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Mircea Dinu
Tel.: (+4) 031.432.96.02
Fax: (+4) 021.210.73.10
E-mail: comenzi@edecon.ro

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Private brand – differentiating concept and source of stimulation of the Romanian retail trade

Ion ANGHEL
The Bucharest University of Economic Studies, Romania
ion.anghel@cig.ase.ro
Anca Maria HRISTEA
The Bucharest University of Economic Studies, Romania
anca.hristea@cig.ase.ro

Abstract. *Recent studies show the importance of the private brand in the stimulation of retail sales. This paper has three main scopes: to evaluate the consumers' attitude towards the retailers' private brand according to the satisfaction and loyalty levels; to show the role of private brands in the consumers' preferences; and to identify the key factors of success in private brands commerce. The authors have selected the descriptive method, the questionnaire, by performing a survey among the loyal customers of four Metro Cash and Carry stores, which represent a representative sample. The final conclusion is that the private brand is the cornerstone completing the puzzle game on a strongly competitive consumer market.*

Keywords: private brand, retail, quality-price ratio, merchandizing, loyalty program.

JEL Classification: D49, L22, L81, M3, O12.

Introduction

In the current global context, when the economic recession tends to prolong, with repercussions on the quality of life, and the competition in retail sales has reached the highest peak ever, the durable criteria approach of trade activities has become a must. Consumer market segmentation is currently considered the "breath of life" resuscitating the final distributors through innovative and competitive levers.

This paper aims to analyze the consumer's behaviour towards the retail traders' private brands and the impact that the private brand may have on the sales volume. The scope of this paper is to present the results of the study performed by the authors, in the sense of the evaluation of the interest shown by customers towards the retailers' private brand products ranges and of the determining factors which had an important contribution in the last few years to the transformation of private brands into competitive means, not just in large distribution networks, but also between them and large producers.

In order to identify the variables which are necessary for the research, we made a synthetic presentation of opinions of the specialized literature and we have highlighted the phase of the knowledge of the utilized concepts. The scope of this approach was to create a fusion between the existing scientific opinions in the field and the trade practices developed up to the present.

The retail trade science is governed by the multiple models and directions. Thus, Mc Nair (1958), Hollander (1966), Davidson, Bates and Bass (1976) studied the evolution of *en detail* sale forms and referred to the need to permanently introduce innovative concepts in this extremely dynamic field, in order to generate revenue margins (Hirschman, 1978; Filser, 1984) and new market niches.

During the last years, at the same time as the start of the global crisis, we have witnessed profound mutation at international level, which contributed to the development of new commercial technologies and caused changes in the power ratio between various retail trade forms (Barth and Anteblian, 2011). We are witnessing a structural transformation of the consumer market architecture, through the exploitation of the interests of all classes of clients or purchase occasions (Haan, 2011). Girod (2003) showed that brand consolidation has a special role in building the company image in the field of retail trade. Renowned paper and research authors in the field (Kumar and Steenkamp, 2013) believe that promoting sales through the retailers' private brand, anchored in a permanently innovative activity, may create the greatest success, because in this manner offer is fully adapted to needs (Lamey et al., 2007), in order to attract new clients and conquer new markets. Recent studies performed in the developed European countries evidence the increasing importance that important retailers give to the promotion and diversification of their private branded products offer (Moati and Rochefort, 2008).

The research performed in this paper starts from the studied specialized literature, from the conclusion of elaborate studies in the field of retailers' private brands, which were performed in the markets of developed countries (Canada, France, Belgium, Austria) or by various international renowned networks of retailers, specialized items and opinions from the management of economic entities in this field in Romania.

The questions for which the authors sought answers refer to the perception which the clients have on the private brand products of the retailer and the proportion in which these products are adequate for the consumers' needs. The results of this analysis confirm the tendency evidenced at global level (Evans, 2011), that in the last few years we witness an important increase in the demand for private brand products, implicitly, a modification of the sales structures for retailers, this being the reason for which large retailers focus more on this commerce niche. Among the main factors contributing to the change in the consumers' tastes we can enumerate: the purchase power, the quality/price ration, the discount policy, the exclusive character of certain private brand products, the promotional policy, merchandising and the visibility of this category of products in the sales area or the sale of products of superior quality compared to the producers' brands. On the other hand, most of the important "trading coaches" have very clear procedures regarding the merchandising of their private brand and policies for the stimulation of the private brand products sales, as levers for attracting and building customer loyalty, as "players" in an extremely dynamic and competitive market.

1. General aspects regarding the retailers' private brand

On a long term perspective, the retail trade evolution is marked by profound transformations, shown as a succession of phases in time (Chevalier and Mayzlin, 2007). History has proven that, during periods of economic turbulences, sustainable innovative concepts are tested and adopted, followed by medium to long periods of perfecting them, by refining and adapting them to the conjecture conditions.

Occurring as a need of the retailers to build customer loyalty through products which cannot be distributed through other store networks, but also due to the manufacturers' desire to ensure a certain volume of activity in the production cycle, retailers' private brands have registered an unprecedented evolution (Evans, 2011), being perceived in the last few years as "saviours" of the crisis situation. In trade, the private brand is considered the opponent of the producer's brand and refers to products or items sold under the name of the retail stores, which owns them.

The phenomenon of private brands trade, which appeared at the middle of the 20th century, has developed visibly during the last ten years and, with the onset of the financial crisis which spread to global level; it became a mass interest phenomenon for the large retailers, for the manufacturers and the consumers. A new type of relationship is growing between demand and offer (Kapferer, 2005), more "relational" than "transactional", centred around building customized solutions, adapted to the increasing segmented needs. These days, the saturated markets, which have become hyper-competitive, the clientele of each retail network has become valuable patrimony, which must be protected and valued.

2. Why the private brand?

Known in the specialized literature under the names "marque maison", "private label" or "store brand", the private brand is a distinguished sign through which the characteristics of a product are defined by a store or store network, in their capacity as sole owner of the brand under which the product is sold. There are few situations when the private brand

products are manufactured by the trading company itself; in most of the cases, they are manufactured by industrial or agricultural producers (Dupré and Gruen, 2004). Despite the success of the retailers' private brand (RPB), it is accepted that distributors are strongly dependent on manufacturers, and for this reason the traders "must develop a policy of real partnership with the suppliers" (Kapferer, 2002). No victory can be declared either for manufacturers or for traders in the battle between each other (Bergès, Bontems and Requillart, 2009), because there can be no clear delimitation between the importance of the producers' brand and that of the retailer's brand, and, during the sales process, usually one sustains the other.

Together with the increased diversity of the offer and the needs, various critical opinions appeared against the exclusive beliefs which centred the commercial businesses only on costs and margins (Davidson, Bates and Bass, 1976). The consumers are more and more involved and exigent, which nowadays is expressed by the responsible consumption concept (Lecompte, 2006); they expect added vale also at the level of the relationship with the retailer in the field of commercial service. The development of new business models in the recent years, adapted to the new market architectures, has also influenced the strategic policy of large traders, who valorised their operational activity through the increased importance given to their private brands.

3. The advantages of private brand products trade

The relational triangle manufacturer – trader – consumer appears in the private brand trade, and there is a series of advantages for each operational side.

For the *large traders*, among the main advantages we may specify:

- The private brand ensures an important *differentiation* between the large retailers, because the sold products are customized and cannot be found in any other retail network. The neighbouring stores cannot speculate price advantages at any moment. The table below presents some of the most important private brands promoted by the retail networks in Romania:

Table 1. *Retailers' private brands*

Hypermarket	Private brands portfolio
Carrefour	Nr. 1, Carrefour, Tex, Reflets de France
Metro Cash and Carry	Horeca Select, H Line, Rioba, Aro, Fine Food, Sigma
Auchan	Auchan, Mieux Vivre Environment, Rik and Rock, Mmm, Mieux Vivre Bio, In extenso
Cora	Cora, Winny, Tradiţia Gustului
Mega Image	365, Bio, Care, Delhaize, Eco, Gusturi româneşti, Le Boucher
Billa	Clever, My
Kaufland	K-Classic
Penny Market	Boni, Karat, Top Apetit
Lidl	Pilos, Baconi, Combio

Source: adaptation from http://incomemagazine.ro/articole/ce-se-ascunde-in-spatele-marcilor-proprii-din-hypermarketuri, October 27.2015.

- The private brand *creates consumer loyalty* because, once they become accustomed to a product, they will always come back to the same retail network to buy it. Loyal clients represent approximately a third of the total number of consumers, but the private brand also represents a source for attracting new clients.

- Since the private brand products are usually manufactured by the large producers of known brands (e.g. Albalact, Napolact, Kandia, Bunge, Dobrogea etc.), *the quality* of these products is very close to that of national brand products (the manufacturers' products).
- Although the producers/suppliers are approximately the same for both categories of brands (the producer's and the trader's) and the quality is approximately similar, the private brands allow the retailers to set lower prices than for the producers' brands, at least for the following reasons:
  - The supply volume is very large, therefore the negotiating power compared to the producers is great, allowing them to obtain important discounts.
  - The significantly larger volume of private brand flow compared to producers' brand allows the stores to sell products at lower prices and this on one hand, stimulates sales, even if the profit margin per unit is lower, and, on the other hand, the costs are lower, because the volume of expired, damaged or improper for sale products is lower.
  - The private brand products are generally cheaper, because many promotion and sales costs of the producers' brands are reduced: publicity, branding, in store sampling, promotional competitions, merchandizing, etc. For private brand products, the traders take care of all forms of promotion and their expenses are significantly lower.
  - Most of the times, private brand products "cut out" the middle man and, implicitly, supplementary costs.
- The private brand products are targeted at people with limited budgets ("economical" products), but also at "pretentious" consumers, because the main retailers sell their private brands in different quality/price classes. However, for the same quality, researches show that, compared to known brands, the private brand products are up to 40% cheaper. During the last years, consumers have had the option to choose high quality and premium private brand products; many of these products do not have an equivalent on the market (exclusivity).
- The merchandizing of private brand products has become a "science" for the retailer, being based on clear procedures of positioning the products in the sales area and on the shelves. The traders have the advantage of placing their private brands next to national brands, without the need for an excessive promotion to inform the clients, who are already familiarized with the product groups.
- The private brand consolidates the position of the distributors in relation to the producers and suppliers, which involves a greater purchase power and an increase in the profit margins. This policy is completed perfectly by the discount policy, leading to an improved retailer-client relation and an increase in the sales volume.
- Due to the quality-price advantages, the clearance speed of these products is faster, thus reducing the risk of large stocks expiration, therefore the profitability of this commercial segment is higher than producers' branded products, despite of the large discounts offered to the clients.

For the *producers,* the main advantages consist in:
- The possibility for economic growth, because delivering products to retailers for sale under a private brand represents an opportunity to extend the business, respectively, to grow the production volume based on certain orders and pre-contracts.
- Avoiding interruptions in activity and reducing the expenses generated by lack of orders.
- Balancing the profitability indicators, through an optimal sizing of the operational activity and through the permanent control of the quality/price ratio, adapted to the demand.
- Reducing the expenses for promoting the products sold under the producer's national brand, under the conditions imposed by the excessive offer or supra-saturation of the market.
- Lack of obligation to associate the name with a low quality product.

For the *consumers*, as end users of the private brand products, therefore, the central elements of the economic cycle, the advantages are:
- They can purchase a product of the same quality as the producer's national brand for a much better price.
- They benefit from a very diversified offer (distributor's private brand and producer's brand).
- They can use and benefit from the price advantage, especially during times of economic crisis defined by a decreased purchase power.
- They can benefit from the supplementary effect of the competition between the private brand and the producers' brand (through continuous discounts, prizes, vouchers, supplementary services, etc.).
- They generate a positive effect on the population's welfare.
- The diversification of the private brand offer covers almost all the categories of food and non-food needs.
- They can find at least a solution to satisfy a need in line with the allocated budget.
- They are safe from the risk of significant losses, because the prices within the same store network vary very little from one store to another.

4. Case study concerning the consumers' position towards the retailers' private brand

4.1. Research methodology

The research method used in the elaboration of the case study was the investigation based on a questionnaire, which in our opinion is created as "a set of questions, well organized and structured" (Havârneanu, 2000) with the purpose of obtaining answers which allow us to formulate documented conclusions for the opinions stated in the first part of this paper. The questionnaire included 25 questions, out of which 22 questions specific to the research theme and 3 questions to help build the respondent's profile. The sample consisted of 80 persons, clients of Metro Cash and Carry Company. In order to formulate accurate conclusion on the research results, we selected four Metro stores, two situated in Bucharest, one in Bacau and one in Brasov. The sample consisted of 77.5% women and 22.4% men. For the majority of the respondents, the frequency of purchases from Metro Cash and Carry network is weekly, bi-monthly or monthly (94%).

