings from developed countries apply in developing African countries might be ingenuous and injudicious. Therefore, this current study focuses on a fairly neglected research area with some practical implications retail SMEs and the South African economy.

4. Conceptual Framework and Hypotheses

In situations where there are no established models, an attempt to develop an e-retailing strategy is bound to involve forays into unfamiliar territories for most SMEs. In the view of the aforementioned research gap, the current study sets out to achieve two main research objectives. First, this study examines the influence of e-retailing adoption on business performance in the context of South African SMEs. Secondly, the study also seeks to explore the mediating role of e-retail innovativeness and e-retail implementation in this posited e-retailing adoption and business performance relationship. However, in order to provide a sound theoretical grounding, an attempt is made to utilize the technology acceptance model (TAM) in the current study. Above and beyond, the current study is expected to make practical contributions to the existing body of literature and the marketing practice of small and medium enterprises in Sub-Saharan Africa

To enable the empirical test of the interrelationships between e-retailing adoption, e-retailing implementation, e-retail innovativeness and retail business performance, a conceptual model is developed based on the reviewed retailing and marketing literature, and a model is proposed as shown in Figure 1.

Figure 1: Conceptual Model



In this conceptualized model e-retailing adoption is the predictor while e-retail implementation and e-retail innovativeness are the mediators. Business performance is the single outcome variable. Figure 1 depicts this conceptualized research model with the hypothesized relationships between the constructs projected hereafter.

In light of this view and also drawing from literature, e-retailing adoption is expected to impact positively on SMEs' e-retail innovativeness and e-retail implementation capacity for SMEs in South Africa. These two components are expected to positively impact on brand recognition which in turn impacts on business performance in a positive way (Kapferer, 2008). The relationships have also been supported in prior empirical studies (Brodie et al. 2007, Trainor et al. 2011). Accordingly, based on the illustrated relationships, the current study projects five hypotheses and posits that:

H1*: E-retailing adoption by SMEs is positively related to e-retail implementation capacity*
H2*: E-retailing adoption of SMEs is positively related to their e-retail innovativeness*
H3*: The SMEs' capacity to implement e-retailing has a direct positive impact on their brand recognition*
H4*: Virtual retail innovativeness has a direct positive impact on brand recognition*
H5*: SME brand recognition created through innovative e-retailing adoption and implementation has a direct positive impact on business performance*

5. Methodology

The study followed a quantitative research paradigm, defined by Bryman and Bell (2011:26) as a "research paradigm that emphasizes quantification in the collection and analysis of data and viewing the relationship between theory and research as deductive".

5.1 Data collection

The data for this research was collected from Vaal Triangle, an industrialized region of South Africa. The research sampling frame was the Gauteng Enterprise Propeller (GEP) and Small Enterprise Development Agency (SEDA) of South Africa. Students from Vaal University of Technology and the Northwest University in South Africa were recruited to distribute and collect the questionnaires after appointments with target retail SMEs were made by telephone. Due to the nature of this research, the targeted research participants were the SME management and owners. In particular, SME owners or officials who occupied management positions related to sales or marketing completed the questionnaires. This was done to ensure the competence of the respondents in evaluating the firms' e-retailing adoption, implementation capacity, innovativeness, brand recognition and business performance (Keller, 2008). Of the total of 385 questionnaires distributed, 273 usable questionnaires were retrieved for the final data analysis, representing a response rate of 65.6 percent.

5.2 Measuring instrument

The research constructs were operationalized on the basis of previous studies. Appropriate scale adaptations were done in order to fit in the current research context and purpose. Some eleven-item scales were adapted from Trainor et al. (2011) previous works and were used to measure "e-retail implementation capacity". "E-retail innovativeness" used a four-item scale measure adopted from Menguc and Auh (2006), while "brand recognition" used a five-item scale also from Terziovski (2010). Finally, a four-item scale to measure "business performance" was adapted from Rivard, Raymond and Verreault (2006) and Terziovski (2010). Entirely, the measurement variables were measured on a 5-point Likert-type scales that was anchored by 1= *strongly disagree* to *5= strongly agree* to express the degree of agreement.

6. Data Analysis

6.1 Age structure of respondents and their levels of education

The age groups and the level of education of the sample used in this study are reported in Table 1. Only 14.7 percent *(n=40)* of the respondents were under the age of 30 years, a quater *(25.6%; n=70)* of the respondents were aged between 30 and 39 years, 17.2 percent *(n=47)* reported their age to be between 50-59 years, a paltry 2.9 percent (*n=8*) of the respondents reported that they were 60 years and above. The bulk of the respondents, 39.6 percent (*n=108*) were aged 40-49 years. From the data illustrated in Table 1, it can be said that the management within the SMEs in South Africa are mainly within the age brackets of 30-59 years. This consequence is logical since operating a SME business is a challenging endeavour which requires experienced individuals who can make well-grounded marketing decisions (Parker and Castleman, 2009), especially strategic marketing decisions.

Table 1: Age of respondents and level of education

Respondent's age	Frequency	%	Education level (respondent)	Frequency	%
Below 30 yrs	40	14.7	No education (informal)	4	1.5
From 30-39 yrs	70	25.6	Basic education (primary school)	10	3.7
From 40-49 yrs	108	39.6	Matric education (grade 12)	55	20.1
From 50-59 yrs	47	17.2	Trade certificate	91	33.3
60 yrs +	8	2.9	Undergraduate degree/diploma	79	28.9
			Postgraduate degree/diploma	34	12.5
Total	**273**	**100**	**Total**	**273**	**100**

Pertaining to formal education levels, Table 1 data reports three quarters (33.3%+28.9%+12.5%=74.7%) of the respondents had at least a tertiary qualification. This implies that the majority of the individuals who own or manage SME businesses either had a trade certificate (33.3%), an equivalent of a degree (28.9%) or a postgraduate qualification (12.5%). The remainder 25.3 percent of the sample represented entrepreneurs either possessing basic education (3.7%+20.1%=23.8%) or no formal education (1.5%) at all.

6.2 Profiling the surveyed SMEs

Reported in Table 2 are the characteristics of the surveyed SMEs in terms of their legal form (business type), their period in existence (age of business in years), their annual turnover (revenue), and employment levels (number of employees). The feedback from the respondents showed that most entities under study were formally registered operating SMEs. The sample consisted mainly of private limited companies (Pty Ltd) (38.7%, *n=105*), partnerships (25.2%, *n=68*), close corporations (CCs) (24.3%, *n=67*), public companies (3.3%, *n=9*), sole traders (6.7%, *n=19*), and co-operatives (1.8%, *n=5*). Of these business operations, 38.1 percent (*n=104*) of them had been in existence for over 10 years, 20.1 percent (*n=55*) had been in operation for 7-10 years, 19.8 percent (*n=54*) had been in operation for 3-6 years, while the remainder, 22 percent (*n=60*) were emerging enterprises that had operated for less than 3 years.

Employment figures for this specific sample-profile (Table 2) shows that the majority of the employers in the South Africa's Vaal Triangle Region are SMEs, although they employ less than 50 employees per business entity. An estimated 33.7 percent of the surveyed SMEs employed 10-50 employees each and a staggering 39.9 percent employed less than 10 employees each. Interestingly, a mere quarter (26.4%, N=72) of the participating SMEs employed more than 50 employees each. These results are consistent with Moodley's (2002:37) findings that SMEs are important inspite of them recruiting less employees per entity. Their potential for job creation is in their numbers.

Most of the participating firms (59.7%) generated annual turnover that was less than R4 million (41 percent generated less than R2 million and 18.7 percent generated between R2 million and R4 million). The rest of the surveyed SME businesses (40.3%) generated annual turnover above R4 million per annum (i.e. 10.6%+8.1%+7.0%+14.7%). These reported survey results (Table 2) clearly indicate that most SME business operations in Vaal Triangle (South Africa) are making small revenues. The results also indicated more than 30 percent of the participants having between 6 and 10 years of work experience, 25 percent had between 3 and 5 years of work experience, and 22 percent had between 10 and 20 years of work experience.

Table 2: Profile of the surveyed SMEs

Business legal form	**Frequ-ency**	**%**	**Age of business (years)**	**Frequ-ency**	**%age**
Sole trader	19	6.6	Less than 3 years	61	22.0
Partnership	68	25.3	Between 3-6 years	54	19.8
Close corporation	67	24.2	Between 7-10 years	56	20.1
Co-operative	5	1.8	Over 10 years	104	38.1
Private company (Pty) Ltd	105	38.8			
Public Company (Ltd)	9	3.3			
Total	**273**	**100**	**Total**	**273**	**100**
Revenue/ Annual turnover (rands)	**Frequ-ency**	**%**	**No. of employees (fulltime)**	**Frequ-ency**	**%age**
Less than R2 million	113	41.0	Less than 10 employees	109	39.9
R2 million to R4 mil	51	18.7	Between 10 - 50 employees	92	33.7
R4 000 001 to R8 mil	29	10.6	Between 51 - 100 employees	37	13.6
R8 000 001 to R16 mil	21	8.1	Between 101 - 200 employees	29	10.6
R16 000 001 to R32 mil	19	7.0	Above 200 employees	6	2.2
Over R32 million	40	14.7			
Total	**273**	**100**	**Total**	**273**	**100**

7. Validity and Reliability of the Measurements

This study followed the two-step procedure that was suggested by Anderson and Gerbing (1988). Before testing the hypotheses, the study ran a confirmatory factor analysis (CFA), performed using AMOS 5 mainly to establish the scale accuracy in terms of its reliability and validity. First, a confirmatory factor analysis (CFA) model of the five research constructs was assessed to check the model fit. The overall model statistics indicate chi-square (CMIN=701.419) to degrees of freedom (DF=273), i.e. (χ^2/df) of 2.5693, the goodness-of-fit-index (GFI) of 0.969, the comparative-fit-index (CFI) of 0.987, the incremental fit index (IFI) of 0.989, the relative fit index (RFI) of 0.908, the normed fit index (NFI) of 0.976 and the root mean square error of approximation (RMSEA) of 0.231. All these measures are considered statistically significant and therefore, confirming a robust and acceptable model fit in line with Bentler (1990) and Bentler and Bonett (1980).

Table 3 (below) presents a report of key descriptive statistics on the reliability analyses for the four constructs.

Table 3: Accuracy Analysis Statistics

Research Construct		Descriptive Statistics				Cronbach's Test		C.R. Value	AVE Value	Factor Loading
		Mean Value		Standard Deviation		Item-total	α value			
EA	EIc1	3.100	2.930	.977	.8363	.851	.933	.921	.839	.939
	EIc2	3.091		.985		.856				.929
	EIc3	3.037		.903		.872				.988
	EIc4	3.021		.912		.861				.991
	EIc5	2.982		.903		.859				.979
	EIc6	2.947		.889		.861				.949
	EIc7	2.909		.908		.865				.919
	EIc8	2.865		.891		.866				.891
	EIc9	2.818		.874		.864				.829
	EIc10	2.754		.881		.863				.789
	EIc11	2.710		.897		.874				.771
EIc	EA1	2.615	2.579	.901	.8931	.880	.911	.906	.923	.930
	EA2	2.595		.912		.874				.971
	EA3	2.560		.915		.884				.989
	EA4	2.548		.907		.882				.959
ErI	ErI1	3.015	2.829	.901	.8723	.880	.903	.901	.929	.931
	ErI2	2.995		.912		.874				.969
	ErI3	2.760		.915		.884				.989
	ErI4	2.547		.907		.882				.961
BR	BR1	2.549	2.586	.907	.8921	.889	.901	.901	.927	.969
	BR2	2.560		.893		.884				.981
	BR3	2.575		.922		.894				.988
	BR4	2.591		.925		.879				.981
	BR5	2.655		.963		.839				.891
BP	BP1	2.619	2.589	.788	.7279	.778	.919	.921	.739	.870
	BP2	2.497		.858		.741				.849
	BP3	2.488		.899		.783				.841
	BP4	2.627		.925		.789				.869

Note: EA=E-retailing adoption, EIc= E-retail Implementation; ErI=E-retail Innovativeness; BR=Brand Recognition; BP=Business Performance; C.R.: Composite Reliability; AVE: Average Variance Reliability; * Scores: 1 – Strongly Disagree; 3 – Neutral; 5 – Strongly Agree, *significance level: *** p<0.01
Measurement CFA model fits:
Structural Model Fits: χ^2/df=2.5693; GFI=0.969; CFI=0.987; IFI=989; RFI=0.908; NFI=0.976 and RMSEA=0.231.

The composite reliabilities are all impressive (above 0.9) and well above the Bagozzi and Yi's (1988) recommended minimum threshold of 0.6. At values all above 0.7, the average variance extracted (AVE) exceeds the well-known Fornell and Larcker (1981) benchmark of 0.5. In addition, all of the coefficient alpha values exceeded the threshold value of 0.7 recommended by Nunnally (1978) and all the

factor loadings significantly above the recommended thresh-hold of 0.5 (Anderson and Gerbing, 1988). These results confirm measures reliability and provide support for an acceptable degree of internal consistency between the corresponding indicators and for satisfying convergent validity (Bagozzi, Yi and Phillips, 1991).