The questions of the questionnaire aimed to obtain answers regarding:

- The proportion of purchases from large retailers.
- The monthly average value of the purchases.
- The structure of periodic purchases of the sample per categories of retailers.
- The degree of familiarity with the main retailers' private brands.
- The budget allocated for purchases from Metro Cash and Carry stores.
- The private brand products ratio from the total purchases.
- The structure of private brand purchases per groups of products.
- The influence of prices of the decision to buy private brand products.
- The quality/price ration for private brand products, compared to producers' products.
- The impact of the purchase power on the decision to buy private brands.
- The role of the promotional policy on the decision to purchase private brands.
- The role of merchandizing and the impact of offering discounts for private brand products on customer loyalty.
- The frequency of defects, low quality or non compliance compared to the producer's brand, etc.

The questionnaires were interpreted by using the statistical method and analogical models.

The analysis focused on the opinion of traditional customers of Metro Cash and Carry with regard to the perception and the position of the private brand of the store in the consumer's preference. The questions, most of them closed ones, had 3-6 short answer options. In the following pages, we will interpret and present the main conclusions of the performed research.

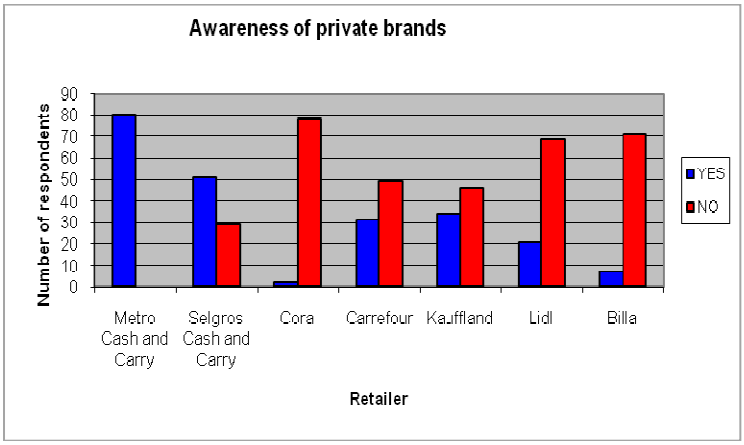
4.2. Research results

In order to analyze the degree of familiarity with the private brands of the main store networks, seven known retailers in the area of the locations involved in the analysis were specified in the questionnaire: Metro Cash and Carry, Selgros Cash and Carry, Cora, Carrefour, Kaufland, Lidl, Billa (Table 2). The structure of the answers can be visualized in Chart 1, attached to the table. All the customers in the sample know that private brand of Metro Cash and Carry, a natural answer, since the sample was created from the retailer's clients. As it can be observed, the private brands of the competitive stores are known in various proportions. The second position is taken by Selgros Cash and Carry, which is a normal tendency, since most of the interviewed clients are professionals in the field of retail.

Table 2. *Are you familiar with the private brands of the large stores?*

Retailer	Yes	No
1. Metro Cash and Carry	80	0
2. Selgros Cash and Carry	51	29
3. Cora	2	78
4. Carrefour	31	49
5. Kaufland	34	46
6. Lidl	21	59
7. Billa	7	73

Chart 1

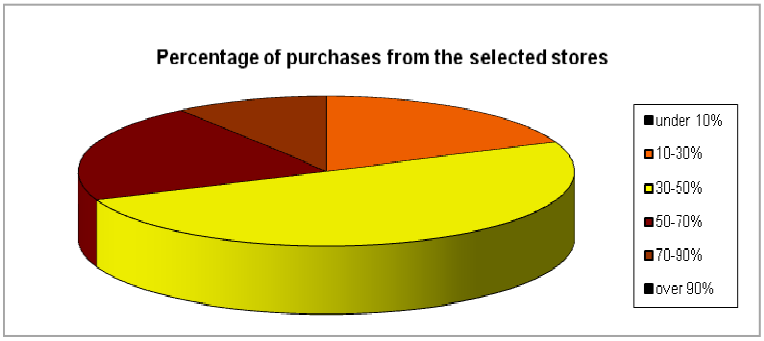


In order to have an image of the degree of relevance of our study, we considered interesting to evaluate in what degree the clients in our sample are loyal to large stores.

Table 3. *How frequently do you buy monthly from large retailers?*

Percentage of total purchases	Number of answers	%
under 10%	0	0
10-30%	15	18.75
30-50%	40	50
50-70%	17	21.25
70-90%	8	10
over 90%	0	0
Total answers	80	100

Chart 2



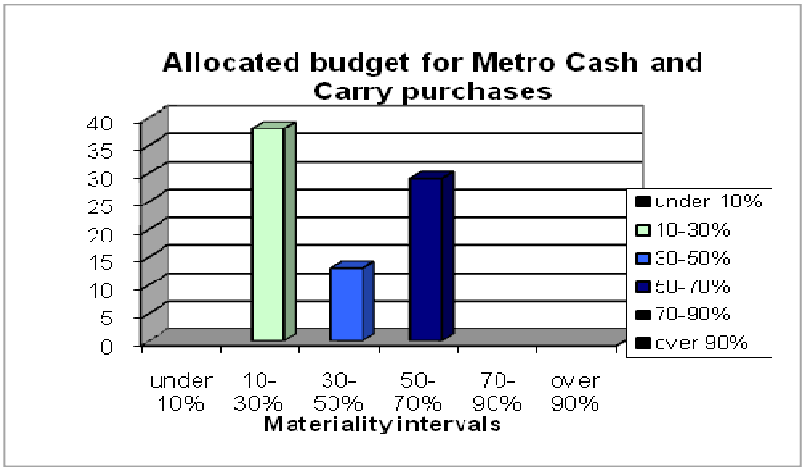
The chart shows that approximately 71% of the respondents buy between 30% and 70% of their monthly purchases from large retail networks.

The performed research showed that approximately 47.5% of the respondents allocate among 10% and 30% of their monthly budget for purchasing goods from Metro Cash and Carry stores, and 47% of the respondents allocate among 50% and 70% of their budget for shopping at Metro Cash and Carry. The conclusion is that the entity under analysis represents an important element in the supply of the products necessary to cover the needs of the consumers included in the sample.

Table 4. *What proportion of your total purchases do you think is represented by Metro Cash and Carry shopping?*

Metro Loyal Client	Number of answers	%
under 10%	-	0
10-30%	38	47.5
30-50%	13	16.25
50-70%	29	36.25
70-90%	-	0
over 90%	-	0
Total answers	80	100

Chart 3

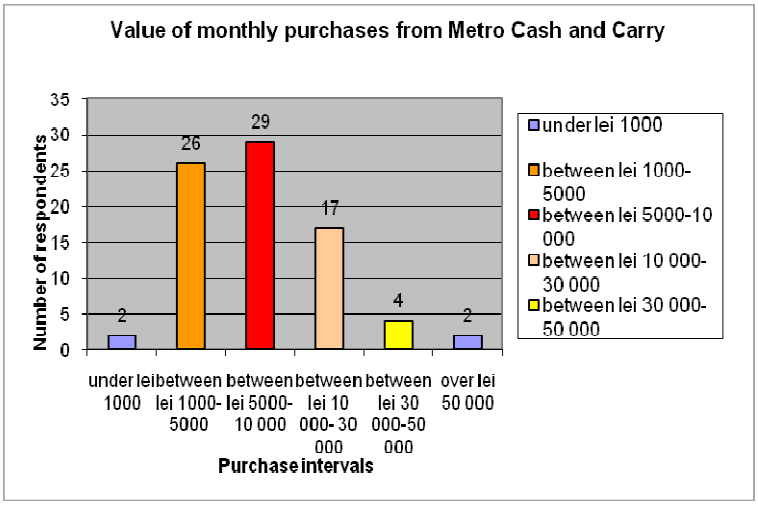


In order to consolidate the image of the selected sample, we considered useful the following question: "What is the monthly average value of the purchases you make from Metro Cash and Carry?" with the answer options presented in Table 5. The summarization of the answers showed that 36.2% of the respondents allocate a budget of lei 5,000 – 10,000 for the purchases from Metro Cash and Carry, 32% make monthly average purchases of lei 1,000 – 5,000 and 21.25% of the respondents spend monthly between lei 10,000 and lei 30,000 for such purchases, the remaining difference being distributed among the other groups. The conclusion is that the value of the purchases is significant and the evaluation of the respondent's attitude towards the private brand of the trader can be considered relevant.

Table 5. *What is the monthly average value of the budget allocated for Metro purchases?*

Metro monthly purchases	Number of answers	%
Under lei 1000	2	2.5
Between lei 1000-5000	26	32.5
Between lei 5000-10 000	29	36.25
Between lei 10 000-30 000	17	21.25
Between lei 30 000-50 000	4	5
over lei 50 000	2	2.5
Total answers	80	100

Chart 4

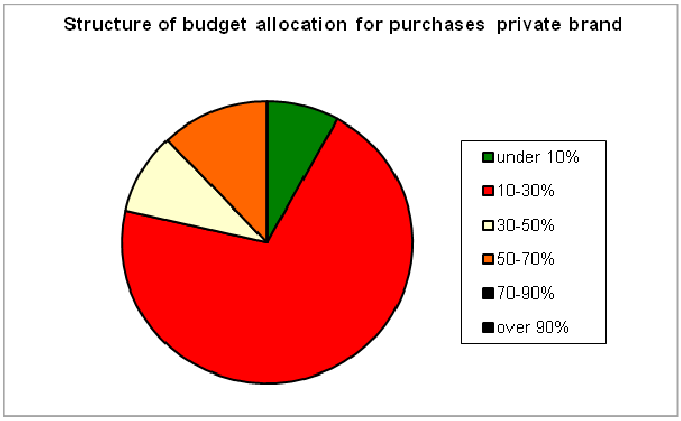


With regard to the clients' interest for the private brand, which is also the theme of the analysis in this scientific undertaking, the synthesis of the data shows that approximately 70% of the respondents allocate a percentage between 10% and 30% of the budget for the purchase of private brands of large stores, a preference which, according to the internal surveys of the large surface stores was greatly amplified during the years 2014-2015 and tends to become a priority of the large retailers' commercial policy for the years to come.

Table 6. *What percentage of the total budget do you allocate for private brand purchases?*

Budget for private brands	Number of answers	%
under 10%	6	8,0
10-30%	53	70,7
30-50%	7	9,3
50-70%	9	12,0
70-90%	0	0,0
over 90%	0	0,0
Total answers	75	100,0

Chart 5



The obtained conclusions confirm the fact that, during the last years, retail undergoes great transformation at global level under the impulse of the unprecedented competition between the large competitors.

According to statistic data collected from local and international economic publication, the situation of the Romanian customers' preference is similar to that of the population from many European countries. If 15-15% of the Romanian consumers prefer to buy private brand products from the large retailers (with small differences from one retailer to another), a recent international study on the sales of Carrefour international networks shows that in England the preference for private brands is 43%, in Belgium 42% and in Switzerland 53%. Moreover, in the developed countries, the statistics for the last few years indicate a substantial increase of the consumers' preference for private brand products, which for certain retail networks represent a percentage of 75%-85% (for example, Lidl).

Regarding the interest shown by the sample for the private brand of other stores, the main competitors of Metro Cash and Carries were shown to be: Selgros (33%), Kaufland (38%), Cora (21%) and Auchan (8%).

Going into detail with the analysis of the Metro Cash and Carry brands, Chart 6 shows that, from the total of respondents, 55% purchase the private brand of the store (we are talking about Aro, Fine life, Rioba, Authentic, Vortez, Horeca Select, etc.) in a volume varying between 10% to 30% of the monthly purchases. Sources from Metro Cash and Carry management stated that the tendency of the customers' preference for the private brand is generalized at global level, and for this reason, most of the renowned retailers have heavily documented internal procedures regarding the supply, presentation, display and promotion of the products from this category. Among the advantages of the private brand for the clients, the following were mentioned: exclusivity in the sale of certain product ranges, the retailer's guarantee for the quality of the products, therefore, an easier solution of the quality non-compliances when even lower prices appear for many of the sold categories.