To investigate the distinctiveness of constructs, the assessment of discriminant validity is tested. Although the inter-correlations between the research constructs are relatively high, they are still marginally acceptable (Hulland, 1999). However, to check discriminant validity the current study compared the variance-extracted estimates of the measurements with the square of the parameter estimate between the measurements. If the variance-extracted estimates of the constructs are greater than the square of the correlation between two constructs, the evidence of discriminant validity exists (Fornell and Larcker, 1981). For example the relationship between "e-retailing adoption" and "e-retail implementation", the average variance-extracted estimate of "e-retailing adoption" was 0.839 and that of "e-retail implementation" was 0.929. These two variance-extracted estimates are greater than the square of the correlation between "e-retailing adoption" and "e-retail implementation" (˚= 0.7851, ˚2 = 0.6164); see Table 4.

Table 4: Descriptive Statistics and Correlations between Constructs

RESEARCH CONSTRUCTS	EIc	EA	Erl	BR	BP
E-retailing Adoption **(EA)**	1.000				
E-retailing Implementation **(EIc)**	0.7851	1.000			
E-retail Innovativeness **(Erl)**	0.7542	0.8920	1.000		
Brand Recognition **(BR)**	0.7393	0.7972	0.8683	1.000	
Business Performance **(BP)**	0.8389	0.7391	0.8012	0.8831	1.000

Therefore, the result supported the discriminant validity of constructs. To further ascertain discriminant validity the researchers performed a chi-squire difference in all two-factor (i.e., any paired latent constructs) CFA tests (which restricted the factor inter-correlations to unity) (Anderson and Gerbing 1988). As such, all pairs of the constructs and the two-factor CFA tests results revealed an adequate level of discriminant validity in line with Bentler (1990). Overall, the two approaches used to check discriminant validity suggest that discriminant validities exist.

Table 5 Chi-Squire Differences (Constrained-Unconstrained) in 2-factor CFA tests (△χ2)

RESEARCH CONSTRUCTS	EIc	EA	Erl	BR	BP
E-retailing Adoption (EA)	--				
E-retailing Implementation (EIc)	52.031	--			
E-retail Innovativeness (Erl)	60.987	90.227	--		
Brand Recognition (BR)	46.354	57.034	54.532	_	--
Business Performance (BP)	41.876	53.981	49.397	57.194	

Note: All figures significant at least at a level of 0.01 significance

8. Structural Equation Modeling

Structural equation modelling (SEM) was conducted to test the validity of the proposed model and the hypotheses also using LISREL 8.8 statistical software program. Table 4 presents the estimated model, illustrating the direction and magnitude of the impact of the standardized path coefficients. Recommended statistics for the overall structural equation model assessment also showed acceptable fit of χ^2/df=2.5693; GFI=0.969; CFI=0.987; IFI=989; RFI=0.908; NFI=0.976 and RMSEA=0.231. The reported indexes showed a model fit deemed satisfactory, thereby providing a good basis for testing the hypothesized paths. The parameter estimates of the structural model exhibited the direct effects of one construct on the other (Chinomona and Cheng, 2013). A significant coefficient at a certain level of alpha thus reveals a significant relationship (Bentler, 1990) among latent constructs (see Table 6).

Table 6: Results of Structural Equation Model Analysis

Path	Hypothesis	Coefficients
E-retailing Adoption (EA)→ E-retailing Implementation (EIc)	**H1**	**0.79[c]**
E-retailing Adoption (EA)→ E-retail Innovativeness (ErI)	**H2**	**0.14[c]**
E-retailing Implementation (EIc) → Brand Recognition (BR)	**H3**	**0.78[c]**
E-retail Innovativeness (ErI) →Brand Recognition (BR)	**H4**	**0.12[c]**
Brand Recognition (BR) →Business Performance (BP)	**H5**	**0.76[c]**

Structural Model Fits: χ^2/df=2.5693; GFI=0.969; CFI=0.987; IFI=989; RFI=0.908; NFI=0.976 and RMSEA=0.231.
[a]Significance Level $p<0.05$; [b]Significance Level $p<0.01$; [c]Significance Level $p<0.001$.

The results in Table 6 provided support for the entire proposed five research hypothesis. The path coefficients for H1, H2, H3, H4 and H5 are 0.79, 0.14, 0.78, 0.12 and 0.76 respectively. All hypothesis coefficients are significant at a confidence level (*p* value) of 0.001.

9. Discussion and Conclusion

This current study sought to examine the impact of e-retailing adoption on business performance and to provide a theoretical grounding for the conceptualized framework, and the hypothesized relationships. Specifically, the current study postulated five hypotheses and to test these hypotheses data were collected from SMEs in Vaal Triangle, South Africa. The empirical results supported all the postulated research hypotheses in a significant way.

Drawing from the findings of this research e-retailing adoption has stronger influence on e-retail implementation (0.79) more than it has on e-retail innovativeness (0.14). Furthermore, the impact of e-retail implementation on brand recognition is robust (0.78). Also, it is not amazing that, brand recognition has stronger influence on SME business performance (0.76) while e-retail innovativeness has a weak influence on brand recognition (0.12). Perhaps since brands appeal to the consumers' mind, it is likely to influence their buying behavior hence the stronger influence on sales

and revenue growth when compared with e-retail innovativeness (Ayyagari, Beck and Demirgüç-Kunt, 2007). Admittedly, there is also a strong relationship (0.78) between e-retailing adoption and brand recognition; it might imply that e-retailing implementation could indirectly be influencing business performance through brand recognition (Lawrence, 2009). Perhaps too, path dependencies might explain also, in part, the weak relationship between e-retailing innovativeness and brand recognition, as well as e-retailing innovativeness and business performance.

10. Implications of the Study

The current study makes important academic and practical contributions to the interactive marketing literature and practice. To begin with, this study forms a pioneering contribution on studies relating to e-retailing adoption, e-retail implementation, e-retail innovativeness and business performance relationships in South Africa's SMEs sector. Since the SMEs sector is deemed the engine of economic growth and vehicle for employment generation in South Africa (Dlodlo and Dhurup, 2010), useful implications for both academicians and practitioners are derived.

On the academic side, a contribution regarding the impact of e-retailing adoption and implementation on business performance of SMEs in a developing country of Southern Africa is made. By and large, the findings in this study add supportive empirical evidence to the existing literature on marketing from developed countries that e-retailing adoption has significant positive impact on brand recognition and business performance (Teece, 2007). In addition, a successful attempt was made to apply the concepts in order to explain e-retailing in the SMEs context.

On the practitioners' side, prominence of e-retailing adoption as a precursor to improved business performance is confirmed. Given that high business performance imply high revenue and profitability to a firm, indeed managers in the SMEs that have not adopted e-retailing yet, can increase their firms' profitability by utilizing their e-retail implementation capacity, e-retail innovativeness and branding capabilities. Recently the Government of South Africa adopted a policy targeted at promoting information and communication technologies in the country (Dlodlo and Dhurup, 2010). Marketing managers in the SMEs sector can take advantage of such government efforts by adopting or expanding their e-retailing business activities in order to reach and retain consumers of their products and services. In reality, the fact that e-retailing implementation strongly influences brand recognition, which eventually has strong impact on business performance, marketing managers or owners of SMEs should make use of all these capabilities since they augment each other (Kotler and Pfoertsch, 2006). For instance, if an enterprise seeks to increase business performance through branding of its products, it can achieve this by making use of its e-retailing capabilities, which in turn also require e-retailing adoption.

Moreover, the adoption of new technologies such as e-retailing might require the SMEs to also adjust their organizational culture and improve employees and management skills in order to achieve effective e-retailing adoption, its implementation and business performance. For instance, the effective management of e-retailing processes might necessitate or require a change in organisational culture and new skills acquisition by SMEs. Thus, a mismatch between the use of e-retailing tools with the employees and management requisite skills or organizational culture will likely yield undesirable results. Therefore, it is imperative that the SMEs accordingly

adjust their organizational culture and human capital skills in tandem with the challenges that come with the adoption of e-retailing tools and the management of e-retailing processes. In other words, this study submits that the SME owners and their managers can successfully improve their business performance by exploiting their e-retailing capabilities. Eventually, a successful business is expected to generate more revenue hence their profitability and survival in South Africa's challenging economic circumstances.

11. Limitations and Future Research

While this study makes significant contributions to both academia and practice, it has its own limitations, which therefore provide avenues for future research directions. First, the data were gathered from the SME owners or marketing staff members. This can have influence on the method bias in the results. Therefore, future studies on this subject should attempt to incorporate secondary source data in order to provide further insight into the impact of e-retailing adoption on business performance. Second, the current study used a cross-sectional survey data to test the proposed research hypotheses. A richer understanding of the relationships between this study's research constructs might be expected if longitudinal data is utilized. Therefore, future studies might consider this research direction. Third, in this study e-retailing adoption was treated as a unidimensional construct. However, e-retailing adoption can be a multi-dimensional construct. Future research should therefore attempt to measure e-retailing adoption as a multidimensional constructs and verify the findings of this study. Moreover, the current study only considered e-retail implementation and e-retail innovativeness as the mediating variables. Further studies might consider investigating the possible mediating influence of other variables such as management expertise, industry sector, level of education, gender in this 'e-retailing adoption and 'business performance' relationship. Exploring the antecedents of e-retailing adoption in the context of SMEs could be another possible future research direction.

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JOB RECRUITMENT AND SELECTION PRACTICES IN SMALL AND MEDIUM ORGANISATIONS

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Abstract. Job recruitment and selection practices represent a prerequisite for companies aiming for competitive and skilled employees. The purpose of this paper is to empirically explore and compare the employee recruitment and selection practices in small and medium organisations. An online quantitative survey was applied on 92 Romanian organisations (25 of small and 67 of medium size), based on a questionnaire which explored the recruitment methods, the employee selection practices and job screening criteria. The results show that while differences exist between these two categories of organisations, these are not that intense. When recruiting, small organizations focus on recommendations based methods. Medium organisations use more selection steps when hiring and render greater importance to the job selection criteria, especially to candidates' attitude, motivation and dedication to work, generic skills, lifelong learning, resistance to stress, and computer skills. The findings show that both the small and medium organizations use less valid employment practices, which imply lower short term costs, but may involve higher costs on the long run. The present research provides useful findings for the management of small and medium organisations, but also for higher education institutions and graduates.

JEL Classification: O15, J24

Keywords: employee recruitment, employee selection, job selection criteria, HR hiring practices

1. Job recruitment and selection practices in organizations

By the means of the job recruitment and selection practices, employers' chief objective is to hire the most competent candidates. Regardless of the size of the employing organization, the goal of the staffing process is to identify the most suitable person for the vacant position, satisfying both job position and organization requirements (Beardwell, Holden, and Claydon, 2004, Rogelberg, 2007). In order to achieve this goal, organizations need to make use of highly valid indicators for the selection process, with an effective predictive value of the candidate's future performance (Wolf and van der Velden, 2001, Hackett, 1991).

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The way the recruitment and selection process is organized depends on the specific characteristics of each business. Due to the dynamic background of the market economy, there occur ongoing changes within the staffing practices implemented by organizations (Osoian and Zaharie, 2009). The companies support their adjustment to external requirements by focusing on improving the human resources practices, including by means of the staffing process. The studies aiming to identify the job selection practices and the frequency of selection stages used in the occupational selection include o series of research works attempting to emphasize the main factors determining the staffing process (Beardwell, Holden, and Claydon, 2004).

While most researches on HR are mainly approached in large organizations (Barber et al., 1999), differences are expected to be found in the human resources (HR) practices implemented in small compared to large businesses (Tanova, 2003, Massey, 2004). Despite some progressions made, studies focused on small businesses indicate the use of rather informal HR practices than formal systems, with reluctance in formalization (Benmore and Palmer, 1996, Wiesner and McDonald, 2001, Kotey and Sheridan, 2004). With regard recruitment, informal methods such as referrals and word-of-mouth from family or friends are rather associated with smaller organizations (Carrol et al. 1999). The *individual difference* hypothesis explains that some recruitment methods (i.e. informal recruitment) outperform the others by addressing and reaching different applicants pools: different recruitment sources attract candidates with abilities, motivation and personality that might impact their future job performance (Schwab, 1982, Taylor and Schmidt, 1983). The *realistic information* hypothesis (Wanous, 1980) states that informal recruitment methods, such as employee referrals, help both candidates and recruiters to get a more real image on the hiring process. This image is improved on what concerns the job, on the one hand and the candidate profile, on the other. While both informal and formal recruitment methods bear advantages and disadvantages, it is important to understand the recruitment practices implemented by small businesses and identify the errors performed when hiring. Findings show that three categories of factors determine the differences between small and large firms with regard the recruitment process: the number of the vacancies, number of candidates and the financial resources available for the recruitment process (Hausdorf, Duncan, 2004).

The process of employee selection comprises a set of components: the indicators/criteria based on which the organizations make the employment decision, the stages and methods of gathering information about the candidates (including the candidates' assessment), and the actual selection decision (Brown and Smetherham, 2006, Milkovich and Boudreau, 1991). As a process of candidates' assessment, the selection is based on the criteria pre-established by the employing company, according to the job and organization requirements.

The selection process is mainly considered to be based on managers' personal judgments and one-to-one interviews (Golhar and Deshpande, 1997). Since both recruitment and selection practices are considered to influence the performance of organizations, analyzing the staffing practices implemented by small businesses bears tremendous importance. Besides that, both small and large organizations are employing higher education graduates. Given the importance of labor force skills for the competitiveness of any enterprises, it is necessary to more deeply understand employers' needs, so that universities can prepare their workforce as required

(Schomburg, 2000, Paul and Murdoch, 2000, Weert, 2007). Input information regarding the competences required during employee selection is very important for higher education institutions. Since often the young graduates are hired by small businesses, a more systematic analysis of the human capital needs represents a prerequisite for improving the quality of the study programs. Most studies focused on employers' requirements aimed to measure their needs by identifying the demand for high skilled labor force (i.e. number of jobs requiring higher education degree), the criteria implemented in the employee selection process, the skills required by the hiring companies, employers' opinions and their satisfaction level regarding the graduates' skills, and the characteristics of the recruitment and selection process.

Aiming to better understand employers' needs, this study is focused on small organisations employment practices, offering a comparison of the recruitment and selection practices in small and medium Romanian organisations. Starting from the difficulties met by small businesses in recruiting and selecting the most adequate employees (Atkinson and Storey, 1994), based on the analysis of the staffing practices implemented in small businesses, this paper also aims to identify strategies to improve the employment process.

2. Research methodology of the study

The study uses a mixed research design, including both qualitative and quantitative approach. The qualitative part implied five interviews with owners of small businesses in services and commerce sector.

Following the qualitative stage, based on the data generated, and on the research instruments used by other employers' surveys, a questionnaire was designed to assess the employers' human capital needs. The questionnaire measured the use of employee recruitment and selection methods in organizations. Based on a five points Likert scale (from 1 Very rare to 5 Very often), the respondents assessed the degree of use of each of the recruitment methods and job selection stages. The instrument also measured the importance of the selection criteria for employers. For the quantitative survey, the study used a non-probability sampling technique. Following the theoretical purposive sampling principles, the aim was to include different type of organisations, so to cover the large variety of differences with regard the staffing process. The sample included 92 Romanian organisations, out of which 25 of small size (between 1 and 49 employees) and 67 of larger sizes (between 50 and 250 employees). Since no organisation had over 250 employees, all the other organizations are considered to be of medium size. One main criterion followed when selecting the organizations in the sample regarded their previous experience in employing young higher education graduates.

3. Results on employee recruitment and selection practices

3.1. Employee recruitment practices

Small organizations face great difficulties in finding qualified persons for their vacancies (Deshpande and Golhar, 1994), due to both lack of attractiveness of the jobs offered in small businesses (Moy and Lee, 2002) and low quality of the recruiting practices. The recruitment process is an important prerequisite stage in a successful hiring process. Since the quality of the recruitment process is crucial for the

effectiveness of the employee selection (Osoian and Zaharie, 2010), small companies need to invest more resources in recruiting good candidates. The questionnaire was designed to identify the employee recruitment and selection practices more frequently used by the organizations in the sample during the employment process. The results obtained on the entire sample of 92 units show that the most frequently used recruitment methods are the *online posting of the recruitment add* (mean 4.11) and *referrals made by superiors* (mean 3.80). Compared to medium organizations, small ones use more frequently *referrals from acquainted persons* ($t = 3.57$, $p < 0.05$). While the referrals have the advantage of offering detailed information about the candidates and the job vacancy, a main drawback regards the small pool of candidates addressed (Tanova, 2003). This greatly impacts the hiring decisions, since recruiters have low choices to select from. These results are consonant with other research studies (Carrol et al., 1999), that also show an emphasis in small businesses on referrals based recruitment. The qualitative interviews showed that the managers of small businesses confer greater trust in referrals when recruiting new employees. But hiring the candidates based only on the referrals increases the chances of hiring wrong candidates. This is a common error made by small companies, which following the recruitment, do not continue the employment process with the selection stages, which to screen out unfitted candidates.

Comparing the *recruitment sources*, while in larger organizations the internal recruitment represents an important source of candidates, small organisations are rather restricted to external sources. This also implies further risks for the small units, which are prone to wrong decisions when choosing the job candidates. As a means to counteract the lack of valid information about the candidates, recruiters in small businesses focus the hiring process on the suggestions got from referrals. Still, for a valid hiring process, organisations need to base the final decision on a valid selection process which to follow the recruitment stage.

3.2. Employee selection practices: selection stages and selection criteria

The second part of the survey instrument aimed to analyze the employee selection practices. As found in other research (Kotey and Sheridan, 2004), the findings of the present study presented in Table 1 indicate the *individual interview* as the most frequent method to select future employees (mean 4.92, respectively 4.43). The lack of variability in use of this selection method is also supported by the rather low values of the standard deviation ($\sigma = 0.28$, respectively 1.12). Of great use in medium organisations seem to be the *CV screening* (mean 4.92), *trial period* (mean 4.76) and *practical selection tasks* (mean 3.84). As expected, a very popular selection method used by both types of organisations is the *CV screening*.

Table 1. Selection stages in small and medium organisations

Selection stage	Size	Mean	SD	t	Sig. 2-tailed
CV screening	Small	3.82	1.33	3.79	0.05*
	Medium	4.92	0.27		
Individual interview	Small	4.43	1.12	-1.9	0.06
	Medium	4.92	0.28		

Selection stage	Size	Mean	SD	t	Sig. 2-tailed
Employment forms	Small	2.94	1.68	.19	0.85
	Medium	2.83	1.52		
Selection tests	Small	2.75	1.40	-.89	0.37
	Medium	3.23	1.64		
Reference check	Small	3.04	1.49	-.08	0.94
	Medium	3.07	0.95		
Practical tasks	Small	3.86	1.09	-.61	0.95
	Medium	3.84	1.06		
Trial period	Small	3.91	1.31	3.25	0.01*
	Medium	4.76	0.59		
Online evaluation	Small	1.30	0.57	-.55	0.58
	Medium	1.50	1.16		
Phone pre-selection interview	Small	2.09	1.44	-.63	0.53
	Medium	2.41	1.31		
Assessment centers	Small	2.07	1.42	-.61	0.52
	Medium	2.40	1.30		
Intelligence tests	Small	1.78	1.03	-.31	0.75
	Medium	1.92	1.25		

Comparing the findings according to the size of the organization (small or medium size), the results of the *independent sample t* test reveal that *CV screening* ($t = 3.79$, $p < 0.05$) is more frequently used by medium organisations. Similarly, the medium organisations are more prone to using the *trial period* as a means of selecting the candidates ($t = 3.25$, $p < 0.01$). But, according to our opinion, since the trial period follows the actual selection process, it shouldn't be considered a proper selection stage. It is just an employment period succeeding the selection decision that should confirm in most cases that recruiters took the right decision. These results indicate that small organisations use less frequently the highly predictive selection methods such as assessment centres and selection ability tests (Anderson and Shackleton, 1993).

Through the means of this study, we aimed to test the research hypothesis which states that there is a direct positive relation between the size of the organization and the complexity of the selection process. We expect larger organisations to use more selection stages when taking the hiring decision. Analyzing the *Pearson correlation coefficient* between the number of employees in the surveyed organisations and the complexity of the selection process, we identified a positive direct relation ($r = 0.33$, $p<0.05$). Medium organisations declare to use more selection stages.

Moreover, we expected for organisations with higher financial turnover to also use more selection stages. Contrary, the results show that there is no relation between the profits of an organisation and the complexity of the hiring process. While larger ones seem to invest more in the selection process by applying more screening stages, the results show that richer organisations do not invest more.

The third part of the questionnaire was designed to identify the mostly used criteria by small organisations during the employment process.

The results presented in table 2 show that in the small organisations, the most important criteria were the *candidate's ability to effectively use the working time* (mean 4.73), the *candidate's motivation to work* (mean 4.39), and *trustworthiness* (mean 4.35), the *generic skills* (mean 4.21) and *computer skills* (mean 4.34). The criterion related to *personality traits* was highly appreciated by the small organizations. These results show the great interest for generic skills and candidates' work values. Contrary to common believes, for entry level jobs, the work experience seems not to be that strongly appreciated. Other international studies also ranked as very important the *work attitude* criteria (The report *Educational Quality of the Workforce National Employer Survey*, 1994 in Zemsky and Iannozzi, 1995).

Table 2. Employee selection criteria in small and medium organisations

Selection stage	Small		Medium		T test	Sig. 2-tailed
	Mean	SD	Mean	SD		
Education degree	3.52	1.20	3.69	0.94	-.44	0.66
Job match	3.91	1.04	4.69	0.48	-2.52	0.01*
Generic skills	4.21	0.79	4.72	0.48	-1.9	0.50
Theoretical knowledge	3.73	1.17	4.00	1.00	-.67	0.37
Job knowledge	4.21	0.85	4.46	0.77	-.87	0.40
Company specific knowledge	3.78	0.85	3.53	0.77	.85	0.40
Job experience	3.39	1.30	3.84	0.98	-1.2	0.24
Recommendations	3.73	0.96	3.46	0.87	.88	0.39
Elective courses attended	2.50	1.05	3.30	0.85	-2.63	0.01*
Trainings & extracurricular	2.59	1.22	3.23	1.02	-1.68	0.10
Professional achievements	3.45	1.14	4.15	0.89	-2.06	0.05*
Physical aspect	2.71	0.95	2.23	0.92	1.93	0.05*
Work motivation	4.39	0.83	4.61	0.50	-.87	0.38
Education-job match	3.59	1.05	4.30	0.48	-2.74	0.02*
Desire to learn new things	3.90	1.15	4.61	4.61	-2.31	0.05*
Optimism	4.18	1.00	4.61	0.50	-1.69	0.10
Trustworthiness	4.35	1.00	4.40	0.80	-1.69	0.10
Enthusiasm	3.86	0.96	4.69	0.63	-2.74	0.01*
Career interests	3.71	0.95	4.30	0.63	-1.98	0.05*
Leadership skills	3.72	0.82	4.38	0.65	-2.44	0.02*
Language skills	3.77	0.97	4.07	0.86	-.93	0.35
Computer skills	4.34	0.71	4.76	0.43	-1.93	0.06
Negotiation skills	3.90	1.01	4.23	0.59	-1.03	0.33
Promptitude & time efficiency	4.73	0.68	4.76	0.43	-.16	0.88
Stress resistance	3.86	1.01	4.46	0.51	-1.99	0.05*
Intelligence level	4.00	0.95	4.53	0.51	-1.87	0.06

Comparing the small and medium organizations with regard job hiring criteria, larger organizations rate higher almost all of the criteria included in the questionnaire. Statistical significant differences are found for the *candidate's match with the job requirements*, *elective courses attended during college*, *previous professional achievements*, the *match between education and job requirements*, *candidate's orientation to learning new things*, *enthusiasm*, *career interests*, *leadership skills*, and *resistance to stress*, which are all rated as being more important in medium

organizations. These results support the findings of Carroll et al. (1999), who show that in small organizations there is a focus on fitting in, rather than qualifications and previous work achievements. On the other hand, our findings show that the physical aspect of the candidate was rated as being more important for small organizations. This also shows that small businesses are more prone to wrong decisions when selecting candidates, since the candidates physical aspect is not a valid predictor for their future performance.

4. Concluding remarks

The results show differences with regard the employment practices implemented in small and medium organisations. Larger units use more complex selection stages when hiring. Still, the differences are not that large and mainly concern the focus in small organizations on *referrals based recruitment methods* and less importance attached to job selection criteria. The findings show that both small and medium organizations use less valid employment practices, which involve lower costs on the short term. Still, relying the hiring process on informal employment practices may involve higher costs on the long run (employee turnover, costs with the new employee induction and training, costs with the recruitment and selections for the new vacancies). Thus, managers of both small and medium organizations should be aware of the importance of the selection process for the organizational performance.

While both small and medium organisations are focused on the candidates generic skills, the medium organisations seem to even stronger appreciate candidates attitude, motivation and dedication to work, orientation towards lifelong learning, resistance to stress, and computer skills. Also, medium organisations use less as a hiring decision the physical aspect of the candidates.

The present research provides useful findings for both educational institutions and graduates. When searching for a job, young graduates need to be aware about the hiring practices and employers' requirements. They should also acknowledge the differences in staffing practice existing between smaller and larger organizations, and adapt the job searching strategies to the recruitment methods used the companies they apply to. In addition, both graduates and educational institutions should be aware about the emphasis employers put on candidates' motivation to work and their generic skills.

The limits of the research regard the lack of sample representativeness. Further research should expand the analysis on larger and more representative samples, which could confer increased validity for the results. Also, of great importance would be to extend the research to the analysis of the entire range of human resource management practices implemented in organisations as a function of size and field of activity, in order to analyze their relation with the hiring practices. Moreover, of great interest would be to research the relation between the staffing practices implemented in organizations and the organisational overall performance.

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REAL EXCHANGE RATE AND CATCHING-UP PROCESS IN ROMANIA: THE BALASSA-SAMUELSON EFFECT

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Abstract: In this paper we examined the implications of the Balassa-Samuelson effect for Romanian currency (leu). Because the traditional form of the approach was only partially validated for Romania, we investigated the extended version of this model by adding the relative administered prices and net foreign assets variables. We showed that productivity in the tradable sector determined the appreciation of the real exchange rate of the leu deflated with producer prices. Also, an increase in the relative productivity from non-tradable and tradable sectors in Romania and euro zone, influenced positively the real exchange rate of the leu, deflated with consumer prices, contrary to the Balassa-Samuelson model assumptions. We explained this weak evidence of the HBS effect in Romanian case by the convergence of the administered prices and the influence of the net foreign assets, which appreciated significantly the nominal exchange rate and busted demand.

JEL classification: F31, C22

Keywords: real exchange rate, Balassa-Samuelson, relative productivity, price convergence

1. Introduction

În the period of 2004-2007, Romanian real exchange rate of leu experienced a significant appreciation. Many studies were conducted for CEE countries, which showed that the real exchange rate of their currency was appreciated in the transition period, and this appreciation was attributed to the Balassa-Samuelson effect (Jazbec, 2002, Lojschová, 2003, Mihaljek and Klau 2008).