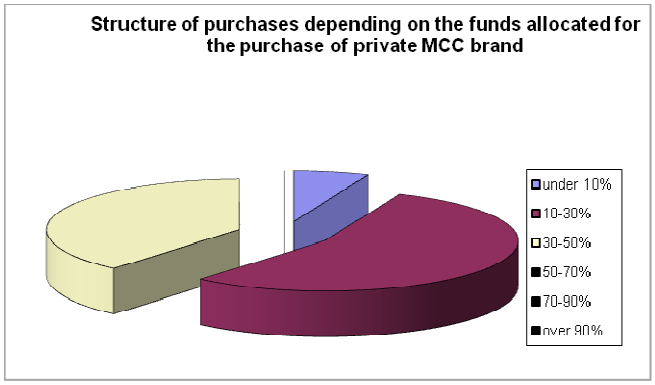
A Mercury Research study performed in July 2015 on a sample of 351 persons, above 18 years of age, showed that, although the price is an important criterion, it is not always the main reason of the interest for the private brand. However, it is considered that the basis of the consolidation of this preference is the decreasing purchase power of the population, which is in direct correlation with the economic crisis which has been ongoing in all the countries of the world during the last few years.

The surveys show that the exclusivity of the sale of certain product ranges is given the importance of 30% in the customers' preferences, and the retailer's guarantee of the quality of the products with 31%. New innovative techniques which differentiate the offer, both materially and visually, appear and are developed continuously, which leads to the conclusion that modern and creative commerce is the survival opportunity in a durable context.

Table 7. *What budget percentage do you allocate for the purchase of Metro Cash and Carry private brand products?*

Budget for Metro private brand	Number of answers	%
under 10%	5	6.25
10-30%	44	55
30-50%	31	38.75
50-70%	0	0
70-90%	0	0
over 90%	0	0
Total answers	80	100

Chart 6

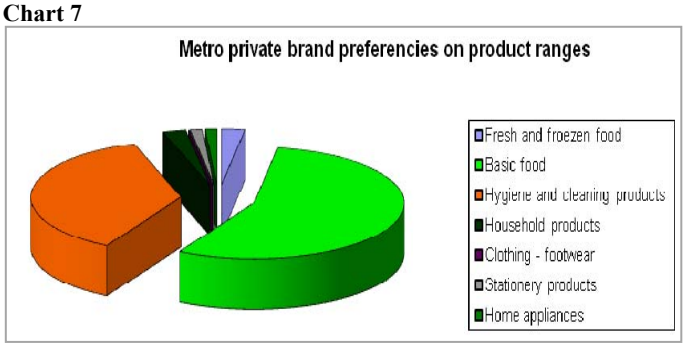


A question of great relevance within the questionnaire conducted by the authors of this paper evidences the interest shown by the customers for the private brand ranges, as shown in Table 8 and Chart 7. Leading with a percentage of 55.75% of the total preferences is the range of basic food range and with 36.7% the hygiene and cleaning products range.

Table 8. *What are main ranges of products you prefer from among Metro private brand products?*

Metro private brand ranges	Number of answers	%
Fresh and frozen food	2	2,5
Basic food products	44	55.7
Hygiene and cleaning products	29	36.7
Household products	2	2,5
Stationery products	1	1.3
Home appliances	1	1.3
Total answers	79	100,0

Chart 7



International studies available regarding the retailers' private brand show the same preference of the consumer for basic food products (sugar, oil, meat, biscuits), personal hygiene products (soap, shower gel, deodorant, napkins) and house cleaning products (detergents, cleaning products, etc.). According to the statistics, from the above specified ranges, the best selling are the cheap products, with a price estimated in average at 72% of the prices of the producers' brands.

With regard to the private brand of Metro Cash and Carry, the following are some relevant conclusions:

- Most of the time, retailers choose to sell the private brand, because the supplier/producer's sale price is more attractive, thus becoming a cheaper alternative for the clients, as well.
- The same product sold under the private brand can originate from several suppliers. From the point of view of quality, it is important to state that the demand for a certain private brand product is in close correlation with the renown of the products supplier. For example, the private brand oil ARO may originate from various production sources. But the oil produced by Bunge Romania is superior in quality to ARO oil, produced by Prutul SA, therefore the demand shall be conditioned by this aspect. Most of the times, the suppliers accept to produce under the brand of a hypermarket/ supermarket when they have the long term objective of very large production volume.
- As a tendency, the private brand products are usually situated a little under the quality level of the supplier's brand, because the stores are interested to obtain a lower purchase and sale price, so that the retailer can increase the volume of sales, as final scope of the commercial activity. In fact, this is the explanation of the producers' hierarchy in forming the private brand.
- Within the same retail stores network, most usually the private brand products are differentiated by quality. Metro Cash and Carry distributor operates at three levels of quality, known by the customers: basic quality (promoted by ARO brand), average quality (such as Fine Life, Horeca Selected) and premium quality (Rioba range). The differences are found in the different level of satisfaction obtained by the consumers, in the form of presentation of the products, in the price, but also in the shelf display policy, in other words, in the merchandising techniques.
- The quality of certain private brand products may sometimes exceed that of the products sold under the producer's brand. For example, during the evaluation of the consumers' tastes, Metro Cash and Carry Company performed certain tests by the blind method on several products, among which: chocolate, biscuits, cereals, household paper, napkins, etc. In one of these tests, the clients tasted various products, presented identically, without having any technical information, only basic information, and their answers were surprising. Many times, the opinions regarding the superior quality of the private brand products, compared to the producer or supplier's brand were categorical. For instance, with regard to taste, the chocolate produced by Kandia under the Fine life brand (private brand) was more appreciated that the original Kandia brand.

Extending the analysis through specific questions, were found that of the total ranges, in the fresh and frozen food group, the determinative percentage goes to fruit, vegetables and fish sales. Given the specific of the activity, the tendency is normal, because Metro Cash and Carry stores are supplied in very large quantities with these groups of merchandize and, thanks to the interest to increase the product flow speed, they promote the policy of discounts for large quantities ordered by the clients. These groups of merchandize are especially adequate for redistribution. Moreover, thanks to the traditional relationship, clients can benefit from other important discounts. Actually, it is in the interest of the cash and carry companies to sell up the available stocks over a short period of time, considering the high rate of perishability. The seasonal character has a great importance for this category of products, leading to a specific modality of supplying and pre-contracting.

The statistics from all the important retailers from the Romanian market indicate the highest sale percentage for basic products of their private brand: sugar, oil, flour, dairy products, bakery products, etc. For these groups of products, the stores sell the private brand merchandize at prices situated almost always under the level of the producers' brands. The commercial margin is very low, but not necessarily the profit, as well, because the negotiating power for these groups of products is very high compared to suppliers.

Per total, with an overall sales percentage between 6% and 35%, private brands offer certain advantages to the retail distribution networks, among which: increased sale volume, increased turnover, promoting their own brand, increased reliability, stability and diversity of the offer. For Metro Cash and Carry stores, the aggressive marketing of the last two years determined an increase in sales for private brand products by over 90%. The tendency is global at international level and it can be considered a favourable alternative to attract and build client loyalty in the conditions of economic crisis and socio-economic downfall.

The summarization of the answers showed that, from the total demand, the leading sales are for sugar and oil, with a percentage of 87.25%, values similar to those presented in the Mercury Research Survey 2013, where it is shown that 54% of the Romanians buy oil and 34% of them sugar from private brands. The same study shows that approximately 90% of the private brand products are manufactured in Romania, this conclusion being also confirmed by the questionnaire conducted by Metro Cash and Carry Company.

The private brand for personal hygiene and cleaning products represents another segment which conditions the turnover of retail stores. The highest demand is for: detergents, house cleaning products, napkins and toilet paper, body and hair care products or child care products. Most of these categories have price differences of 25-45% compared to the average values of the producers' brands.

In the authors' opinion, the key question of the questionnaire considered the ranking of the preferences that form the base of the increased demand for private brand products. As we specified, the engines for the increased preferences for the private brand of stores were the quality/price ratio, this characteristic representing 78.5% of the motivation to

choose the private brand of stores. Given the conditions of the extended economic crisis, it is unanimously accepted that in most of the European countries the demand is more and more channelled towards the private brands of the stores. This is also the reason why the large retailers give an ever increasing attention to the display and promotion of these categories of products. The fight for "survival" is in many situations a reality that forces the retailers to find innovating solutions for building client loyalty and to attract new clients.

For field documentation, we also visited other commercial networks. We found that their operational activity is based exclusively on explicit operational procedures which offer safety in the operational activity. The procedure regarding the private brand is extremely documented and includes information regarding: the sizing of products on the shelf, the sizing of stocks depending on the product flow, the modality to add new products to the portfolio, ensuring the safety stocks for out of rhythm periods of entries or oscillating demand, liquidating the slow moving stocks, eliminating certain products from the portfolio, the modality of displaying the products on the shelf, promotional policy, etc.

For Metro Cash and Carry, the merchandizing, one of the most usual forms of sustaining the retail trade, based on scientifically developed principles, methods and practices, is essential for the display of merchandize on the sales area.

According to the results of the questionnaire, a special role in the increasing sales of private brand products is played by the aggressive promotion, for which retailers invest very large amounts. The most attractive forms of promotion are considered to be the magazines and flyers (52% of the impact), followed by visits to the store (31%), media channels, etc. From this point of view, Metro Cash and Carry shows a special care for its clients, sending them offers, discounts and other facilities both by post and in electronic form, with a high frequency.

An extremely important criterion for the stimulation of private brand sales is the discount policy. Metro Cash and Carry gives important discounts for situations such as: premium clients, large volume of orders, stock liquidation, items close to expiration date, special events (for example, winter holidays), individual negotiations with top clients, etc.. For an important segment of our sample, the discount policy has a decisive importance in purchasing the private brand (70-90%). Practically, some of the clients can be considered "offer hunters" for private brand products. It has been found that this category of clients consists either of small clients, who count only on this type of opportunity, or on very large clients, who purchase almost exclusively from Metro stores and, given the very large volume of their orders, belong to the Premium class, who can benefit from special sales conditions. Per total, however, the situation is normal, because approximately 65% of all of the interviewees rank the importance of this criterion under 30%, therefore, the interest for the private brand products is not decisively conditioned only by one criterion.

An extremely important aspect in the purchase decision is the positioning of the private brand products, 94% of the respondents considering essential the modality of presentation

and the visibility of private brand merchandize. From this point of view, the procedures dedicated exclusively to the private brands are rigorously explicit in case of most "important players": positioning merchandize at eye level, arranging them on the shelf according to size, the number of exposed sides, labelling, audio-visual promotion, etc.

Given the fact that the structure of clients is very different for cash and carry stores, for certain categories of traditional clients, oriented strictly towards certain groups of products, the positioning of the merchandize on the shelf is without relevance, since the intention to purchase those products exists in any situation. Another category, of new or undecided clients, considers the positioning of merchandize essential in making the purchase decision for the private brand products.

Out of all of the interviewees, 51% consider the frequency of complaints between the private brand and the producer's brand as impossible to differentiate, and 34% consider such a question irrelevant in making the purchase decision. We can deduce that directing client's interest towards private brand product is not influenced by certain misgivings regarding defects and non-compliance, compared to the other merchandize on the market.

When requested to make a comparison between the private brand and the producer's brands, 52% of the respondents do not consider that there are major quality differences between the two, 25% consider the private brand better, because it offers greater safety and a faster solution to non-compliances and only 23% consider that the private brand is inferior as compared to the producers' brands. Here, as well, the answers are conditioned by the buyer's profile and the type of preferred private brand (first price or profit brand).

Irrespective of the client's profile, for the question "What is the influence of the price in making the decision to buy private brand products?", the answers show that the price size is essential. Therefore, due to the high concentration of the answers, we can conclude that no matter how many advantages and characteristics these products have, the option for purchasing private brand is influenced by the price size in the greater measure, the other characteristics being considered, but only secondary.

For the question regarding the importance of the income size on the decision to purchase private brand products, 47.5% of the interviewees answered "very high importance" and 47.5% answered "high importance". In conclusion, corroborating the answers of the two questions concerning the conditioning of private brand purchases by the size of incomes and price, it is clearly visible that this orientation of buyers' preferences towards private brand products has appeared out of necessity, then it was developed and refined later on, together with the perfecting of the organizational culture, which represents the source of differentiation and segmentation of the retail market for most of the important retailers of the world.