The Balassa-Samuelson (HBS) effect was formulated in 1964, in attempt to explain the deviation of exchange rate from the PPP level. This effect was introduced by Balassa and Samuelson in 1964 and it implies that countries with high growth of relative productivity will have their currency appreciated, due to the higher relative prices in non-tradable sector of the national economy. For Euro Area joining countries, researching the HBS effect on the one side, we can provide some guidance in setting the central parity of the national currencies relative to euro and efficient managing afterwards, in the ERM II period, and on the other side, we can offer some information about potential problems with respect of fulfilling the Maastricht criteria and provide the real convergence of the economy. In

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some cases it is impossible to achieve a consistent level of inflation and nominal exchange rate with Maastricht criteria. On the other side, a monetary tightening that might be necessary to bring inflation (or exchange rate) to the Maastricht-consistent level may suppress the real growth of the economy (Blaszkiewicz et.al, 2004).

For Romania the evidence for HBS effect was provided mainly by Dumitru (2009), Dedu and Dumitrescu (2010). Dedu and Dumitrescu (2010) investigated the international version of the Balassa-Samuelson effect and found that only 0,569% of the observed inflation can be explained by the HBS effect. Therefore, it was concluded that there could be other factors than productivity differences, which influence the inflation differential between Romania and Euro Zone.

Mihaljek and Klau (2008) analyzed the internal and international versions for HBS effect for 11 CEE countries. For Romania they found that the domestic effects explain on average 2% of overall domestic inflation, and the international effects explain about 20% of inflation differential towards the euro area.

Dumitru (2009) estimated two models: in one model the administered priced were excluded, and in the second model the administered price were incorporated in the non-tradable prices. Also, he found that when the administered prices are also taken in consideration, the HBS effect on inflation is higher, about 2,18%, comparing to the level of 0,40% for the first model, when the administered prices are not considered.

In our study we extended the existent literature on the HBS effect for Romania, first by investigating the validity of the traditional version of the Balassa-Samuelson model and second, by applying an extended version of this model in order to investigate the influence of the productivity differential between Romania and euro zone on the external competitiveness. We extended the HBS model, by adding the net foreign asset position and the administered prices variables.

The traditional HBS model assumes that productivity increases are exogenous variables, and that they are driven by domestic capital formation. In our model, we assumed that productivity increases and real exchange rate appreciation of the national currency are driven by the substantial foreign capital inflows.

Also, in order to account for influence of price deregulation, which can create a spurious correlation between increases in productivity and relative prices, we investigated the influence of the administered prices on the real exchange rate.

Unlike other studies, we investigated the mechanism through which the productivity affected the real exchange rate of the Romanian leu. We estimated two models: in the first one we examined the influence of the productivity differential between tradable and non-tradable sector home and abroad on the real exchange rate deflated with consumer prices; and in the second model, we investigated the influence of the productivity differential in the tradable sector home and abroad on the real exchange rate, adjusted with producer prices. In both models, the net foreign assets variable was included, but the administered prices variable was used only in the first model.

The paper was structured as follows: in the second section we described the theoretical framework of the performed analysis, in the fourth section the validity of the HBS assumptions in Romanian case was tested, in the fifth section the empirical results of the study were presented, and in the last section we highlighted the main conclusions of the study.

2. Theoretical framework

In order to illustrate the Balassa-Samuelson model we considered a traditional two-country model, there are produced only two goods: tradable and non-tradable. In order to specify the model we assumed the following: the PPP holds for tradable goods, capital is mobile internationally and domestically, and wages tend to equalize between sectors.

Let us assume that both of economies produce identical goods tradable and non-tradable on the basis of Cobb-Douglas production function.

$$Y_T = A_T L_T^{\sigma} K_T^{(1-\sigma)} \quad (1)$$

$$Y_{NT} = A_{NT} L_{NT}^{\mu} K_{NT}^{(1-\mu)} \quad (2)$$

where, Y is the output, A – labor productivity and K- capital productivity; the subscripts T and NT denote the traded and non-traded sectors, σ and μ are output elasticities of labor and (1- σ) and (1-μ) output elasticies of capital in both sectors.

Under the profit maximization function the nominal wages (W) and the interest rate (R) should satisfy the following conditions:

$$W_T = \sigma A_T \left(\frac{K_T}{L_T}\right)^{1-\sigma}, \; W_{NT} = \mu P_{relativ} A_{NT} \left(\frac{K_{NT}}{L_{NT}}\right)^{1-\mu} \quad (3,4)$$

$$R_T = (1-\sigma) A_T \left(\frac{K_T}{L_T}\right)^{-\sigma}, \; R_{NT} = (1-\mu) P_{relativ} A_{NT} \left(\frac{K_{NT}}{L_{NT}}\right)^{-\mu} \quad (5,6)$$

where, $P_{relativ} = P_{NT}/P_T$ (relative price of non-tradables to tradables)

Under the assumptions of wage equalization and perfect capital mobility across sectors, we will have:

$$W_T = W_{NT} = W \quad (7)$$

$$R_T = R_{NT} = R \quad (8)$$

The above equilibrium conditions taken in logarithms can be expressed as follows:

$$w = \ln(\sigma) + a_T + (1-\sigma)(k_T - l_T) = \ln(\mu) + (p_{NT} - p_T) + a_{NT} + (1-\mu)(k_{NT} - l_{NT}) \quad (9)$$

$$r = \ln(1-\sigma) + a_T - \sigma(k_T - l_T) = \ln(1-\mu) + (p_{NT} - p_T) + a_{NT} - \mu(k_{NT} - l_{NT}) \quad (10)$$

Solving above equations for relative prices we get the internal version of the Balassa-Samuelson model, knows also, as Baumol-Bowen effect:

$$P_{relativ} = p_{NT} - p_T = c + \frac{\mu}{\sigma} a_T - a_{NT} \quad (11)$$

Next, let us assume that aggregate price level (P) can be decomposed into traded (P_T) and non-traded (P_{NT}) components, in the home and foreign country:

$$P = (P_T)^{\alpha} * (P_{NT})^{(1-\alpha)} \quad (12)$$

$$P^* = (P_T^*)^{\alpha^*} * (P_{NT}^*)^{(1-\alpha^*)} \quad (13)$$

where (1- α) – is share of non-traded goods in the consumption basket

The real exchange rate can be defined as a relative price of goods produced at home and abroad.

$$Q = S\frac{P^*}{P} \quad (14)$$

where Q is the real exchange rate, S - nominal exchange rate, P and P* - domestic and foreign prices

Taking the logarithms of the above equations we get:

$$p = \propto p_T + (1-\propto)p_{NT} \quad (15)$$

$$p^* = \propto^* p_T^* + (1-\propto^*)p_{NT}^* \quad (16)$$

$$q = s + p^* - p \quad (17)$$

Substituting (15) and (16) into (17) gives, the real exchange rate that can be expressed as follows:

$$q = (s + p_T^* - p_T) + [(1-\propto^*)(p_{NT}^* - p_T^*) - (1-\propto)(p_{NT} - p_T)] \quad (18)$$

The first parenthesis stands for the real exchange rate calculated with tradable prices. Assuming that the PPP theory holds for the tradable sector, this parenthesis would equal zero and the real exchange rate can be written as:

$$q = [(1-\propto^*)(p_{NT}^* - p_T^*) - (1-\propto)(p_{NT} - p_T)] \quad (19)$$

Further in our analysis, as in the other studies, we assumed that factor intensities in tradables and non-tradables are the same, and do not differ across countries, $\mu/\sigma = \mu^*/\sigma^* = 1$ (Mihaljek and Klau, 2008).

3. Data description

The domestic economies were split into two sectors: tradable and non-tradable. Due to the fact that exports are represented mainly by the industrial goods, the industrial sector of economy was used as a proxy for tradables. Some authors included also agriculture in the tradable sector of economy. In this study, we did not include agriculture, because trade in this sector is distorted by controlled prices.

We classified as non-tradable the following sectors: construction, wholesale and retail trade, and financial intermediation.

To remove seasonality and potential trend from the data, the Tramo Seats method was used. All variables were transformed into indices, with 2002 as a base year. Also, the natural logarithms of all series were used.

The sources of data were the Eurostat, UNECE and IMF IFS databases. The economies and periods considered in our study are Romania and euro area (2002Q1-2011Q2).

Real exchange rate

In order to determine the real exchange rate, we used the quarterly averages of the nominal exchange rate of leu relative to euro, and two price indices. We have chosen the consumer price index (CPI), which is an optimal price index for Romanian price levels, although many studies used also, the GDP deflator. But, considering the Romanian perspective to enter the euro zone, more appropriate index to analyze the extent to which the HBS effect could endanger the Maastricht inflation criterion, is the consumer price index. Also, we used the producer price index to account for price influences from the tradable sector on the real exchange rate.

Productivity measures

In economic literature exists two measures of productivity: labor productivity (LP) and total factor productivity (TFP).

Total factor productivity (TFP) is a more complex measure which accounts not only for labor inputs, but also capital and material inputs. Labor productivity (LP) is considered to be a partial measure for productivity, but due to its simplicity and lack of the data, previous studies used this indicator. It can be calculated as output per worker or output per hour.

In our study, in order to account for productivity differentials, we used the labor productivity variable, calculated as value added from the production side GDP estimates, relative to employment in each sector (tradables and non-tradables).

Administered prices

Solanes (2008) considers that during the economic restructuring of the CEE countries towards market economies many companies from industrial sectors pursued a profit maximization policy instead of optimizing production and employment, which led to an important reallocation of workers from industrial sector. This phenomenon and administered price convergence created a spurious correlation between labor productivity increase in tradables, and price increases in non-tradables, so called Balassa-Samuelson effect.

In order to test this hypothesis, we included in our model an additional variable of relative growth of regulated service prices in Romania and Euro Area.

Net foreign asset position

After the financial account liberalization, Romanian economy accumulated large current account deficits. In economic literature it is considered that large accumulations of the external liabilities, will force the real exchange rate to adjust in the long-run (Mussa, 1964, Nurske, 1944). In order to account for the influence of the current account position on the real exchange rate, we considered the net foreign asset position variable. To compute this variable we used the ratio of the negative of the net foreign assets to nominal GDP, both denominated in RON, where net foreign assets were calculated based on the methodology proposed by Lane and Milesi-Ferretti (2004) using below formulae:

$$NFAt=NFA_0+\Delta NFA_t \quad (20)$$

$$\Delta NFAt\approx CA_t+\Delta KA_t \quad (21)$$

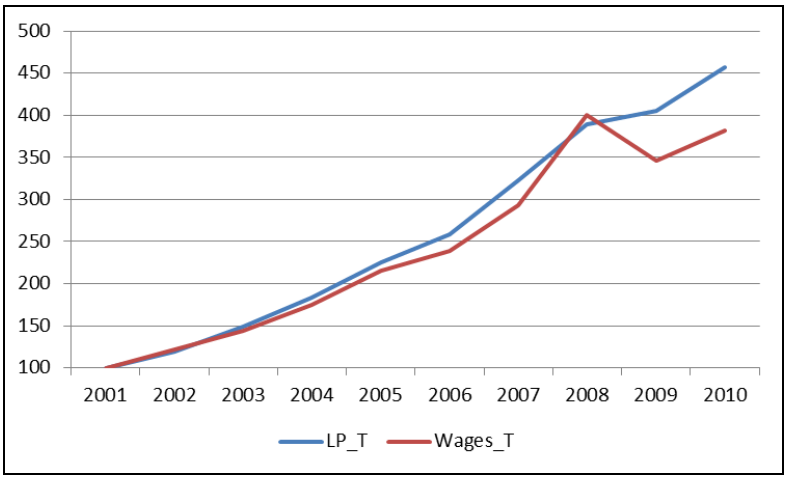
where: NFA0 – initial value of the net foreign assets, which was set to zero, CA – current account balance, ΔKA – change in capital account balance.

Also, we used two variables dummy, to account for structural breaks in series. Starting with the third quarter of 2005, Romanian National Bank applied direct inflation targeting strategy. To consider the implications of passing to this strategy on prices we used a dummy variable, which took values 1 starting from the third quarter of 2005 till 2011Q2, and 0 otherwise. The second dummy was introduced to account for implications of the capital account liberalization. The variable took values of 1 in the period 2003Q1, 2003Q2, 2003Q4, and 0 otherwise.

4. Testing the Harrod-Balassa-Samuelson hypothesis

The first step in our analysis was to check the validity of the traditional HBS effect assumptions: productivity growth drives wages in the tradable sector; wages in the tradable and non-tradable sectors tend to equalize; productivity growth in the non-tradable sector is low, about zero; PPP holds for tradable sector

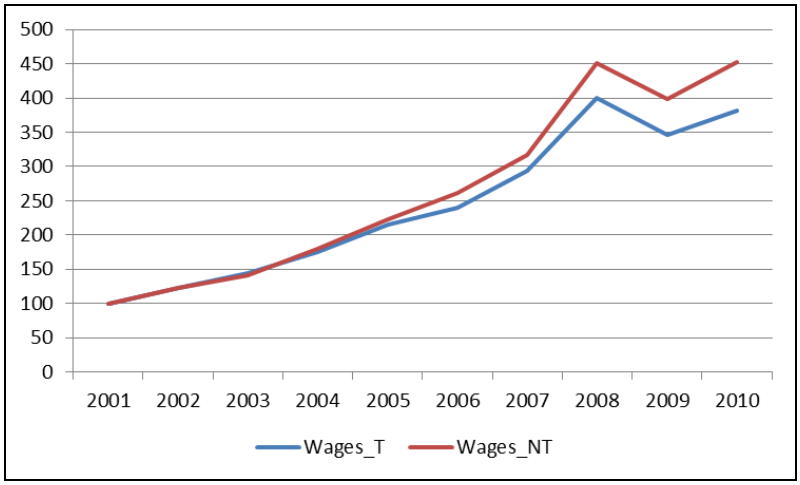
Figure 1 - Labor productivity and nominal wages in tradable sector
(index with base year, 2001=100)



Data source: Eurostat

As we can see from the figure above, the productivity growth in tradable sector drove the wage growth in the same sector, with some misalignments in the period of the financial crises. Therefore the first assumption of the HBS is valid.

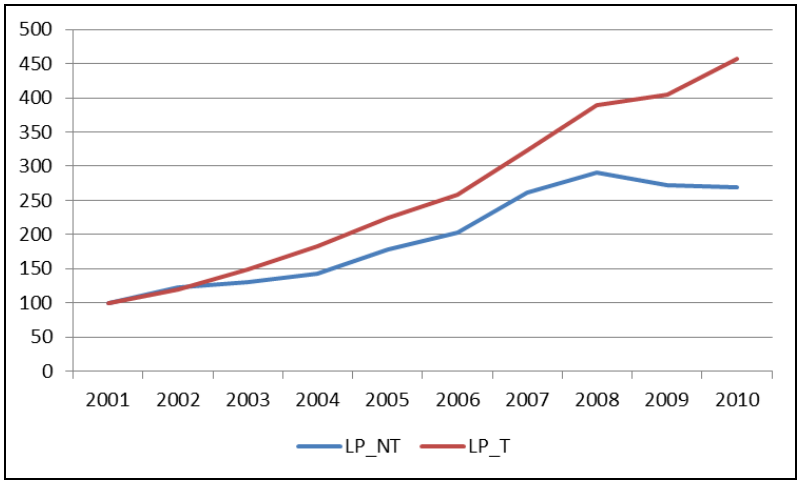
Figure 2 - Nominal wages in traded and non-traded sectors
(index with base year, 2001=100)



Data source: Eurostat

Regarding the second hypothesis of the HBS, it can be validated, too. Nominal wages in both sectors have the same trend, tending to equalize during the analyzed period of time.

Figure 3 - Labor productivity in traded and non-traded sectors (index with base year, 2001=100)

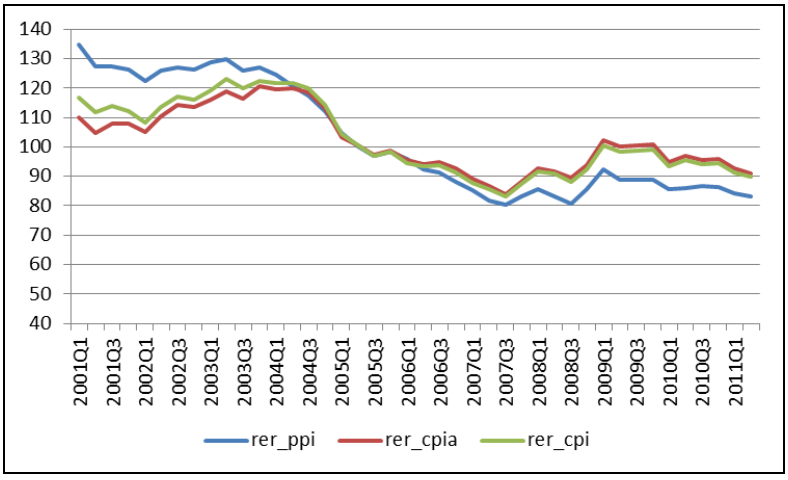


Data source: Eurostat

Also, HBS assumes that due to low productivity growth in non-tradable sector, the wage increases in tradable sector will fully translate into higher prices in this sector increasing the overall inflation rate, and determining the real exchange rate appreciation.

As we can see from the figure above, the labor productivity in non-traded sector increased significantly in the period of the real exchange rate appreciation (2005-2008), despite the assumption of the HBS model.

Figure 4 - Real exchange rates (index with base year, 2001=100)



Data source: Eurostat and UNCD

After financial account liberalization, the foreign capital inflows, besides the industrial sector, targeted also the financial sector of economy, contributing to productivity increases in both sectors by improving production technologies and providing additional know-how (Belke et al., 2009). As was stated in Egert and Podpiera (2008), in this way can be explained the weak evidence for the HBS effect, because productivity gains in non-traded sector can offset the effect of productivity gains of tradable sector on the relative price of non-traded goods, lowering the effect of the HBS.

Also, HBS assumes that the PPP holds for the traded sector, but as we can see from the figure above, the real exchange rate ppi based, appreciated considerably during the period of 2004-2007, and followed mainly the same trend as the real exchange rates cpi, and cpia based. From this we can conclude that in Romanian case, the PPP does not hold for the tradable sector, and the real appreciation of the leu relative to euro was determined mainly by the tradable sector. The growth of tradable prices can be attributed to increases in the share of higher value added goods production. Due to improvements of the quality of the produced goods in this sector, prices rose in response to the increases in labor productivity. These improvements in quality of goods in tradable sector were determined by the large foreign direct investments, which brought advanced know-how and technologies, which ameliorated the production capacities of the economy.

Because the assumptions of the traditional Balassa-Samuelson model partially failed, we extended the traditional form of the model by adding the net foreign stock variable to capture the influence of the administered prices and the foreign capital inflows on the real exchange rate.

5. Empirical results

Unit root test

In order to test the series for stationarity were applied two tests: Augmented Dickey-Fuller and Phillips-Perron tests.

With respect to the equation of the performed test, we decided to include a time trend and a constant for equation of the series in levels and a constant for the equation of the series in first differences. For productivity series for the equation in levels, we introduced an intercept, and in first differences no intercept and no trend. For net foreign asset position variable, also in first differences, we did not introduce any intercept and trend in equation.

The results of running the ADF and PP tests showed that all variables are integrated of order one (see appendix 1).

Johansen cointegration method

We estimated two models. In first model we studied the implications of the classical Balassa-Samuelson effect on the real exchange rate, deflated with consumer prices and in the second model we analyzed the influence of relative productivity growth in the tradable sector home, and abroad, on the real exchange rate, deflated with producer prices.

Given that all variables were integrated of order one, next, a cointegration test was performed, in order to identify the long-run relationship between them.

The first step was to estimate an unrestricted VAR model. In order to avoid serial correlation of the data, we chose two lags for both models. Then we performed a series residual test on VAR and we evaluated the stability of the chosen model.

As we can see from appendixes 2 and 4, both VAR models passed all diagnostic tests, except for normality test, but because the distribution shows signs of kurtosis and not skewness, we considered that VARs passed the normality test, too.

To test the presence of the cointegrating relationship between the variables, we applied Trace and Maximum-Eigen Value statistics. Trace statistic test and Maximum-Eigen value statistic indicated the presence of one cointegrating vector for the both models. For the second model the Trace statistic indicated the presence of one cointegrating vector, and Maximum-Eigen value statistic pointed out that there is no cointegration, but based on the result of the Trace statistic test, we considered that there exists one cointegrating vector (see appendixes 4 and 6).

Table 1 - Estimation of cointegrating coefficients for model 1

	lrer_cpi	**lca_ka**	**lprod**	**ladmin**
Normalized cointegrating coefficient	1.000000	-0.214683	-1.280374	1.625751
Standard error		(0.02889)	(0.13257)	(0.13559)
t-statistic		[-7.43046]*	[-9.65787]*	[11.9904]*

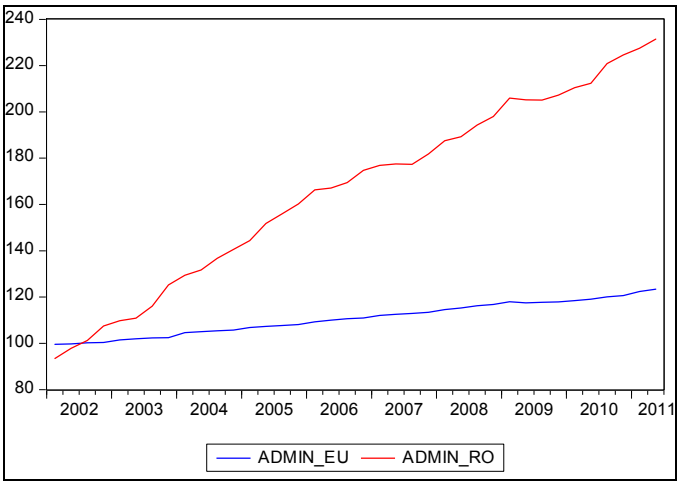
* *denotes rejection of the hypothesis at the 0.05 level*
Data source: Author's calculations

From the table above we can see that the net foreign asset position and productivity differential influenced positively the real exchange rate movements and the relative administered prices negatively.

As was expected, the deterioration in the current account balance determined a depreciation of the real exchange rate. The productivity differential variable influenced significantly the real exchange rate, but despite the HBS assumption, an increase in productivity differential determined a depreciation of the real exchange rate, not an appreciation. This can be explained by the fact that increased value added also busted the domestic aggregate demand. Due to the rigidity of the domestic supply, growing demand stimulated imports from abroad and contributed to the deterioration of the current account. In this way we can explain the positive relationship between the real exchange rate and productivity differential.

The relative administered prices also, influenced the movements of the real exchange rate. An increase in variable determined an appreciation of the real exchange rate.

Figure 5 - Administered prices (index with base year, 2002=100)



Data source: Eurostat

As we could see from the figure above, administered prices had a significant growth in the transition period, which was justified by the convergence of the domestic prices towards euro area level, which increased the overall inflation and determining the appreciation of the real exchange rate.

One of the assumptions of the HBS is that labor productivity increase in tradable sector does not affect the prices in this sector. According to this hypothesis, the increase in labor productivity in tradable sector should not affect the movements of the real exchange rate, deflated with producer prices.

But as we showed earlier, the real exchange rate deflated with producer prices followed mainly the same evolution as real exchange rate, deflated with consumer prices, indicating that the real appreciation of the leu relative to euro was determined mainly by the tradable sector.

To further investigate the possibility of persistent deviation from PPP in prices of tradable goods we analyzed the influence of the relative productivity in home country and abroad on the real exchange rate, deflated with producer prices.

Table 2 - Estimation of cointegrating coefficients

	lrer_ppi	**lprod_t**	**lca_ka**
Normalized cointegrating coefficient	1.000000	7.518005	-1.070443
Standard error		(1.33763)	(0.05953)
t-statistic		[5.62040]*	[-17.9805]*

* *denotes rejection of the hypothesis at the 0.05 level*
Data source: Author's calculations

As we can see from the table above, as in the first model, net foreign asset position influenced positively the real exchange rate, but it has greater influence than in the first model.

Regarding the relative productivity growth in the tradable sector, this variable influenced significantly the movements of the real exchange rate of leu relative to euro. But, unlike in the first model, an increase in relative productivity determined an appreciation of the real exchange rate, not depreciation.

From the results of the second model, we can conclude that, first PPP does not hold for the tradable sector. The relative productivity influenced significantly the relative prices in this sector. The failure of the PPP for the tradable sector can be explained by the increasing differentiation of goods, the presence of transaction and distribution costs (Loko and Tuladhar, 2005), and pricing to market behavior of multinational companies (Engel, 2002).

Also, analyzing the results of both models, we can conclude that the growth of the relative productivity in the tradable sector determined a significant appreciation of the real exchange rate deflated with tradable prices. But the relative productivity between the tradable and non-tradable sector home and abroad had the opposite influence on the real exchange rate deflated with consumer prices. This can be explained by the fact that the real exchange rate deflated with consumer prices was influenced significantly by the following factors: the growth of the relative administered prices, increase of the aggregate demand, stimulated by the growth of domestic product; also, the HBS model assumes that productivity growth in the non-tradable sector is near zero, but as we showed the productivity in the non-tradable sector was growing constantly over time, offsetting the effect of productivity gains in the tradable sector on the relative price of non-tradables, and consequently on the real exchange rate deflated with consumer prices.

6. Conclusions

Before the financial crisis, many CEE countries experienced a significant appreciation of their currencies. Most of the studies, performed for these countries, showed that this appreciation can be attributed to the Balassa-Samuelson effect.

In order to examine the fundamental determinants of the movements of the real exchange rate of leu we first investigated the validity of the traditional form of the Balassa-Samuelson model for Romania. We showed that the traditional form may not be appropriate for Romanian case, because not all assumption of this model were validated. But, considering the fact that Romanian economy underwent a significant catching-up process, we decided to proceed further with an extended version of the Balassa-Samuelson model. Because after the financial account liberalization, Romania accumulated large current account deficits, we considered additionally the variable of the stock of the net foreign assets.

The main findings of our study can be summarized as follows: 1) productivity differential and the current account position had a significant influence on the real exchange rate of leu relative to euro; 2) the mechanism of the transmission of the relative productivity variations into the real exchange rate movements, assumed by the traditional version of the Balassa-Samuelson model, was distorted by the influence of the structural transformation in the real sector of the Romanian economy, the consumption boom and influence of the administered prices; 3) the relative productivity in the tradable sector influenced negatively the real exchange rate deflated with producer prices, and the relative productivity in both sectors influenced positively the real exchange rate, deflated with consumer prices.