As a confirmation and explanation of the new tendency of the global market for retail trade, we have the answers regarding the impact of the economic crisis on the orientation of the consumers towards the private brand products of stores. Approximately 88% of the total respondents believe that the onset of the crisis and its continuation has changed their purchase options, which subsequently proved to ensure them a high satisfaction level.

Conclusions

The conducted researches showed that the economic recession of the recent years has changed the order of priorities regarding the policy of retail operators. We consider than in these sectors, which are strongly competitive, where the profit margins per unit are reduced due to the limited freedom to intervene on sale prices, the cost control per expense item has an incredible incidence on the profitability indicators. Irrespective of the size or sale method, the retailers' priority must be channelling their efforts to identify new methods to increase the efficiency of using expenses and permanent adapting their offer to the evolution of consumers' demand.

An important aspect of this paper is our opinion, the interest we have shown in identifying the key factors of success and the phenomena which may influence the commerce with private brand products, considered by many specialists as a real opportunity to reposition the retailers on the market. Through our undertaking, we tried to present the main correlations establishing the balance between the consumer's vision and the retailers' strategic actions for promoting the sales of private brand products as faithfully as possible.

Conducting the case study on a sample of experienced clients, with economic power and knowledge in the field of retail, performing the interviews in four different geographic locations and including large number of thematic questions in the questionnaire, four of them being open questions, allowed us to create the profile of the consumer of private brand products and to identify the determinant factors for the purchase decision. Among the most important conclusions of this research, we mention:

- The buyers know the private brands of retail networks and most of them allocate 20-50% of their monthly budget for such purchases.
- The main categories of private brand products of the store preferred by consumers are basic food and hygiene and cleaning products groups.
- There is a clear delimitation between "economic" products buyers and "high quality" or "premium" products buyers.
- The demand increase was determined by the diversification of private brand products offer and the introduction of substitutive products for many of the producers' brands.
- In the field of private brand products, clients usually stay loyal to the retail network that offered them advantages.
- The quality of private brand offer is comparable to that of national brands.
- The determinant factors for the purchase of private brand products are: quality/price ratio, merchandizing, discount policy, exclusivity in sale, promotional policy, purchase power, very diversified products range, high satisfaction in consumption.

The conducted research showed that for the retailers, apart from the multiple advantages resulting from the sale of private brands, there are also a series of inconveniences, such as:

- The private brand sales "oblige" each group of stores to resort to the same type of promotions, approximately at the same time, for the same range of products (loyalty card, discounts, etc.
- The clients will consider price first when considering whether to stay loyal to a brand.

- A private brand usually means a similar product in a customized packaging.
- In many situations, the retailers' private brand has a lower image due to the smaller prices, but without justification, because they are owed to the high negotiating power in relation to the producers and the retailers' interest to attract clients towards the private brand.
- Despite the success, we must admit that, due to the total dependence of the retailers on the producers, there must be a permanent "policy of real partnership" between the private brand and the national brands, involving all the aspects involved in merchandize sale.
- The launching of "private label" products on the market is always cyclically staggered from the product categories manufactured by producers, but, from the trader's perspective, this is a great advantage, because distributors lower the launching – development costs, and the promotional costs necessary to create the demand and the market segments for the new products.

The conducted research showed us that the option of stores to sell private brand products has the main purpose to optimize profitability by building client loyalty and increasing the negotiating power in relation to the suppliers.

Starting from the almost total dependence that retailers have on the large producers, the authors have decided to conduct a future research in order to evidence the partnership relations between them and the impact that the "permanently negotiated cooperation" generates on the operational activity of each of the two economic entities. We believe that the distributors' private brand will be the "star" of retail in the next few years; strategies will be built around it, policies will be adopted and partnerships will be established in relation to it. The experience of developed countries comes as a confirmation that the private brand is not just an option in the context of global crisis, but a profound concept having an impact on the global vision concerning the role of modern retail in maximizing the consumption satisfaction.

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Macroeconomic determinants of the labour share of income: Evidence from OECD economies(1)

Ivan D. TROFIMOV
Kolej Yayasan Saad (KYS) Business School, Malaysia
ivan.trofimov1@gmail.com
Nazaria Md. ARIS
University of Malaysia, Sarawak, Malaysia
nazzoes@gmail.com
Muhammad Khairil Firdaus Bin ROSLI
University of Malaysia, Sarawak, Malaysia
khairil.firdausss@gmail.com

Abstract. *The study investigates the relationships between the labour share of income and several macroeconomic variables – the GDP growth, inflation, unemployment, as well as GDP gap and capacity utilization – in industrialised economies between 1960 and the 2010s. Three complementary hypotheses that relate macroeconomic determinants to the labour share dynamics are considered: 'overhead labour' hypothesis, 'realization theory/wage lag' hypothesis and the 'rising strength of labour' hypothesis. The study employs a sequential procedure: testing for the stationarity properties of the variables, using bounds test to identify the presence of cointegrating relationships, and estimating long-run relationships using ARDL or OLS methods. The results show that all three hypotheses are supported only in a limited number of economies, whilst in the majority of cases only certain relationships are prominent. On the whole, the GDP growth rate, the unemployment rate, and to a smaller extent capacity are found to be the principal determinants of the labour share, while change in the level of prices is of subsidiary importance.*

Keywords: labour share; time series; macroeconomic determinants.

JEL Classification: C22, E25, J30.

1. Introduction

The functional distribution of income between capital, labour and land, its determinants, and the broader and lasting economic implications have long been the central themes of classical economics and have remained an important area of investigation in contemporary economic thought (Kramer, 2011).

The analytical issues pertaining to functional distribution are numerous, including the relationship between factor income and personal income inequality (Ryan, 1996); multiple types of income and the relationship between the analysis of income at national and household levels (Atkinson, 2009: 5-8); the effect of factor income inequality on the social dynamics, and the effect on structural torsions in the society and broader prospects of capitalism (Glyn and Suttcliffe, 1972), the long-term stability or trends in the levels of wages and profitability (Kalecki, 1954; Kaldor, 1961; Blanchard, 2006; Feldstein, 2008), convergence and equalization in wages and profits (Vaona, 2011; Izyumov and Vahaly, 2014).

In the heterodox and Marxist economics, the dynamics of factor income distribution is analysed explicitly as a class conflict, whilst in the neoclassical school it is conceptualized as the variation in and divergence between wages and productivity. Being a salient political and policy issue, the problem of the factor income distribution attracted attention in the 1970s, when the post-war 'grand accord' between labour and capital (whereby organized labour was getting increases in real wages and share in economic prosperity in exchange for political loyalty and cooperation) started to unravel and to undergo a series of modifications, becoming a more liberal and less regulated order. Likewise, the issue became prominent in the post-GFC world, discussed in the context of persistent unemployment, deindustrialization, and the debate around stagnation and the deceleration of growth rates and the revival of profit rate (Brenner, 2006; Dumenil and Levy, 2004).

The majority of theoretical and empirical analyses concerned the structural factors behind the stagnation of real wages and the fall in labour share: the weakening of labour's collective bargaining power (Bassanini, Duval, 2006); privatization and deregulation (Torrini, 2005); globalization, trade openness and capital flow liberalization (Jayadev, 2007); the changing structure of the economy and the fall of labour share across and within sectors (De Serres et al., 2001; Lawless and Whelan, 2007); technological change and factor substitution (Acemoglu, 2003); demographic factors and the ageing population (Schmidt and Vosen, 2013).

Another section of the literature considers labour share in relation to the macroeconomic performance of the economy and specific macroeconomic variables (Weisskopf, 1979; Sherman, 1991). This focuses on empirical analysis in a limited number of economies (USA and Australia), given the economic data constraints and the earlier debates on the cyclicality of the wage and productivity that took place amongst US economists (Bernanke and Powell, 1986). The empirical methods include earlier generation techniques, such as Partial Adjustment Differential Equation Model (PADEM), ordinary

least squares (without prior examination of the stationarity properties of the variables), and Johansen cointegration.

The purpose of the paper is to contribute to the analysis of macroeconomic determinants of labour share by introducing certain novelties. Firstly, in contrast to earlier studies that focused on a single economy, this paper considers a reasonably complete set of industrialised economies over a period of several decades, including the recent period after the global recession of 2008-2009. Secondly, more advanced econometric techniques that address the problem of spurious relations and provide robust evidence in small samples are used. Thirdly, several measures of labour share and capacity utilisation are used.

The paper is structured as follows. Section 2 discusses alternative theoretical views and past empirical analyses. Section 3 considers methodological issues, including data sources, model and econometric techniques. Section 4 presents empirical findings and discusses their economic significance. Section 5 provides concluding remarks.

2. Theoretical explanations and past empirical research

It is well known that short-run fluctuations during the business cycle are incorporated into medium-term changes in the economy (periods of high and low growth and stagnation), both being part of economic growth in the long-run (Comin and Gertler, 2006). The three hypotheses, examined below, look at labour share and explanatory macroeconomic variables in the short-run (i.e. during specific stages of the cycle), whilst also intending, directly or indirectly, to provide insights into broader trends in the capitalist economy (e.g. profitability, effective demand, patterns of technical change). Thus, they are closely related to respective economic growth and distribution theories. Whilst recognizing the need to examine behaviour of the labour share around cycle turning points and during its stages (using quarterly data), this paper focuses on establishing relationships between relevant variables in the medium- and long-term.

According to the 'overhead labour' hypothesis (Weisskopf, 1979; Hahnel and Sherman, 1982, Bernanke, 2000, p. 273), low-wage production labour is a function of output produced, whilst high-wage supervisory and managerial labour (overhead labour) is a function of production capacity. The overhead labour costs are variable across the business cycle, in line with the theorizing in neo-Kaleckian growth models (Mohun, 2006, 2014).

During a recession, the level of output and average productivity fall, whilst managerial labour is hoarded, resulting in an increase in the labour income share due to an increase in average compensation levels and the rising percentage of overhead labour to the total labour. In contrast, during expansion periods, the labour share of income falls with productivity levels rising, and the proportion of overhead labour to total labour falls. In the early post-recession period, overhead labour does not increase as much as output and capacity utilization do, resulting in the fall of the labour share. In the early contractionary stages, productivity and output fall, whilst overhead labour is maintained, thus resulting

in labour share stabilization. Overall, overhead labour costs and aggregate labour share of income are inversely related to the level of capacity utilization.

In a related 'labour-hoarding' hypothesis (Caballero and Hammour, 1998), all types of labour are hoarded during the recession, resulting in a falling (procyclical) productivity and rising labour share and countercyclical wages and compensation. Hence, the inverse relationship between capacity utilization and the labour share is hypothesized. In a similar vein, the inverse relationship between capacity utilization and labour share is hypothesized by Goldstein (1986, 1996), considering the effect of the increase in capacity utilization and the revival of the economy on the variability of the mark-up and changes in variable costs and respective labour share of income.

The 'realization failure' and 'wage-lag' hypotheses (Foster, 1987; Sherman, 1991: 160-1) have their origins in the under-consumptionist view of the economy: the growth in wages is seen to lag behind national income growth, resulting in sluggish effective demand, overproduction of goods and services, accumulation of inventories and a fall in labour share (Baran and Sweezy, 1966).

It is assumed that the workers do not own the output produced, the adjustment on the part of workers during the upswing differs from the adjustment during the downturn, productivity gains are substantial during expansion but decline rapidly during contractions, and that wages are sticky. In the expansionary phase of the business cycle, productivity gains are appropriated by the employer and profit share increases at the expense of the labour share. In the contractionary phase, if workers manage to maintain their older wages, the labour share may increase whilst productivity and national income fall. Also, the lower power of labour relative to capital results in wages lagging behind productivity and output prices outpacing compensation rates. As a result, the negative relationship between inflation and output on one side and labour share on the other are hypothesized. Overall, growth in GDP and output prices are seen to decrease the labour share of income.

Views aligning with the realization failure and wage-lag hypotheses were put forward by Bowles and Boyer (1988, 1995), and pointed to the profit-led nature of modern economies and inability of high levels of economic activity to restore wage levels. Likewise, in the long-run, GDP growth and associated labour-saving technical progress would imply rising elasticity of substitution of labour for capital and declining labour share of income.