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Appendix 1

Unit roots test results

Variable	Series in levels		Series in first differences	
	ADF test	**PP test**	**ADF test**	**PP test**
lrer_cpi	-1.4634 (0.8242)	-1.7759 (0.6960)	-4.6554 (0.0006)	-4.6421 (0.0007)
lca_ka	-2.4310 (0.3586)	-2.4125 (0.3674)	-4.7801 (0.0004)	-4.8808 (0.0003)
prod	-1.6193 (0.7659)	-1.6372 (0.7584)	-6.1209 (0.0000)	-6.1211 (0.0000)
ladmin	-2.0324 (0.5649)	-2.5974 (0.2836)	-4.8942 (0.0003)	-4.8964 (0.0003)
lrer_ppi	-0.9435 (0.9397)	-1.2487 (0.8849)	-4.3780 (0.0014)	-4.3780 (0.0014)

Note: (.) denotes the associated probability
Source: Author's calculations

Appendix 2

VAR model evaluation and diagnostics (model 1)

VAR stability condition check	No root lies outside the unit circle VAR satisfies the stability condition
Autocorrelation LM test - LM-statistics - p-value	 16.7957 (0.3989) no serial correlations
Heteroskedasticity test	$\chi^2(180)=203.8560$ (0.1074) no heteroskedasticity
Normality test	*Skeweness:* $x^2(4)=6.6988$ (0.1527) *Kurtosis:* $x^2(4)= 22.7198$ (0.0001) normally distributed

Source: Author's calculations

Appendix 3

VAR cointegration test statistics

Hypothesized No. of CE(s)	Eigenvalue	Trace statistic	Maximum-Eigen value
None	0.634514	51.14955*	36.23503*
At most 1	0.235914	14.91453	9.686719
At most 2	0.089474	5.227808	3.374392
At most 3	0.050181	1.853416	1.853416

* *denotes rejection of the hypothesis at the 0.05 level*
Source: Author's calculations

Appendix 4

VAR model evaluation and diagnostics (model 2)

VAR stability condition check	No root lies outside the unit circle VAR satisfies the stability condition
Autocorrelation LM test - LM-statistics - p-value	 13.36332 (0.1468) no serial correlations
Heteroskedasticity test	$\chi^2(84)=104.3954$ (0.0652) no heteroskedasticity
Normality test	*Skeweness:* $x^2(3)=2.8006$ (0.4234) *Kurtosis:* $x^2(3)=58.7424$ (0.0000) normally distributed

Source: Author's calculations

Appendix 5

VAR cointegration test statistics

Hypothesized No. of CE(s)	Eigenvalue	Trace statistic	Maximum-Eigen value
None	0.468248	25.78586*	22.73680*
At most 1	0.067168	3.049060	2.503100
At most 2	0.015051	0.545960	0.545960

* *denotes rejection of the hypothesis at the 0.05 level*
Source: Author's calculations

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FINANCEMENT BANCAIRE DE L'ETAT ET CREDIT PRIVE: EXISTE-T-IL UN EFFET D'EVICTION AU SENEGAL?

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Abstract This paper tries to assess the consequences of the strong intervention of the Senegalese government on the financial market during the recent period. Focusing on the emerging financial market in West Africa, the reforms initiated since 1990s have helped to deepen and make more efficient the collect of national savings for the financing of investment. In order to assess the risk of crowding out effects of the large intervention of the Senegalese government on this market, an econometric approach is used. The results reveal that 100 CFAF more borrowing by government reduces private credit by about 127 FCFA. In other words, it develops a `lazy bank' model of bank behavior in Senegal. Moreover, Senegalese banks focus more around the collection of deposits, loans to large companies and Government and transfers of money. Through the recommendations made at the end of this article, our study suggests to revise the model of bank in Senegal in order to accompany the private investment. Moreover, the Senegalese government might to reduce its large public deficit for making less intervention on the financial market.

JEL Classification: O23, H62

Keywords: Government Borrowing, Private Credit, Domestic Banking Sector, Crowding Out, Private Investment, Lazy Banks

1. Introduction

Dans les pays à faible revenu, la relance de la croissance en vue de réduire la pauvreté constitue un des objectifs essentiels des politiques mises en place par les gouvernements. En effet, les systèmes financiers contribuent à la croissance et tiennent une place importante dans le financement des activités économiques. Dès lors, un système financier bien développé peut mobiliser l'épargne et l'orienter vers des investissements rentables, tout en offrant aux épargnants une liquidité élevée. La littérature économique récente est marquée par des controverses sur le rôle du secteur financier dans la croissance et le développement.

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Les contributions empiriques de King et Levine (1993), Beck et al. (2000), montrent dans leur grande tendance que le développement financier et la croissance économique sont positivement associés. Dans ce même registre, Eggoh (2010) a réexaminé la relation entre le développement financier, l'instabilité financière et croissance économique. Il conclut qu'une hausse de 1% du développement financier améliore le taux de croissance économique de 1,5%. Toutefois, il est important de remarquer une divergence entre les travaux consacrés à l'analyse du lien entre le développement financier et la croissance. De Gregorio et Guidotti (1995) ont trouvé des résultats qui révèlent une relation négative entre le développement financier et la croissance économique dans les pays d'Amérique Latine. Quant à Demetriades et Hussein (1996), à partir d'un échantillon de 16 pays, n'ont trouvé aucune preuve d'une relation de causalité entre la finance et la croissance économique. Néanmoins, dans leur grande tendance, la plupart des études concluent à l'existence d'une relation positive entre le développement financier et la croissance.

Au niveau de la zone UEMOA, le retard de développement des systèmes financiers est peut être due à la crise bancaire des années 1980 qui a été causée par les difficultés économiques de l'époque. Cette crise a entraîné la faillite de beaucoup de banques de l'espace communautaire. Les réformes amorcées, à partir des années 90, et relatives à l'assainissement du système bancaire, la réduction de la participation de l'Etat et l'amélioration de l'intermédiation financière ont permis d'approfondir et rendre plus efficace la collecte de l'épargne nationale pour assurer le financement des investissements. Toutefois, il convient de signaler que l'Etat, dans sa quête d'orientation d'allocation des ressources, de financement des projets porteurs de croissance économique, a besoin des ressources financières dont une partie peut provenir du marché financier. Jusqu'à une période récente, le recours aux avances statutaires de la Banque Centrale a été un moyen privilégié pour couvrir des besoins de trésorerie. Néanmoins, cette modalité de financement du déficit public a été jugé inflationniste. Elle peut être également une forme structurelle de financement des déficits publics et par ricochet un facteur qui inhibe l'émergence d'un marché financier capable d'accompagner les projets porteurs. Par conséquent, les avances statutaires ont été supprimées et la création d'un marché de la dette publique promue.

Depuis la suppression des avances statutaires, les emprunts publics ont fortement augmenté ces dernières années. Pour le cas spécifique du Sénégal, l'encours de la dette intérieure de l'Etat du Sénégal s'est établi à 438,3 milliards de F CFA au 31 décembre 2010 contre 339,4 milliards en 2009. Il représente 6,9% du PIB en 2010 contre 5,6% en 2009. Et les emprunts obligataires représentent l'essentiel de l'encours de la dette intérieure avec 53% contre 46,1% en 2009. S'agissant du secteur privé, le financement relativement faible des entreprises locales par le système bancaire constitue une entrave majeure pour le développement de l'initiative privée et de promotion de la croissance économique. Le climat des affaires est également caractérisé par le financement des projets des entreprises sur fonds propres. En effet, seulement 64% des entreprises sénégalaises ont accès au crédit et la distribution des crédits bancaires est plus orientée vers les grandes entreprises qui disposent d'une plus grande visibilité ou évoluant dans les sous-secteurs « commerce, bars, restaurants », les activités de rente ou celles qui sont de nationalité étrangère. De ce fait, les banques, préférant placer leur excédent de ressources dans des instruments financiers à faible risque, vont privilégier l'Etat au détriment des privés.

Or, pour stimuler la croissance, l'accès aux crédits pour le secteur privé est essentiel. Dés lors, les effets de la hausse des crédits à l'Etat sur les crédits pour le secteur privé sont devenus particulièrement important pour l'analyse des politiques au cours des deux dernières décennies. De manière générale, on désigne sous le nom d'éviction le phénomène qui conduit l'activité économique du secteur public supplanter celle du secteur privé. L'effet d'éviction des crédits privés par l'emprunt domestique de l'Etat définit comme une baisse des crédits privés lorsque les crédits à l'Etats augmentent à fait l'objet de plusieurs recherches. Les résultats des études menés sur l'effet d'éviction offrent une diversité de conclusions selon le pays. La présente étude analyse empiriquement la relation entre les emprunts publics et le crédit privé. Ce document met en lumière le montant d'éviction du crédit privé lorsque les emprunts public augmentent au Sénégal.

Le reste de l'article s'articule comme suit. La section I se porte sur la revue de la littérature, essentiellement théorique, sur les principaux facteurs devant présider l'effet d'éviction des crédits privés par les crédits à l'Etat. La section II présente les faits stylisés en analysant le financement bancaire du secteur privé et de l'Etat. Les résultats économétriques de l'évaluation de l'effet d'éviction sont présentés à la section III et la dernière section est réservée à la conclusion et aux recommandations.

2. Revue de la littérature

Plusieurs économistes ont traité la question des intermédiaires financiers dans la croissance économique. Déjà dès 1776, Smith soulignait le rôle important des institutions financières dans la croissance notamment par le fait qu'elles rendent active et productive une plus grande partie du capital. Bagehot (1873) et Hicks (1969) ont également évoqué l'implication du système financier dans le démarrage de l'industrialisation en Angleterre.

Schumpeter (1911), pour sa part, s'est penché sur l'importance du système financier dans le développement en affirmant : «on ne peut devenir entreprise qu'en ayant été préalablement un débiteur». Avec cette affirmation, il a tenté de mettre en relief, le rôle central du crédit dans l'aspiration à la croissance économique. Dans le même sillage, il indique que le crédit sert de levier à la création et à l'innovation donc au développement industriel.

De façon globale, il faut remarquer que la majorité des travaux de recherche ont établi un lien positif entre le développement financier et la croissance économique. Selon les travaux de Goldsmith (1969) et Mc Kinnon (1973), le secteur financier joue un rôle important dans le processus de la croissance économique mais il peut être limité dans un contexte de répression financière. Dès lors, la libéralisation financière entraîne un développement financier conduisant à une meilleure mobilisation de l'épargne et sa répartition efficiente pour le financement des investissements.

Le financement de l'investissement peut se faire soit par emprunt national ou international. Or, l'accès au marché international du crédit est limité pour la plupart des pays en développement. Ainsi, le financement de l'investissement se fait de plus en plus par des sources nationales. En dehors de l'impôt, le financement des investissements publics est également assuré par les emprunts obligataires réalisés par les Etats, ainsi que par le recours occasionnel à des emprunts auprès de leur Banque centrale (planche à billets). Même si le financement domestique du besoin des Etats joue un rôle important, il n'en demeure pas moins que l'emprunt

public auprès du système financier domestique peut créer des banques « paresseuses» c'est-à-dire des banques qui préfèrent octroyés des crédits à l'Etat qu'au secteur privé. La présence de banques « paresseuses » au sein d'une économie peut avoir pour conséquence de relever les taux d'intérêts donc limiter l'accès au crédit du secteur privé.

De ce constat découle une abondante littérature économique sur l'impact de l'emprunt public sur l'activité économique. Ducoudré (2005) cherche à analyser les effets de la politique budgétaire sur les taux d'intérêt, d'un point de vue théorique comme d'un point de vue empirique. Ainsi, il a montré que la politique budgétaire n'a pas d'effet mécanique sur les taux d'intérêt. Les effets dépendent plutôt de la coordination entre la politique budgétaire et monétaire (policy mix)) et du régime dans lequel se trouve l'économie. Toutefois, il ressort des analyses empiriques que la distinction entre effets d'éviction et effets de court terme peut être délicate.

Après avoir souligné l'importance théorique et empirique du débat sur les effets d'éviction ou de renforcement, Roselière et Bouchard (2011), à partir des données d'une enquête portant sur l'économie sociale de Montréal, ont mis en évidence un effet de renforcement. Aussi ont-ils souligné qu'une augmentation de 1% des subventions publiques entraine une hausse de 0,15% des ventes c'est-à-dire un effet de renforcement de 10 cents de ventes supplémentaire pour 1$ de subvention ?

La littérature sur l'éviction dans le contexte des pays développés se concentre sur les effets de la dette du gouvernement ou du déficit sur le taux d'intérêt d'équilibre. Blanchard (2007) montre une relation faible entre la dette publique et le taux d'intérêt. Dans ce registre, des études ont montré la présence d'un effet d'éviction du crédit privé découlant d'une hausse des emprunts publics. Raymond (1993) a, dans ce sens, supposé tout en ne niant pas la présence d'un effet d'éviction par le taux d'intérêt, la possibilité d'un effet d'éviction qui est fonction de la relation qui subsiste entre les dépenses publiques et privés.

Pour ce qui est des pays en développement, Emran et Farazi (2009) ont, pour leur part, estimé l'ampleur de l'effet d'éviction des emprunts publics sur le crédit privé en utilisant les données de 60 pays. A cet effet, ils ont trouvé qu'il existe un effet négatif significatif des emprunts du gouvernement sur le crédit privé. En d'autrement termes, dans ces pays, lorsque l'emprunt public augmente de 1$, le crédit privé baisse de 1,4$. Dans le même sillage, Esam (2012) a étudié l'effet d'éviction en Egypte en cherchant à montrer l'effet d'éviction des emprunts publics sur l'investissement privé tout en privilégiant le volume du crédit privé. Il conclut l'existence d'un effet d'éviction des emprunts publics sur le crédit privé à long terme. Toutefois, dans le court terme les emprunts publics n'ont pas d'effet significatif sur le crédit privé. Au total, il préconise la rationalisation des emprunts publics auprès des sources nationales.

En présence d'un effet d'éviction des emprunts publics sur le crédit privé, il est naturel de s'interroger sur l'existence d'un effet d'éviction de l'investissement privé par celui public. C'est dans ce cadre qu'il faut inscrire les travaux de Chakraborty (2006) qui montre qu'en Inde, au cours de la période 1970-2003, il n'y a pas d'effet d'éviction de formation du capital privé par les investissements publics. Blejer et Khan (1984) se sont intéressés aussi à l'étude de la possibilité de l'existence d'une relation de complémentarité ou de substituabilité entre l'investissement public et l'investissement privé dans les pays en développement. Leur étude a porté sur le comportement de l'investissement privé dans 24 pays en

développement qui a abouti à la conclusion selon laquelle le niveau de l'investissement privé est positivement lié à la variation du PIB réel anticipé et négativement influencé par l'excès de la capacité de production. Dans le même ordre d'idées, Demetriades et Mamuneas (2000), ont montré que le capital public est complémentaire, à la fois au travail et au capital privé. En d'autres termes, une augmentation de 1% de capital public engendre une augmentation de capital privé de 0,5% en Belgique et de 0,07% en Grande-Bretagne. Mamatzakis (1999) et Conrad et Seitz (1992) ont trouvé les mêmes résultats respectivement pour la Grèce et l'Allemagne. En utilisant les séries chronologiques pour différents pays en développement, Atukeren (2005) a montré que pour des économies comme le Pakistan, le Maroc et l'Afrique du Sud, les deux types d'investissement sont plutôt complémentaires. Dans cette même lancée, Erden et Holcombe (2005, 2006) ont conclu que les investissements publics et privées sont complémentaires dans les pays en développement.

Greene et Villanueva (1991) ont interprété la relation entre les investissements publics et ceux privés comme « une complémentarité à long terme et une substituabilité à court terme entre l'investissement public et l'investissement privé. En ce sens qu'une augmentation à court terme de l'investissement du secteur public semble évincer l'investissement du secteur privé ».

Aschauer (1989) et Erenburg (1993) ont examiné à un niveau agrégé l'impact des infrastructures publiques sur l'investissement privé et ont montré une corrélation positive. C'est ainsi que, l'investissement public stimulerait l'investissement privé au Pakistan (Haque et Montiel, 1991, 1994) et au Zimbabwe (Morande et Schmidt-Hebbel, 1991, 1994).

Pour d'autres études empiriques, l'investissement public évincerait l'investissement privé au Chili (Marshall et Schmidt-Hebbel, 1991, 1994), en Colombie (Easterly, 1991, 1994), au Ghana (Islam et Wetzel, 1991) et au Mexique (Semerena, 1991; Aschauer et Lachler, 1998). En outre, une étude très robuste de Furceri et Sousa (2009), en utilisant un échantillon de 145 pays sur la période 1960 à 2007, conclut que l'augmentation des dépenses gouvernementales a un impact négatif sur la consommation et l'investissement privé. En l'occurrence, ils trouvent qu'une augmentation de 1% du PIB engendre une réduction de 1.9% de la consommation et de 1.8% de l'investissement.

Pradhan, Ratha, et Sarma (1990) ont montré que l'augmentation des investissements publics en Inde aurait engendré une diminution des investissements privés entre 1960 et 1981. Ce résultat est lié à la réduction du crédit au secteur privé ou à la hausse des taux d'intérêts née d'une augmentation du déficit budgétaire consécutive à une hausse des investissements publics. Au Sénégal, Fall et Diagne (2007) ont montré que les infrastructures publiques jouent un rôle important dans la croissance de la productivité des entreprises, à travers la réduction du coût de production. Toujours dans le même ordre d'idées, Diané et Fall (2007) ont tenté d'apprécier la nature de la relation entre la politique budgétaire et la croissance économique au Sénégal en montrant que l'impact de la politique budgétaire sur la croissance est conditionnel à l'évolution du stock de la dette publique. En effet, la politique budgétaire au Sénégal est keynésienne lorsque l'endettement extérieur est inférieur à 69% du PIB. Ce qui n'est pas le cas lorsque l'endettement est supérieur à ce seuil.

D'après certains résultats empiriques, la hausse des emprunts publics domestiques exercent un effet d'éviction sur le crédit privé ce qui entrainerait une baisse de l'investissement privé. La divergence des conclusions des travaux

empiriques sur l'effet d'éviction du crédit privé par les emprunts publics montre que ceux-ci peuvent stimuler l'investissement privé tout autant qu'elles peuvent l'évincer. En conséquence, la nature du lien existant entre les emprunts publics et les crédits privés dépend de plusieurs facteurs propres à l'économie du pays considéré. Ceci nous conduit à étudier l'effet d'éviction du crédit privé par les emprunts publics pour le cas du Sénégal.

3. Faits stylisés

Les marchés de capitaux tiennent une place importante dans le financement des activités d'une économie. Ils contribuent à la croissance économique par le canal de l'innovation technologique et l'accumulation de capital. Un système financier bien développé peut mobiliser l'épargne et l'orienter vers des investissements rentables à grande échelle, tout en offrant aux épargnants une liquidité élevée. Ces constats découlent de la faiblesse de l'approfondissement du marché financier sénégalais. En effet, le ratio de la masse monétaire au sens large au PIB est passé de 34,1 % en 2004 à 39,2 % en 2011 alors que le ratio du crédit intérieur au secteur privé au PIB affiche une évolution similaire, passant de 22,7% en 2006 à 25,9% en 2010[1]. Au même moment, les pays à revenu intermédiaires[2] d'Afrique au Sud du Sahara dont le Sénégal fait partie ont vu leur ratio de la masse monétaire au sens large au PIB passer de 57,6% en 2004 à 69,2% en 2011. Pour ce qui est du marché boursier régional, il a connu une croissance modérée au cours de ces dernières années et sa taille demeure modeste. Sa capitalisation en pourcentage du PIB[3] est passée de 24% en 2006 à 31% en 2010 et la liquidité[4] est restée très faible par rapport à d'autres bourses d'Afrique subsaharienne.

3.1. Secteur bancaire sénégalais

Pour ce qui est du secteur bancaire, le Sénégal occupe la deuxième place dans l'UEMOA avec 21 banques en 2010 derrière la Côte d'Ivoire soit 25% de l'actif du système financier de la région. De plus, le secteur bancaire sénégalais continue d'attirer de nouvelles institutions financières comme en témoigne l'entrée récente dans le secteur de banques nigérianes, marocaines et sous-régionales et le crédit bancaire à l'économie a progressé de 19% en 2011 soit 29% du PIB et est aujourd'hui supérieur à ceux des pays de la sous-région de l'Afrique de l'Ouest. A cela, il faut ajouter une forte progression du nombre d'agences bancaires (11%) et du nombre de comptes bancaires (44%). En 2011, les banques constituent environ 90% du système financier dont les cinq plus grandes banques représentent 66%

[1] Ratio du crédit intérieur au secteur privé au PIB : le Botswana (18,4% en 2006, 23,4% en 2010) ; Ile Maurice (74,2% en 2006, 87,8% en 2010) ; Cap-Vert (44,8% en 2004, 62,5% en 2010) ; le Ghana (11,1% en 2006, 15,2% en 2011).

[2] Masse monétaire au sens large au PIB: le Botswana (41,8% en 2004, 41,6% en 2011) ; Ile Maurice (90,2% en 2004, 102,8% en 2011) ; Cap-Vert (76,2% en 2004, 69,0% en 2011) ; le Ghana (20,4% en 2004 ; 32,6% en 2011) ; Afrique subsaharienne (37,1% en 2004, 47,4% en 2011).a

[3] Ghana: 15,8% en 2006 à 10,9% en 2010 ; Ile Maurice : 55,3% en 2006, 66,9% en 2010; Botswana : 35,1% en 2006, 27,4% en 2010.

[4] La liquidité du marché boursier régional peut être mesurée comme valeur des actions négociées en proportion du PIB.

des actifs et captent 79% des dépôts (FMI (2012)). Par ailleurs, ces dernières années, tirant les leçons de la crise bancaire des années 80, une politique de renforcement de la surveillance de la qualité des crédits octroyés est de rigueur afin de préserver la solidité du système bancaire et renforcer la capacité à mobiliser les ressources nécessaires à la satisfaction des besoins du secteur public et privé. Pour l'essentiel, il faut dire que le modèle de banque au Sénégal peut se résumer autour de la collecte de dépôts, des prêts aux grandes entreprises, y compris les filiales de multinationales, les transferts d'argent et de la détention et négociation de titres publics. Toutefois, l'accentuation de la concurrence découlant de l'arrivée banques africaines pousse les banques traditionnelles à diversifier leurs activités.

Au titre de l'analyse sectorielle des crédits, ils sont destinés pour l'essentiel au secteur des services en raison de sa prédominance dans le tissu économique.

Pour ce qui de la solidité financière du secteur bancaire, FMI (2012) a révélé qu'au Sénégal le ratio capital sur actifs pondérés en fonction des risques se situe en 2011 à 16% pour minimum réglementaire de 8%. Ce niveau de capitalisation est à mettre en rapport avec le volume élevé des titres publics au risque nul. Du côté de la rentabilité du secteur bancaire, il faut dire qu'elle est assez élevée avec des rendements des actifs après impôts et des fonds respectifs de 2,2% et 22,6% en 2011. De même, en 2011, la marge d'intérêt moyenne se situe à 6,4% alimentée par un taux d'intérêt moyen sur les prêts très favorable (8,4%) alors que le coût moyen des fonds empruntés demeure très faible (2%). Cette rentabilité élevée des banques est, en réalité, favorisée par les dépôts abondants et bon marché des ménages utilisés pour acheter des titres publics sans risque et à taux élevés.

S'agissant de la liquidité des banques, les actifs liquides sur le total des actifs se situe à 74,9% en 2011 contre 66,5% en 2003 reflétant un niveau de liquidité élevé. Toutefois, cette situation ne profite pas globalement à l'économie à raison de la forte asymétrie d'information donc un nombre limité de projets finançables, à la réglementation qui oblige les banques à financer dans une large mesure leurs actifs à moyen et long terme par des ressources à moyen et long terme et des règles internes des maisons mères qui limitent les placements de leurs filiales. Au total, les risques de liquidités sont faibles et les banques préfèrent conserver leurs fonds sous forme liquide.

3.2. Le Marché des titres publics

Ce marché donne aux Etats, l'opportunité de moderniser le mode de financement des trésors publics. En 2011, les émissions annuelles de titres publics du Sénégal constituaient près de 6,1% du PIB et 32,4% des recettes fiscales. En 2012, il est prévu un volume d'émissions d'un montant total de 518 milliards FCFA soit 7,2 % du PIB et 36,7% des recettes fiscales. Elles ont progressé tant en termes nominaux qu'en pourcentage du PIB et des recettes fiscales respectivement de 55,2%, 46,1%, 42,1% entre 2009 et 2012.

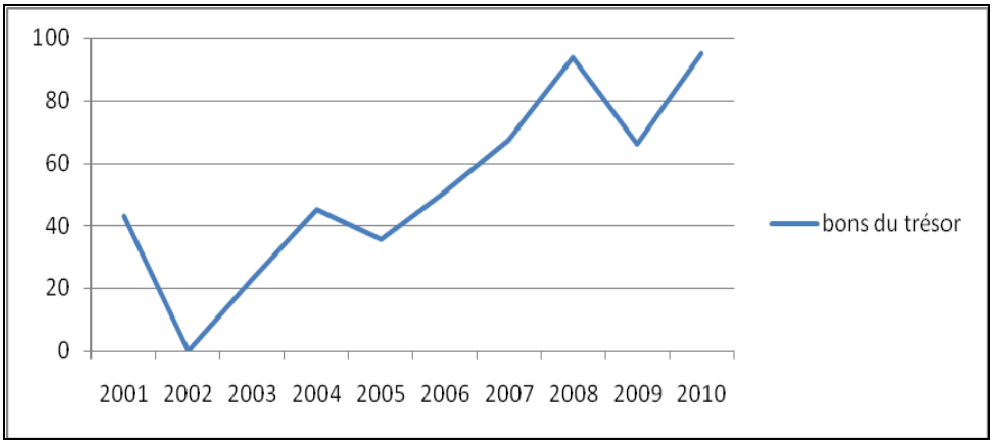
Toutefois, les emprunts publics restent dominés par les titres de court terme. S'agissant des instruments utilisés sur ce marché, on en recense deux types:

- les bons du Trésor : titres à court terme, d'une durée comprise entre 7 jours et 2 ans, utilisés pour la gestion de trésorerie ;
- les obligations du Trésor : titres à moyen et long termes de durée strictement supérieure à 2 ans, utilisés, notamment pour le financement des investissements.