According to the rising strength of labour hypothesis, labour shortages and declining unemployment during economic upswings (and particularly during the second part of economic expansion) result in increased bargaining power for labour, higher labour costs, and wage rates growing faster than productivity and growth in the latter being brought to a halt (Boddy, Crotty, 1975; Gordon et al., 1987). In contrast, during a downturn (specifically, its second half), bargaining power is reduced, and the intensity of work is increased, leading to an increase in productivity and fall in the labour share. Hence, a positive relationship between labour share and employment levels and a negative relationship between labour share and unemployment rate are postulated. According to

Boddy (2007), collective confidence is a salient variable for stronger labour power, and the level of confidence is a result of the overall level of unemployment and the speed of the decrease in the rate of unemployment. As Sherman (1991: 165) puts it, the lags between changes in unemployment and resulting changes in the wage share are common due to the slack and organizational hurdles behind the increase in labour's bargaining power and militancy.

The earlier empirical analysis by Weisskopf (1979) considered the US non-financial corporate sector over the period of 1949-1979 and found the unemployment rate to be the most significant variable for explaining the movements of labour share, also confirming the salience of realization failure and wage-lag effects. According to Munley (1981), based on the US data from the 1970s, the rising strength of labour hypothesis appears to be confirmed, however accelerating inflation is likely to be a factor offsetting gains in labour share and precluding increases in real wages (in the absence of appropriate income and price policies). Hahnel and Sherman (1982), working with the US data from 1949-1980 and applying correlation analysis and OLS in bivariate and multivariate settings, found support for all three hypotheses, albeit the rising strength of labour hypothesis was the weakest, with unemployment explaining only 9% of the variation in labour share on a bivariate basis.

Metwally and Tamaschke (1986) examined cost structures of GDP in 45 countries and applied the OLS model to the 1977 cross-sectional data, using compensation of employees, gross operating surplus (GOS) and their ratio as dependent variables. A positive relationship between compensation of employees and income per capita was identified, but growth in real GDP was found to be insignificant in explaining compensation of employees, GOS or their ratio. Henley (1987) in a US study pointed to the significance of capacity utilization as an explanatory variable, and relative insignificance of the strength of organized labour, hence confirming the overhead labour hypothesis, but not the rising strength of labour hypothesis. Moseley (1987) did not identify unemployment rate and capacity utilization as significant regressors, but indicated a possible role of an unproductive-productive labour ratio in explaining labour share fluctuations.

According to a study of US labour share and its constituent components, by Raffalovich et al. (1992), the rising strength of labour hypothesis has some partial support (with higher unemployment rate having a negative effect on the labour share, but through the level of employment rather than wage rates and labour costs). The overhead labour hypothesis was also supported, but the effects were experienced through the level of employment and output rather than the compensation levels. With regard to the wage lag hypothesis, the evidence was that revenue rose faster than employment during the periods of economic growth, and hence labour share fell. However, inflation that accelerated during upturns increased employment and thus offset negative effects on the labour share. Overall, the effect of inflation on the labour share was negligible.

Macri, Sinha (1999) was the only examination of the hypotheses in the non-US context. Using quarterly data for Australia over the period of 1966-1997, and performing Augmented Dickey Fuller (ADF) unit root and Johansen cointegration tests, the authors

determined that labour share was negatively related to GDP growth rate, capacity utilization and the unemployment rate, but positively correlated with the inflation rate.

Overall, empirical studies give conflicting results, even when analysis is conducted for a single economy. Given the structural breaks that likely characterized developed economies around major political and economic junctures (e.g. in the 1970s or in the late 2000s), and the variation of variables across the periods (e.g. inflation in the 1970s versus the 1990s, or the varying bargaining power of labour), it is necessary to consider sufficiently long samples covering a number of decades, and to include other economies in consideration.

3. Methodology

Following Hahnel and Sherman (1982) and Raffalovich et al. (1992), the multivariate model is estimated, simultaneously testing the above-mentioned hypotheses.

The model in the general form was specified as:

$$LS = f(DGDP, GAP, INFL, UNEMP) \text{ or}$$

$$LS = f(DGDP, CAP, INFL, UNEMP),$$

where LS is the labour share of income, $DGDP$ is the growth rate of the nominal GDP, GAP is the gap between potential and actual GDP, CAP is the capacity utilization measure in the manufacturing sector, $INFL$ is the inflation rate, and $UNEMP$ is the unemployment rate.

In line with the overhead labour, realization failure/wage-lag, and rising strength of labour hypotheses, the following partial relations between independent variables and labour share are expected, *ceteris paribus*:

$$\frac{\partial DGDP}{\partial LS} < 0 \quad \frac{\partial GAP}{\partial LS} < 0 \quad \frac{\partial INFL}{\partial LS} < 0 \text{ and } \frac{\partial UNEMP}{\partial LS} < 0.$$

Two labour share indicators are used in the model. Firstly, the labour share is defined narrowly as the ratio of the compensation of employees in the total economy to the net revenue in the total economy. The latter is the sum of the compensation of employees and the net operating surplus in the total economy. Secondly, the broadly defined labour share is calculated as the ratio of the compensation of employees to GDP at current factor cost, multiplied by the ratio of employment to employees. The use of two alternative indicators is justified by two complementary views of the distributional problem: the short-term view, implying that the current net revenue, if fully allocated to either capital (in the form of profits and operating surplus) or labour (in the form of salaries and wages); and the long-term view, considering distribution of GDP to capital and labour, as well as allocation to for the purpose of technological renewal (investments in the fixed capital) and to intermediate products (Raffalovich et al., 1992: 246).

Likewise, two alternative indicators to test the overhead labour hypothesis are used: capacity utilization in manufacturing and the GDP gap (defined as the gap between actual and trend GDP at constant prices, expressed in percentage terms). The latter measure is introduced to capture the degree of production factors' utilization in the broader economy (given the de-industrialisation processes taking place in the developed economies and the rise of the tertiary sector).

The paper considered the economies of Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, the UK and the USA. Due to data constraints and the absence of GDP gap series for Australia, Canada, New Zealand and Norway, and the absence of one of the labour share indicators for Norway and New Zealand, equations with only three independent variables and/or equations with only one of the labour share indicators were estimated for these economies.

The labour share, inflation, unemployment, GDP gap and GDP growth rates annual data for the industrialised economies was obtained from the European Commission AMECO database. The relevant data codes are ALCD2 (broadly defined labour share), UWCD (compensation of employees), UOND (net operating surplus), AVGDPG (output gap), OVGD (real GDP at 2010 constant prices), ZUTN (unemployment rate in the total economy), and ZCPIN (national CPI index with 2010 as a base period). The manufacturing capacity utilization indicator was obtained from multiple sources (with the performed conversion of the quarterly to annual data): the seasonally adjusted quarterly data for Belgium, Germany, France, Italy, Netherlands, Portugal, Spain and the USA from the OECD 'Main Economic Indicators – Complete Database' (OECD, 2017); and the seasonally adjusted quarterly data for Sweden from the Economic Tendency Survey statistical database of the National Institute of Economic Research (NIER). For New Zealand, the seasonally adjusted capacity utilization indicator covers the total production sector of the economy. It is based on the original work by Edwards and Holmes (1994) incorporated into the methodology of the New Zealand Institute of Economic Research (NZIER) Quarterly Survey of Business Opinion.

The series included in the equation with GDP gap span the periods of 1965-2015 and 1961-2015 (in Australia, Canada, Japan, Norway and New Zealand) and 1967-2015 (USA). The capacity utilization series covers 1978-2016 in Belgium, 1976-2016 in France, 1961-2015 in Germany, 1968-2016 in Italy, 1973-2015 in the Netherlands, 1962-2004 in New Zealand, 1977-2015 in Portugal, 1965-2016 in Spain, 1980-2015 in Sweden, and 1967-2016 in the USA.

As a first step, the integration properties of the variables are examined. Twounit root tests are used: the Phillips-Perron (PP) test, which has unit root as a null hypothesis; and the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test, which has unit root as the alternative hypothesis (Phillips, Perron, 1988; Kwiatkowski et al., 1992). Whilst the Phillips-Perron (PP) test is superior to the Augmented Dickey Fuller (ADF) test in that it computes a residual variance that is robust to serial correlation, similar to Dickey-Fuller type tests, it accepts the null hypothesis of the unit root too often. On the other hand, whilst the KPSS test tends to over-reject the null hypothesis of the stationarity in the series, it is more

suitable for confirmatory analysis, making it possible to distinguish between the series that appear to be stationary, the series that appear to have unit root and the series for which available data is not informative (Kwiatkowski et al., 1992: 176). Therefore, following Amano and van Norden (1992) and Henricsson and Lundback (1995), a combination of KPSS and PP is used to deliver more reliable inference.

The stationarity of all variables would suggest estimation of the relationship between variables using ordinary least squares in levels. The presence of the unit roots in all variables would warrant the use of cointegration tests (e.g. Johansen-Juselius or Engle-Granger cointegration), and if cointegration is detected, the estimation of the long-run cointegrating equation(s) and examination of the short-run dynamics using error correction model (ECM). In the case of more complicated integration patterns (e.g. when several variables are I(0) whilst others are I(1)), application of the bounds test is possible. In the presence of cointegration between the variables, the estimation of the long-run relation and short-run dynamics within the autoregressive distributed lags (ARDL) framework is performed (Pesaran, 1997; Pesaran et al., 2001).

The ARDL model is represented as:

$$\Delta LS_t = \alpha_0 + \sum_{i=1}^{n} \beta_i \Delta LS_{t-i} + \sum_{j=0}^{n} \delta_j \Delta X_{t-j} + \varphi LS_{t-1} + \theta X_{t-1} + \mu_t ,$$

where: LS is the dependent variable, $X_t = [DGDP_t, GAP_t, INFL_t, UNEMP_t]$ is the matrix of independent variables, parameters β_i and δ_j are short-run coefficients, parameters φ and θ are long-run multipliers, Δ is the first-difference operator.

The null hypothesis of no cointegration $H_0 : \varphi = \theta = 0$ is tested against the alternative hypothesis of cointegrating relation $H_a : \varphi \neq 0, \theta \neq 0$ using the F-statistic.

$$LS_t = a + \sum_{i=1}^{p} b_i LS_{t-i} + \sum_{i=0}^{q} c_i X_{t-i} + \varepsilon_t$$

$$LS_t = \gamma a + \gamma \sum_{i=0}^{q} c_i X_t + \gamma \varepsilon_t$$

$$\gamma = \frac{1}{1 - \sum_{i=1}^{p} b_i}$$

There are multiple advantages of using the ARDL framework. In contrast to conventional cointegration tests (Engle and Granger, 1987; Johansen and Juselius, 1990), it has greater power in smaller samples. It also allows a combination of series with different integration properties, e.g. I(0) and I(1), solely I(0) or I(1). It involves the estimation of a single equation rather than a system of equations, and treats long-run and short-run processes simultaneously. It permits a more flexible equation structure by selecting different lags

for each variable and distinguishing between dependent and independent variables. Given that the past levels of the factor shares are significant determinants of the current levels (Metwally and Tamaschke, 1983: 781), ARDL is a particularly suitable model that allows incorporation of the lags of the dependent variable. Finally, it resolves the problem of the conflict between unit root tests not requiring pre-testing of the integration order.

The critical values for the bounds test were provided by Pesaran et al. (2001) for large samples. Given the limited sample in the paper, spanning 50-55 years, an alternative set of critical values was provided by Narayan (2004; 2005) for smaller samples (ranging 30-80 observations). The ARDL model implementable in the econometric software allows for five alternative specifications: (1) no constant, no trend; (2) restricted constant, no trend; (3) unrestricted constant, no trend; (4) unrestricted constant, restricted trend; and (5) unrestricted constant, unrestricted trend. Given the non-trending nature of the data and acknowledging that Narayan critical values are not provided for some of the specifications, the models with unrestricted and restricted constant and without trend were estimated, delivering virtually identical results. The estimates from the model with the unrestricted constant are reported in Section 3.

We note that ARDL model assumes that none of the variables is I(2). Therefore, the unit root tests are implemented on the first differences of the respective variable to ensure that the first difference is I(0). Likewise, the potential conflict between the results of the bounds test and the integration order of the dependent variable is noted: it is possible that the bounds test indicates cointegration between the variables, whilst the unit root tests indicate that the dependent variable is I(0). A set of the unit root tests was therefore performed on the labour share variable to establish that in none of the cases is it I(0).