3.2.1. Les Bons du Trésor

Entre 2001-2011, les émissions de Bons de Trésor ont fortement augmenté pour atteindre 247 milliards en 2011 et permis de financer en moyenne 30% du déficit public par année. Toutefois, il faut relever depuis 2011, les bons du Trésor financent plus de la moitié du déficit public. Au plan régional, le Sénégal est devenu le second animateur du marché sous-régional derrière la Côte d'Ivoire avec un poids de 25% des bons de trésor.

Graphique 1 : Emission de Bons de Trésor en milliards de FCFA



Source: *Direction de la Prévision et des Etudes Economiques*

3.2.2. Les emprunts obligataires

La première opération du genre remonte en 2005 avec l'emprunt obligataire pour un montant de 45 milliards pour financer le Programme d'Amélioration de la Mobilité Urbaine (PAMU). Depuis lors, le Sénégal a également levé plusieurs fois des emprunts obligataires. En 2011, sur les 518 milliards d'émissions totales, les emprunts obligataires ont représenté 206 milliards soit 40% des titres publics. Par ailleurs, ils représentent 3% du PIB en 2011 et dépassent les tirages sur ressources extérieures.

I. Approche économétrique de la relation entre les crédits à l'Etat et les crédits à l'économie au Sénégal

Dans une tentative d'évaluer la relation entre les emprunts publics et le crédit au secteur privé, le modèle de base spécifie le crédit au secteur privé par le secteur bancaire en fonction des emprunts du gouvernement, le PIB, le taux d'intérêt, le niveau de liquidité. On a :

$$CP_t = \alpha_0 + \alpha_1 CE_t + \alpha_2 LPIB_t + \alpha_3 \left[\frac{MM}{PIB}\right]_t + \alpha_4 TX_t + \varepsilon_t \quad \text{(Modèle 1)}$$

où CP est le crédit au secteur privé en pourcentage du PIB ;
CE représente les crédits à l'Etat en pourcentage du PIB ;

LPIB est le log du produit intérieur brut (PIB) ;

MM/PIB est le ratio de la masse monétaire sur le PIB elle nous renseigne sur la bancarisation ;

TX est le taux d'intérêt réel ;

ε est le terme d'erreur.

a) Les signes attendus des coefficients des variables explicatives

- Le coefficient des crédits à l'Etat négatif implique que la hausse des crédits à l'Etat par les banques nationales entraine une contraction temporaire de la liquidité, provoquant ainsi une hausse des taux d'intérêts et une baisse du crédit privé. $\alpha_1 < 0$ alors il y'a effet d'éviction du crédit privé par l'emprunt public.
- Un taux d'intérêt élevé entraine une augmentation du coût des emprunts et une baisse du crédit privé. Le signe attendu est par conséquent positif.
- Un niveau de liquidité (masse monétaire sur PIB) élevé faciliterait l'accès au crédit donc le signe attendu est positif
- Le coefficient du log du PIB devrait être positif dans le sens une activité économique favorable alimente les crédits au secteur privé.

b) Données et méthodes d'estimations

Les données utilisées couvrent la période 1976-2010 et sont issues de la base de données statistiques de la BCEAO. Dans le but de tester les propriétés stationnaires des séries, les tests de racine unitaire sont appliqués (ADF). Ensuite, un test de cointégration pour identifier l'existence ou non d'une relation de cointégration entre les séries. Enfin, un modèle à correction d'erreur est estimé.

c) L'analyse des résultats des tests[5]

Les résultats des tests ADF sont récapitulés dans le tableau suivant

Tableau 1 : Test de racine unitaire

	VARIABLE	T-STAT	RESULTAT
Variables en niveau	CP	- 1 .56	non stationnaire
	CE	-1.88	non stationnaire
	LPIB	-2.39	non stationnaire
	MM/PIB	-1.9	non stationnaire
	TX	-3.2	non stationnaire
Variables en difference premiere	D(CP)	-4.51	stationnaire
	D(CE)	-5.90	stationnaire
	D(LPIB)	-5.39	stationnaire

[5] Les résultats des estimations sont récapitulés dans un tableau en annexe

VARIABLE	T-STAT	RESULTAT
D (MM/PIB)	-4.04	stationnaire
D(TX)	-5.4	stationnaire

Les tests statistiques de stationnarité ADF (Dickey-Fuller augmenté) font ressortir que toutes les variables sont non stationnaires en niveau mais qu'elles sont stationnaires en différence première c'est-à-dire intégrées d'ordre un I(1). Comme, toutes les variables sont au même niveau d'intégration, il est possible d'effectuer un test de cointégration.

Tableau 2: Test de cointégration

Trace statistics	Valeur critique a 5%	Rang de cointegration
83.4	60.1	1
37.0	40.2	0
11.6	24.3	0
5.2	12.3	0
1.1	4.1	0

Ainsi, le test de cointégration de Johansen effectués sur les séries indique qu'il existe une relation de cointégration au seuil de 5% ; ceci montrent que les variables crédit au secteur privé et crédit à l'Etat sont cointégrées et qu'il y'a une relation de long terme entre ces variables.

L'estimation de la relation de long terme par la méthode des moindres carrés ordinaires donne :

$$CP_t = \underset{(11,51)}{1,10} + \underset{(1,73)}{0,97}\,CE_t - \underset{(8,17)}{0,14}\,LPIB_t + \underset{(5,14)}{0,99}\left[\frac{MM}{PIB}\right]_t + \underset{(1,24)}{0,17}\,TX_t$$

Les chiffres entre parenthèses sont les t-statistiques.

A long terme, le coefficient associé aux crédits accordés à l'Etat est positif donc il n'y a pas d'effet d'éviction du crédit privé. Il faudra noter qu'au seuil de 5% les coefficients des crédits à l'Etat et du taux d'intérêt réel ne sont pas statistiquement significatifs. Ce qui signifie que les emprunts du gouvernement et le taux d'intérêt réel n'ont pas d'effet significatif sur le crédit privé dans le long terme. Ceci est peut être dû au fait que l'Etat à recours au marché international et aux bailleurs bilatéraux et multilatéraux pour ses emprunts à long terme. Le signe négatif du coefficient du LPIB pourrait s'expliquer par la faiblesse des crédits à long terme accordés au secteur privé or ceux sont ces crédits qui sont porteurs de croissance. En outre, l'impact négatif de la production (LPIB) reflète le fait que l'économie n'est pas assez grande pour assumer les coûts fixes impliqués dans la mise en place d'institutions de crédit (Fayed (2012)).

La dynamique du modèle à court terme est analysée à travers le modèle à correction d'erreur (MCE). Les résultats de l'estimation du modèle se présentent comme suit:

$$\Delta CP_t = \underset{(-0,44)}{-0,0034} \underset{(2,06)}{-0,416}\,\Delta CE_t \underset{(-0,80)}{-0,024}\,\Delta LPIB_t + \underset{(4,33)}{0,66}\,\Delta\left[\frac{MM}{PIB}\right]_t + \underset{(1,29)}{0,11}\,\Delta TX_t \underset{(-2,15)}{-0,35}\,RESIDU_{t-1}$$

$RESIDU_{t-1}$: est le résidu retardé de la relation de long terme.

Le coefficient de rappel (-0,35) est significatif et négatif rappelant que le modèle a tendance de revenir à son niveau d'équilibre à long terme à chaque fois qu'il s'éloigne. Par ailleurs, à court terme, les coefficients du ratio masse monétaire sur PIB et des crédits à l'Etat sont statistiquement significatif.

Le coefficient des crédits à l'Etat est négatif (-0,416) ce qui laisse apparaître un effet d'éviction. En d'autres termes, on peut dire qu'à court terme une augmentation de 100 FCFA des emprunts publics auprès du secteur bancaire réduirait le crédit privé d'environ 42 FCFA. La présence d'effet d'éviction est renforcée par les conditions restrictives d'octroi de crédit pour le secteur privé comme en atteste le signe positif du coefficient relatif au taux d'intérêt.

Pour approfondir la question, on a estimé une deuxième version du modèle en remplaçant le financement bancaire net de l'Etat par les crédits à l'Etat (CSAC). Le modèle devient alors :

$$CP_t = \beta_0 + \beta_1 CSAC_t + \beta_2 LPIB_t + \beta_3\left[\frac{MM}{PIB}\right]_t + \beta_4 TX_t + \varepsilon_t \text{ (Modèle 2)}$$

Les mêmes exercices de tests de stationnarité et d'existence de relation de cointégration ont été menés et ont abouti aux résultats déclinés dans les tableaux ci-dessous.

Tableau 3 : Test de racine unitaire

	Variable	**T-stat**	**Resultat**
Variables en niveau	CP	-0.5	non stationnaire
	CSAC	-2.26	non stationnaire
	LPIB	-4.31	stationnaire
	MM/PIB	-1.26	non stationnaire
	TX	-3.78	non stationnaire
Variables en différence première	D(CP)	-7.82	stationnaire
	D(CE)	-4.70	stationnaire
	D(LPIB)	-9.67	stationnaire
	D (MM/PIB)	-6.06	stationnaire
	D(TX)	-7.06	stationnaire

Au total, les tests de cointégration et de racine unitaires sont concluants et permettent d'établir les relations de long et le modèle à correction d'erreurs.

Tableau 4 : Test de cointégration

Trace statistics	Valeur critique a 5%	Rang de cointegration
114.6	60.1	1
56.1	40.2	1
19.5	24.3	0
9.4	12.3	0
3.1	4.1	0

L'estimation de la relation de long terme est résumée comme suit :

$$CP_t = \underset{(11,28)}{1,05} \underset{(-1,17)}{-0,72}\, CSAC_t \underset{(-8,71)}{-0,14}\, LPIB_t + \underset{(6,88)}{1,22}\left[\frac{MM}{PIB}\right]_t + \underset{(0,78)}{0,11}\, TX_t$$

Pour ce qui est des analyses, il faut dire qu'à long terme il apparaît clairement un effet d'éviction contrairement à la première version du modèle. Ainsi, lorsque les emprunts publics augmentent de 100 FCFA les crédits accordés au secteur privé baissent de 72 FCFA.

Pour ce qui est de la dynamique de court terme, l'estimation du modèle à correction d'erreurs donne :

$$\Delta CP_t = \underset{(-0,94)}{-0,004} \underset{(-2,23)}{-1,27}\, \Delta CSAC_t \underset{(-1,23)}{-0,03}\, \Delta LPIB_t + \underset{(2,71)}{0,6}\, \Delta\left[\frac{MM}{PIB}\right]_t + \underset{(1,49)}{0,13}\, \Delta TX_t \underset{(-2,38)}{-0,35}\, RESIDU_{t-1}$$

Autrement dit, à court terme une hausse de 100 FCFA des crédits à l'Etat entraine une baisse des crédits du secteur privé de 127 FCFA. Ce résultat est tout à fait compatible avec celui de Emran et Farazi (2009) qui ont trouvé que dans les pays en développement une hausse de 1$ des crédits à l'Etat réduit les crédits accordés au secteur privé de 1,4$. Il faudra noter que le coefficient de la force de rappel (-0,35) reste inchangé aussi bien dans les court et long termes traduisant ainsi le fait que deux types de variables comme proxy des emprunts publics met en évidence l'effet d'éviction des crédits privés mais avec des proportions différentes selon que l'Etat emprunte à long ou à court terme. Globalement, il faut dire qu'au Sénégal il existe un effet d'éviction des crédits accordés aux secteurs privés par les crédits à l'Etat, cependant, ce dernier est plus important à court terme qu'à long terme. Ce résultat est à mettre en relation avec la prédominance des crédits de court terme des banques et des différents facteurs structurels qui expliquent les faibles risques de liquidité du secteur bancaire malgré l'abondance des fonds. En effet, nonobstant le fait que les actifs liquides représentent plus de 66% du total des actifs des banques sénégalaises en 2011, les institutions financières préfèrent faire des placements sur des actifs peu risqués (titres publics). Ce modèle de banque paresseuse est encouragé par les problèmes d'asymétrie de l'information, la réglementation de leurs maisons mères qui les obligent à trop peu s'engager.

Tout cela milite pour la conservation des fonds des banques sous forme liquide et créant ainsi un nombre limité de projets financés.

4. Conclusion

Avec les chocs économiques qui ont éprouvé le Sénégal, les finances publiques sont devenues moins étincelantes comme ce fut le cas entre 1995 et 2005. Pour financer son déficit et effectuer ses dépenses, l'Etat sollicite de plus en plus le marché financier. Ainsi, les interventions publiques sur ce marché ont alimenté le débat portant l'existence d'un effet d'éviction. Pour rappel, il faut dire qu'en 2012, les émissions annuelles de titres publics du Sénégal constituent près de 7,2 % du PIB et 36,7% des recettes fiscales. Elles ont progressé tant en termes nominaux qu'en pourcentage du PIB et des recettes fiscales respectivement de 55,2%, 46,1%, 42,1% entre 2009 et 2012.

Les analyses économétriques montrent qu'une hausse des crédits à l'Etat entraine une baisse des crédits accordés au secteur privé avec une ampleur de l'éviction plus importante à court terme. Cette situation confirme l'idée de l'existence de banques paresseuses. Pour l'essentiel, une banque typique au Sénégal se résume autour de la collecte de dépôts, des prêts aux grandes entreprises, les transferts d'argent et de la détention et négociation de titres publics. Ce modèle est encouragé par les problèmes d'asymétrie de l'information, la réglementation de leurs maisons mères qui les obligent à trop peu s'engager.

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