The bounds test statistics are interpreted as follows. Firstly, if they fall below I(0) bound, it is concluded that all the variables in question are stationary and hence there is no cointegrating relation by definition. The relationship between the variables is then estimated by OLS with variables converted to the first differences. OLS results are interpreted as a one-unit change in the differenced labour share following a one unit change in the differenced independent variables (i.e. as accelerations in the dependent and independent variables). Secondly, if the bounds test statistics exceed I(1) bound, the cointegration is present and long-run and ECM representations are obtained in ARDL model. Thirdly, if the statistics fall within the bounds, the bounds test is seen as inconclusive. In this case, the presence or absence of cointegration is determined based on the significance of the error-correction term (Kremers et al., 1992; Bahmani-Oskooee and Nasir, 2004). Fourthly, if none of the variables in the cointegrating equation are statistically significant despite the bounds test statistics exceeding I(1) and significant error-correction term, the series are considered to be co-moving but not explaining each other, and OLS in first differences as an alternative model is tried. Finally, if there is conflict between models with unrestricted and restricted constants (whereby one model suggests cointegration, whilst the other indicates its absence), both OLS in differences and ARDL models are tried.

Given that the results of the bounds test are sensitive to lag selection, the automatic lag selection is performed based on Schwarz Information Criterion with a maximum of four lags. If diagnostic problems are detected, Akaike Information Criterion is used with up to

six lags (in order to prevent under-estimation of the lag numbers), or fixed lags are set for dependent and independent variables. The usual diagnostic tests are performed (normality, serial correlation, stability, functional form, and heteroscedasticity), with particular emphasis put on preventing serial correlation. Specifically, Section 3 reports results of the Jarque-Bera test for normality, Breusch-Pagan LM test for serial correlation, White or Breusch-Pagan heteroscedasticity tests, and the RESET test for functional form.

4. Empirical results

As a first step, unit root testing was performed. PP and KPSS tests with constant and no trend were applied to the first differences of each of the six series in the 19 economies in question, in order to ensure that none of the variables is I(2). The null hypothesis of the unit root was rejected in most cases, at a 5% significance level. Based on the PP test, the null hypothesis was rejected for the unemployment series in Finland at a 10% significance level. In the KPSS test, the null hypothesis of stationarity was accepted at a 1% level for the GDP growth series in Canada, Denmark and the UK, inflation rate series in the USA, and for GDP gap series in Germany and Sweden.

In addition, PP and KPSS tests were applied to the labour share series in levels to ensure that the dependent variable was not stationary (Table 2 in Appendix). Based on the PP test, the alternative of stationarity was rejected in all cases at a 5% significance level (except for the broadly defined labour share in Germany, Netherlands and Sweden, where it was rejected at a 1% level). The KPSS test identifies stationarity in a greater number of cases: for the narrowly-defined labour share – in Belgium and the UK; and for the broadly-defined labour share – in Australia, Austria, Finland, Germany, Italy, Netherlands, New Zealand, Portugal and Sweden. In these instances, DF-GLS and ERS tests are used to confirm the presence of the unit root.

Table 1. *Unit root test results (first difference of the variables)*

Country	DGDP		GAP		INFL		UNEMP		LS1		LS2	
	PP	KPSS	PP	KPSS	PP	KPSS	PP	KPSS	PP	KPSS	PP	KPSS
Australia	-37.29	0.39	NA	NA	-6.87	0.16	-5.63	0.16	-7.84	0.15	-7.68	0.15
Austria	-19.81	0.08	-9.75	0.13	-7.57	0.05	-6.28	0.07	-7.73	0.09	-6.85	0.19
Belgium	-28.45	0.22	-11.42	0.11	-6.30	0.10	-3.75	0.22	-5.06	0.28	-5.16	0.22
Canada	-29.85	**0.50**	NA	NA	-6.57	0.18	-5.01	0.08	-7.16	0.11	-6.94	0.12
Denmark	-35.41	**0.50**	-6.60	0.10	-8.51	0.09	-4.82	0.11	-7.49	0.13	-9.15	0.32
Finland	-14.49	0.19	-6.67	0.11	-6.15	0.09	*-2.69*	0.13	-6.49	0.23	-5.45	0.13
France	-22.11	0.22	-6.28	0.08	-6.27	0.16	-4.71	0.18	-5.24	0.14	-4.94	0.11
Germany	-23.05	0.26	-15.70	**0.50**	-4.83	0.05	-3.53	0.45	-5.68	0.12	-5.39	0.23
Greece	-9.27	0.03	-5.66	0.14	-6.72	0.25	-3.04	0.18	-6.67	0.21	-6.51	0.06
Italy	-31.37	0.12	-9.57	0.25	-6.62	0.14	-4.42	0.07	-6.44	0.17	-5.86	0.13
Japan	-14.49	0.04	NA	NA	-9.78	0.08	-4.67	0.14	-5.52	0.08	-6.11	0.32
Netherlands	-10.98	0.19	-6.43	0.12	-7.57	0.06	-4.72	0.15	-7.38	0.17	-7.33	0.21
New Zealand	-24.39	0.14	NA	NA	-8.71	0.23	-4.57	0.10	NA	NA	-6.62	0.17
Norway	-27.39	0.28	NA	NA	-11.42	0.16	-4.50	0.05	-7.14	0.16	NA	NA
Portugal	-10.97	0.21	-3.74	0.10	-8.25	0.20	-3.98	0.07	-3.96	0.12	-5.00	0.12
Spain	-8.18	0.10	-4.09	0.05	-7.26	0.06	-3.75	0.08	-6.11	0.11	-4.83	0.21
Sweden	-18.19	0.25	-13.62	**0.50**	-9.01	0.16	-3.51	0.08	-5.78	0.08	-6.11	0.08
UK	-24.37	**0.50**	-8.96	0.32	-7.76	0.24	-3.30	0.24	-5.42	0.16	-4.77	0.10
USA	-18.62	0.22	-10.57	0.30	-9.67	**0.50**	-4.53	0.15	-6.17	0.07	-5.77	0.30

Note: PP test (constant, no trend) 1%, 5% and 10% critical values are -3.560, -2.917 and -2.597; KPSS test (constant, no trend) 1%, 5% and 10% critical values are 0.739, 0.463 and 0.347. Stationarity at 1% level is indicated in bold; at 10% level in italicized bold.

Secondly, a bounds test of cointegration was performed. The results of the bounds tests performed on the narrowly and broadly defined labour shares are shown in Tables 3 and 4 respectively. Each of the tables contains bounds test's F-statistics and the t-ratio for the error-correction term obtained from the ARDL model without restricted constant. The model with restricted constant was also estimated and delivered similar results. The lag structure and the selection criterion are indicated, as are the dummy variables to ensure the stability of the model. The last column of the tables contains the overall conclusion on the presence of cointegration.

In the case of the model with the narrowly defined labour share, the bounds test identified cointegration relationships in Denmark, Finland, France, Germany, Japan, the UK and the USA. For Belgium, Netherland and Portugal, some form of co-movement among the series was present in the absence of an equilibrium relationship and common stochastic trend. No cointegration relation was detected amongst the series in Australia, Austria, Canada, Italy, Spain and Sweden. For Greece and Norway, the results of the bounds test were inconclusive, as F-statistics were located between the lower and upper bounds. However, the statistically significant error-correction term may indicate that cointegration is nonetheless present (Kremers et al., 1992). The relevant dummy variables corresponded to salient political and economic events and developments in the respective countries.

Table 3. *Bounds test results (narrowly defined labour share)*

Country	F-statistics	ECT t-ratio	Model - URC	Dummies	Outcome
Australia	2.497	-5.584	(1,1,0,0) S	1974 2008	No cointegration
Austria	2.755	-5.379	(4,0,3,1,0) A	1970 1982	No cointegration
Belgium	5.731	-5.917	(1,2,2,0,0) A	NA	No cointegration (*)
Canada	2.679	-2.413	(1,0,0,0) S	NA	No cointegration
Denmark	10.501	-5.699	(1,0,1,3,0) S	2000	Cointegration
Finland	5.311	-6.155	(4,1,2,0,0) S	1975	Cointegration
France	8.121	-6.724	(1,0,0,0,0) S	NA	Cointegration
Germany	5.727	-5.201	(3,4,1,0,0) A	NA	Cointegration
Greece	3.857	-4.554	(3,0,1,0,1) S	NA	Inconclusive (**)
Italy	1.456	-1.963	(1,0,1,0,0) S	NA	No cointegration
Japan	18.032	-8.771	(1,1,1,2) S	NA	Cointegration
Netherlands	5.057	-5.293	(1,1,2,2,1) S	NA	No cointegration (*)
Norway	3.793	-3.558	(1,0,0,0) S	2000	Inconclusive (**)
Portugal	4.466	-5.641	(3,1) Fixed	1983-4	No cointegration (*)
Spain	1.829	-3.225	(4,3,0,1,1) S	NA	No cointegration
Sweden	1.877	-3.224	(2,0,3,2,4) A	NA	No cointegration
UK	6.021	-3.081	(2,0,0,0,0) S	NA	Cointegration
USA	5.069	-5.438	(5,5,1,1,4) A	NA	Cointegration

Note: (*) represents comovement in the absence of cointegration.
(**) represents possibility of cointegration, if ECT t-test is used as decision rule.
Critical values for F-statistics (T = 55) at the 5% level (Narayan, 2004).

# of regressors	k=4		k=3	
Bounds	I(0)	I(1)	I(0)	I(1)
Unrestricted constant, no trend	3.068	4.334	3.408	4.623

Critical values for F-statistics pertain to the sample size T=55. k represent the number of regressors.
A and S represent Akaike and Schwartz information criteria respectively. URC stands for model with unrestricted constant.
T-statistics critical values for n=50 are 2.678 (1% level), 2.009 (5% level) and 1.676 (10% level).

For Australia and Finland, the dummy represented the mid-1970s recession; for Portugal the 1983-4 dummy stood for the EC accession and accompanying economic reforms; for Norway, the 2000 dummy represented the decline in oil prices in the international market; and for Denmark, the 2000 dummy indicated the economic slowdown associated with increases in interest rates, decline in private consumption and transition from domestic- to foreign-demand-driven growth. We note that for smaller European economies, short-term fluctuations and outliers did not always correspond to broader international or European cycle movements (Andersen, 2001).

For the model with broadly defined labour share as a dependent variable, the bounds test indicated the presence of cointegration in Belgium, Denmark, Finland, Portugal, the UK and the USA. The series in Australia, Austria, Japan, Spain and Sweden were characterized by the absence of a common stochastic trend, whilst the relationships in Canada, France and Greece were undefined (with possible cointegration if ECT t-ratio were used as a decision rule). Comovement among the series without any long-run relation was likely in Germany and Netherlands. In Italy and New Zealand, the models with unrestricted and restricted constants gave conflicting results, requiring consideration of both OLS and ARDL models (as shown in Table 6). In the case of Italy, the ARDL model was found unstable; hence, only OLS results were retained.

Table 4. *Bounds test results (broadly defined labour share)*

Country	F-statistics	ECT t-ratio	Model - URC	Dummies	Outcome
Australia	3.264	-4.027	(1,1,0,0) S	2008	No cointegration
Austria	1.297	-2.664	(3,0,3,0,0) S	NA	No cointegration
Belgium	15.431	-6.745	(1,0,0,0,0) S	NA	Cointegration
Canada	3.792	-3.642	(1,1,1,0) S	NA	Inconclusive (**)
Denmark	5.229	-6.468	(4,4,3,3,0) A	2000, 2011	Cointegration
Finland	21.402	-6.235	(4,1,0,0,0) S	NA	Cointegration
France	3.395	-5.252	(4,1) Fixed	1983	Inconclusive (**)
Germany	6.095	-5.877	(4,2) Fixed	NA	No cointegration (*)
Greece	3.506	-4.783	(3,1,0,0,1) S	1989, 2002	Inconclusive (**)
Italy	2.885	-4.008	(2,1,4,0,2) S	NA	Conflicting results (***)
Japan	2.459	-6.036	(2,0) Fixed	NA	No cointegration
Netherlands	6.896	-6.181	(1,1,2,2,1) S	NA	No cointegration (*)
New Zealand	3.547	-4.579	(1,0,0,0) S	1974, 1976	Conflicting results (***)
Portugal	5.816	-7.422	(4,0,0,2,0) S	1983-4	Cointegration
Spain	2.366	-4.675	(4,0,0,0,1) S	NA	No cointegration
Sweden	2.853	-3.517	(3,1,0,2,4) S	NA	No cointegration
UK	8.465	-3.691	(1,0,0,0,0) S	NA	Cointegration
USA	6.076	-5.516	(3,0,3,1,0) A	NA	Cointegration

Note: As per Table 3.
(***) represents different results (cointegration vs. no cointegration) under URC and RC (restricted constant) models.

The estimates from the ARDL and OLS models are presented in Tables 5 and 6. It is shown that in all economies except Australia and New Zealand (Tables 5 and 6), at least one of the macroeconomic variables in question had a negative effect on labour share, in line with the stated hypotheses. The two economies which saw no effects are both characterized by a substantial primary sector (mining in Australia, agriculture in New Zealand) and hence were facing volatile international prices: a factor that could distort aggregate business sector indicators.

Table 5. *Estimates of the long-run relationships (narrowly defined labour share as dependent variable)*

Country	DGDP	GAP	INFL	UNEMP	Model	R^2_{adj}	JB	LM	RESET	Hetero.
Australia	-0.001		0.003	-0.001	OLS	0.55	0.61	0.70	0.75	0.29^
	(-1.23)		(2.90)	(-0.57)			(0.74)			
Austria	-0.001	0.001	0.000	0.006	OLS	0.23	6.85	0.11	0.32	0.55*
	(-3.08)	(0.68)	(-0.19)	(1.52)			(0.03)			
Belgium	0.001	-0.004	0.001	0.000	OLS	0.22	1.82	0.14	0.67	0.18*
	(1.66)	(-3.55)	(1.38)	(0.20)			(0.40)			
Canada	*-0.001*		0.000	0.004	OLS	0.18	0.38	0.90	0.26	0.18*
	(-1.85)		(0.12)	(2.21)			(0.83)			
Denmark	0.006	0.001	0.005	-0.005	ARDL	0.94	0.77	0.90	0.60	0.20^
	(1.07)	(0.50)	(5.26)	(-2.10)			(0.68)			
Finland	*-0.027*	-0.004	-0.002	-0.022	ARDL	0.97	0.72	0.22	0.31	0.68^
	(-2.01)	(-0.57)	(-0.36)	(-3.13)			(0.70)			
France	-0.009	-0.009	0.006	-0.010	ARDL	0.98	1.34	0.41	0.46	0.60*
	(-2.83)	(-5.27)	(6.28)	(-5.12)			(0.51)			
Germany	0.008	-0.027	-0.015	-0.026	ARDL	0.98	1.09	0.44	0.70	0.50^
	(0.46)	(-1.09)	(-1.03)	(-2.13)			(0.58)			
Greece	-0.014	-0.009	-0.006	-0.013	ARDL	0.81	1.51	0.66	0.33	0.96^
	(-2.61)	(-4.15)	(-3.61)	(-4.18)			(0.47)			
Italy	-0.001	0.000	0.000	-0.003	OLS	0.35	4.24	0.87	0.52	0.98*
	(-4.48)	(-0.31)	(0.27)	(-1.63)			(0.12)			
Japan	-0.014		0.013	-0.036	ARDL	0.98	0.51	0.92	0.49	0.48*
	(-3.06)		(4.00)	(-2.91)			(0.77)			
Netherlands	0.000	-0.006	0.000	-0.003	OLS	0.24	0.27	0.19	0.86	HW
	(0.43)	(-4.91)	(-0.31)	(-1.06)			(0.88)			
Norway	-0.001		-0.001	-0.040	ARDL	0.90	1.26	0.44	0.32	0.14*
	(-0.08)		(-0.08)	(-2.10)			(0.53)			
Portugal	0.002	-0.012	0.000	-0.014	OLS	0.55	2.63	0.19	0.06	0.31*
	(2.39)	(-6.83)	(-0.37)	(-4.17)			(0.27)			
Spain	0.000	-0.004	-0.001	-0.003	OLS	0.17	0.77	0.06	0.50	0.63*
	(0.74)	(-2.70)	(-1.28)	(-2.59)			(0.68)			
Sweden	-0.002	0.001	0.000	-0.002	OLS	0.18	1.05	0.08	0.09	0.54*
	(-2.78)	(1.00)	(-0.36)	(-0.69)			(0.59)			
UK	-0.011	0.000	0.000	-0.005	ARDL	0.84	4.15	0.48	0.58	0.18*
	(-2.27)	(-0.06)	(0.42)	(-3.08)			(0.13)			
USA	0.022	0.018	-0.005	0.005	ARDL	0.96	0.87	0.19	0.59	0.53^
	(8.59)	(5.06)	(-3.04)	(2.68)			(0.65)			

Note. T-statistics are indicated in parentheses. T-statistics critical values for n=50 are 2.678 (1% level), 2.009 (5% level) and 1.676 (10% level). Statistically significant variables with correct sign are shown in italics (5% significance level) or italicized bold (10% significance level). LM is the Lagrange Multiplier test of error term serial correlation. JB is Jarque-Bera test for normality in residuals (p-values in parentheses). RESET is the functional form test (p-values). Hetero. is White (*) or Breusch-Pagan (^) test of heteroscedasticity. HW represents Huber-White heteroskedasticity-robust standard errors.

Regarding realization failure and wage-lag hypotheses, a negative relationship between GDP growth and labour share was identified in Austria, Belgium, Canada, Denmark, Finland, France, Italy, Japan, Portugal, Sweden and the UK, and between inflation and labour share in Greece and the US. The negative coefficients for GDP growth appear to be consistent with the assumption of the labour-saving technical change and rising elasticity of substitution of labour for capital. The GDP growth coefficients in several economies (Germany, Greece, Portugal, Spain and the US) may be attributed to the labour-augmenting technical change that was documented in certain cases (Amaral and Nunes, 2009, in Spain and Portugal; Kohli, 2011, and Lawrence, 2015, in the USA).

The negative coefficient for the inflation variable in Greece is puzzling, given the strong power of the Greek collective labour and wages growth in excess of productivity growth in the 1990s and the early 2000s (Manasse, 2015). The negative effect may be related

mostly to the 1960-70s period when output growth was accompanied by wage repression, resulting in the decline of labour share from 90% in 1960 to 60% in 1970 (European Commission, 2007: 240), and to the fall in real wages in the post-GFC period (Stuchlik, 2015; Gallant, 2016: 279).

Table 6. *Estimates of the long-run relationships (broadly defined labour share as dependent variable)*

Country	DGDP	GAP	INFL	UNEMP	Model	R^2_{adj}	JB	LM	RESET	Hetero.
Australia	0.000		0.003	-0.002	OLS	0.18	0.28	0.25	0.07	HW
	(-0.84)		(2.14)	(-0.47)			(0.87)			
Austria	-0.001	0.002	0.000	0.012	OLS	0.10	1.05	0.44	0.05	0.60*
	(-1.29)	(1.06)	(-0.08)	(2.16)			(0.59)			
Belgium	*-0.049*	0.030	0.007	-0.031	ARDL	0.94	1.12	0.71	0.12	0.28*
	(-1.94)	(1.75)	(1.49)	(-1.37)			(0.57)			
Canada	-0.052		0.006	-0.060	ARDL	0.80	0.48	0.22	0.43	0.10*
	(-0.69)		(0.56)	(-0.68)			(0.79)			
Denmark	-0.030	0.005	0.000	0.004	ARDL	0.95	0.87	0.11	0.58	0.96^
	(-6.41)	(2.15)	(0.19)	(2.19)			(0.65)			
Finland	-0.043	0.011	0.005	*-0.028*	ARDL	0.93	3.50	0.35	0.81	0.04^
	(-2.63)	(1.14)	(1.22)	(-1.92)			(0.17)			
France	-0.037	*-0.005*	0.003	*-0.007*	ARDL	0.97	1.91	0.43	0.28	0.39^
	(-6.03)	(-1.97)	(3.09)	(-2.05)			(0.39)			
Germany	0.001	-0.007	0.004	-0.006	OLS	0.36	0.56	0.10	0.06	0.10*
	(2.40)	(-5.38)	(2.85)	(-2.56)			(0.76)			
Greece	-0.024	0.002	-0.006	-0.002	ARDL	0.98	1.65	0.14	0.14	0.21^
	(-4.04)	(0.92)	(-2.89)	(-0.49)			(0.44)			
Italy	-0.001	-0.001	0.001	-0.002	OLS	0.22	1.20	0.20	0.23	0.99*
	(-3.01)	(-1.29)	(0.84)	(-0.93)			(0.55)			
Japan	0.000		0.003	0.015	OLS	0.36	0.39	0.43	0.10	0.93*
	(0.51)		(3.66)	(2.56)			(0.83)			
Netherlands	0.001	-0.008	0.000	-0.004	OLS	0.30	0.42	0.22	0.81	HW
	(1.39)	(-6.21)	(-0.21)	(-1.29)			(0.81)			
New Zealand	-0.008		0.007	-0.003	ARDL	0.92	0.92	0.52	0.51	0.04*
	(-2.39)		(4.16)	(-0.87)			(0.63)			
New Zealand	0.000		0.003	0.003	OLS	0.16	6.93	0.66	0.36	0.61*
	(-0.51)		(3.12)	(0.78)			(0.03)			
Portugal	-0.011	-0.011	-0.001	-0.020	ARDL	0.94	0.12	0.44	0.05	0.70^
	(-2.42)	(-2.52)	(-0.45)	(-3.20)			(0.94)			
Spain	0.002	-0.005	0.000	*-0.003*	OLS	0.26	0.73	0.11	0.89	0.81*
	(4.13)	(-3.94)	(-0.10)	(-2.63)			(0.70)			
Sweden	-0.002	0.001	0.000	-0.003	OLS	0.11	0.84	0.07	0.02	0.44*
	(-2.24)	(0.55)	(0.04)	(-0.68)			(0.66)			
UK	*-0.011*	-0.002	0.004	-0.009	ARDL	0.90	2.33	0.17	0.47	0.71*
	(-2.07)	(-0.65)	(3.79)	(-4.28)			(0.31)			
USA	0.021	0.028	*-0.007*	0.010	ARDL	0.90	0.97	0.71	0.64	0.62^
	(3.75)	(2.66)	(-1.95)	(2.27)			(0.62)			

Note: As per Table 5.

In the US, the negative coefficient for the inflation rate is an illustration of the low bargaining power of organized labour in the post-war period and declining real wages. (Western, Healy (1999: 234) demonstrate a decline in manufacturing real wages in the US between 1974 and 1992, in contrast to the slowdown in most other OECD economies. Rosenfeld (2006) discusses the decline in the collective bargaining capacity of labour and in the union membership in the USA.

The positive relationship between inflation rate and labour share (Australia, Denmark, France, Germany, Japan, New Zealand and the UK) appears to support the wage-push hypothesis, which proposes growth in compensation of employees exceeding net revenue

growth, or higher wage demands causing greater increases in output prices (Scherer, 1980: 352). Excessive wage growth is documented by Berger, Wolff (2017: 5) in France in the 1998-2017 period, and by Collignon (2016) in Japan, France and Germany during 1995-2015 period, where wages were above equilibrium wages. The Economist Intelligence Unit (2016) likewise indicates pervasive increases in labour costs ahead of productivity in Germany and France in the period of 2010-15.

With regard to the rising strength of labour hypothesis, a significant and negative relationship between the unemployment rate and labour share has been identified in Denmark, Finland, France, Germany, Greece, Italy, Japan, Portugal, Spain and the UK, if a narrowly defined labour share is used, and in Finland, Germany, Greece, Portugal, Spain and the UK, if broadly defined labour share is considered. Significant and positive relationships were identified in Austria, Canada, Denmark, France, Japan and the US. In case of the USA and Japan, a higher unemployment rate is not translated into a lower labour share, due to an increase in the average hours worked by an employee. (OECD (1998: 155) demonstrates that the level of average annual working hours in the US and Japan was consistently higher in the 1960-96 period than in peer OECD economies.) In Austria, Denmark and France, the positive relationship can likely be attributed to an increase in compensation rates (Economist Intelligence Unit, 2016).

Concerning the overhead labour hypothesis, a significant negative relationship between GDP gap and labour share is identified in Belgium, Germany, Greece, France, Netherlands, Portugal and Spain. A positive relationship is shown in Denmark, France and the US. The direct evidence of overhead labour retention and labour-hoarding was scant, as the appropriate level of employment is not observable. Likewise, the majority of studies were confined to the investigation of the hoarding of total labour, rather than overhead labour specifically. In addition, they tended to focus on particular cyclical episodes. Hence, establishing the validity of the above results may be problematic.

Arguably, the negative relationship was observed in a greater number of cases, given the typically wide spread of labour-hoarding. Fay and Medoff (1985) indicate 4% of the blue collar labour hours were being hoarded during the early-1980 recessions in the US. Van den Berge et al. (2014) likewise show disproportionately small layoffs of labour during the 2009 downturn in the Netherlands. On the other hand, all the negative relationships between the GDP gap and labour share that were identified were observed in Europe, thus confirming the earlier result by the OECD (2010) of slow adjustment of total employment to GDP decline in European economies. Why negative relationships were not present in Denmark and France remains a puzzle to be clarified in further research.

As a robustness check and in line with earlier studies, the paper considered the manufacturing capacity utilization ratio as an alternative independent variable. The above-mentioned estimation procedure (bounds test followed by ARDL or OLS estimation) was applied. Whilst results are not comparable with the estimates which have GDP gap as an independent variable (due to their different sample lengths), similar relationships are observed (as shown in Tables 7 and 8 in the Appendix). Additional significant and negative coefficients are obtained for Netherlands (GDP growth rate),

New Zealand (manufacturing capacity utilization), Portugal (inflation), Sweden (GDP growth rate) and the US (unemployment).

Overall, a significant and negative coefficient for DGP growth rate was present in 9-10 economies (equations with narrowly and broadly defined labour shares), for GDP gap in 5-6 economies, for unemployment rate in 6-10 economies, and for inflation rate in two economies (Table 9). The estimates for the equation of manufacturing capacity utilization rate do not alter the results dramatically: increases in GDP growth rate decrease labour share in 3-6 economies, whilst increases in unemployment rate decrease labour share in 4-6 economies, respectively. A significant negative relationship between capacity utilisation and labour share is indicated in two and five economies, and between inflation rate and labour share in one economy.

The fact that inflation is an insignificant determinant of labour share in most cases (Greece and the US being the exceptions) requires further investigation into the strength of organized labour in maintaining income share during the inflation periods and the state of income and price policies in the respective economies. In general, the minimal influence of inflation on labour share is consistent with findings by Raffalovich et al. (1992) and Hibbs (1987), and the study of the New Keynesian Phillips Curve in the European economies using sectoral data by Lawless and Whelan (2007). The large number of positive coefficients for inflation is consistent with Metwally and Tamaschke (1983: 781), when it comes to results for Australia, France, Germany and the UK.

Table 9. *Significant regressors with correct sign*

Country	Models with GDP gap as regressor		Models with manufacturing capacity as regressor	
	Dependent variable		Dependent variable	
	LS1	LS2	LS1	LS2
Australia	NONE	NONE		
Austria	DGDP	NONE		
Belgium	GAP	DGDP	DGDP	UNEMP
Canada	DGDP	NONE		
Denmark	UNEMP	DGDP		
Finland	DGDP, UNEMP	DGDP, UNEMP		
France	DGDP, GAP, UNEMP	DGDP, GAP, UNEMP	DGDP	DGDP, CAP, UNEMP
Germany	UNEMP	GAP, UNEMP	CAP, UNEMP	CAP, UNEMP
Greece	DGDP, GAP, INFL, UNEMP	DGDP, INFL		
Italy	DGDP	DGDP	DGDP, UNEMP	DGDP, CAP
Japan	DGDP, UNEMP	NONE		
Netherlands	GAP	GAP	DGDP	NONE
New Zealand		DGDP or NONE		CAP
Norway	UNEMP			
Portugal	GAP, UNEMP	DGDP, GAP, UNEMP	INFL, UNEMP	INFL
Spain	GAP, UNEMP	GAP, UNEMP	CAP, UNEMP	CAP
Sweden	DGDP	DGDP	DGDP, UNEMP	DGDP, UNEMP
UK	DGDP, UNEMP	DGDP, UNEMP		
USA	INFL	INFL	DGDP, UNEMP	NONE
Summary of cases				
DGDP	9	10	6	3
GAP/CAP	6	5	2	5
INFL	2	2	1	1
UNEMP	10	6	6	4

On the other hand, our results contravene the estimates by Alcala-Agullo and Sancho (2000), who identified positive and significant inflation coefficients in 13 OECD economies. However, different studies are conducted on varied samples, hence direct comparison of results may be unwarranted. For Australia, significant coefficients (albeit with an incorrect sign) were obtained only for inflation. This contravenes results by Macri and Sinha, who found support for all three hypotheses. In the US's case, significant coefficients with the correct sign were obtained for inflation rate and GDP gap, thus giving certain support to the 'overhead labour' and 'wage lag' hypotheses, in line with earlier studies.

5. Conclusion

This paper investigated the effect of principal macroeconomic determinants on labour share in OECD economies. The fluctuations in the two labour share indicators (the ratio of labour compensation to national income, and labour share adjusted for mixed income and depreciation) were examined in relation to change in prices, unemployment rate, GDP growth rate, capacity utilization in manufacturing, and GDP gap. Three hypotheses were tested (the realization failure/wage gap, overhead labour, and relative strength of labour). The former two explain labour share in terms of capacity utilization, output and price level, and postulate a fall in labour share during expansions. The latter explains labour share in terms of unemployment and argues that labour share rises in late expansions. A combination of econometric methods was employed: unit root testing, the bounds test for cointegration, the ARDL method to establish short- and long-run relationships, and the conventional OLS method.

The results suggest that in all cases except Australia and Norway, macroeconomic performance conditions functional income distribution, with at least one of the hypotheses finding support. Country-specific patterns in labour share determinants were prominent, thereby precluding broader generalizations. GDP growth rate and unemployment appeared to be the dominant factors, whilst GDP gap, manufacturing capacity utilization and inflation were of lesser importance. Thus, rising strength of labour and wage-lag hypotheses found most support. On the other hand, the results of the study point to the suggestion that in too many cases, macroeconomic factors leave the evolution of labour share unexplained, indicating that the political-economic and structural determinants identified in the literature are likely to be remain salient factors.

The estimates provided do not constitute final confirmation or rejection of the hypotheses. Firstly, given the deep transformation of the national and global economies in past decades, as well as multitude of driving forces of the labour share in addition to those discussed in the paper (privatization, greater openness, the strength of collective labour, amongst others), a more formal procedure may be needed to explicitly incorporate structural breaks (e.g. the Bai-Perron procedure, or unit root tests with structural breaks) into the estimation. Likewise, a separate analysis of the hypotheses (preferably based on the quarterly data) may be required for each sub-period. Secondly, the definition of the overhead labour has to be finessed, e.g. by incorporating the ratio of unproductive supervisory to productive labour, as an intervening variable, in line with Moseley's (1987) suggestion. Thirdly, other variables that could explain labour share – population size, government consumption, manufacturing output and degree of industrialization, gross fixed capital formation – may be considered, as suggested by Metwally and Tamashke (1986). Finally, a decomposition of labour share may be performed to investigate the specific mechanisms through which macroeconomic variables affect labour share (e.g. through changes in the level of employment, or the level of labour compensation or net revenue).

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Appendix

Table 2. *Unit root test results (the levels of the dependent variables)*

Country	LS1				LS2			
	PP	KPSS	DF-GLS	ERS	PP	KPSS	DF-GLS	ERS
Australia	-1.16	0.50			-2.25	*0.26*	-1.92	5.00
Austria	-0.92	0.87			-2.22	*0.19*	-1.34	11.86
Belgium	-2.41	*0.18*	-1.11	11.65	-2.68	0.39		
Canada	-1.95	0.80			-2.52	0.39		
Denmark	-1.26	0.76			-2.80	0.80		
Finland	-1.62	0.80			-2.27	*0.16*	-1.64	6.50
France	-1.40	0.70			-1.82	0.38		
Germany	-0.83	0.80			-2.64	*0.19*	-1.05	24.39
Greece	-2.72	0.37			-0.41	0.90		
Italy	-1.55	0.83			-1.61	*0.15*	-1.31	7.16
Japan	-0.91	0.67			-2.55	0.76		
Netherlands	-1.07	0.73			-2.85	*0.24*	-1.69	8.98
New Zealand					-1.80	*0.19*	-1.42	8.57
Norway	-1.29	0.77						
Portugal	-1.49	0.52			-2.19	*0.24*	-2.46	2.20
Spain	-0.37	0.91			-2.31	0.69		
Sweden	-1.65	0.68			-2.75	*0.11*	-2.53	2.65
UK	-2.10	*0.22*	-1.98	4.04	-1.85	0.36		
USA	-0.96	0.82			-1.81	0.71		

Note: PP test (constant, no trend) 1%, 5% and 10% critical values are -3.560, -2.917 and -2.597; KPSS test (constant, no trend) 1%, 5% and 10% critical values are 0.739, 0.463 and 0.347; DF-GLS test (constant, no trend) 1%, 5% and 10% critical values are -2.609, -1.947; ERS PO test (constant, no trend) 1%, 5% and 10% critical values are 1.876, 2.981 and 3.931. Unit root null (PP test) at 1% level is shown in bold; stationarity null (KPSS) at 5% level is shown in bold and italics.

Table 7. *Bounds test and estimates of the long-run relationships (narrowly defined labour share as dependent variable, manufacturing capacity utilization as regressor)*

Country	Model - URC	F-statistics	ECT t-ratio	Model	DGDP	CAPUTIL	INFL	UNEMP	R^2_{adj}	JB	LM	RESET	Hetero.
Belgium	(2,0,2,0,0) S	2.642		OLS	-0.003	0.005	0.000	-0.001	0.21	1.32	0.25	0.06	HW
					(-2.12)	(1.44)	(0.40)	(-0.60)		(0.52)			
France	(2,1) FIX	2.679		OLS	-0.003	0.006	0.003	0.002	0.49	1.21	0.57	0.59	HW
					(-3.75)	(2.49)	(2.64)	(1.20)		(0.55)			
Germany	(4,3,0,0,1) A	1.330		OLS	0.000	-0.164	0.002	-0.004	0.43	0.51	0.09	0.25	HW
					(-0.56)	(-5.83)	(2.54)	(-3.19)		(0.77)			
Italy	(1,0,1,0,0) S	1.083		OLS	-0.003	0.036	0.000	-0.003	0.53	0.32	0.18	0.11	0.68*
					(-5.68)	(5.86)	(0.22)	(-2.10)		(0.85)			
Netherlands	(1,1,0,1,0) S	0.963		OLS	-0.002	-0.095	-0.001	-0.003	0.42	2.02	0.99	0.43	HW
					(-2.57)	(-0.86)	(-1.01)	(-1.36)		(0.36)			
Portugal	(3,0,0,0,0) S	11.219	-5.797	ARDL	-0.002	-0.430	-0.005	-0.018	0.89	1.16	0.13	0.85	0.57^
					(-0.46)	(-0.96)	(-2.25)	(-3.96)		(0.56)			
Spain	(4,4,3,1,4) A	1.257		OLS	0.001	*-0.086*	-0.001	-0.001	0.37	0.96	0.50	0.32	0.72^
					(1.68)	(-1.73)	(-1.17)	(-2.83)		(0.62)			
Sweden	(2,0) Fixed	7.209	-4.099	ARDL	-0.007	0.089	-0.002	-0.005	0.72	0.09	0.33	0.90	0.36*
					(-2.17)	(0.44)	(-0.93)	(-2.35)		(0.96)			
USA	(2,1) FIX	1.064		OLS	-0.002	0.006	0.001	*-0.003*	0.16	1.81	0.15	0.19	0.90*
					(-2.59)	(2.03)	(1.58)	(-1.94)		(0.41)			

Note: T-statistics are indicated in parentheses. T-statistics critical values for n = 50 are 2.678 (1% level), 2.009 (5% level) and 1.676 (10% level). Statistically significant variables with correct sign are shown in italics (5% significance level) or italicized bold (10% significance level). LM is the Lagrange Multiplier test of error term serial correlation. JB is Jarque-Bera test for normality in residuals (p-values in parentheses). RESET is the functional form test (p-values). Hetero. is White (*) or Breusch-Pagan (^) test of heteroscedasticity. HW represents Huber-White heteroskedasticity-robust standard errors.

Table 8. *Bounds test and estimates of the long-run relationships (broadly defined labour share as dependent variable, manufacturing capacity utilization as regressor)*

Country	Model - URC	F-statistics	ECT t-ratio	Model	DGDP	CAPUTIL	INFL	UNEMP	R^2 adj	JB	LM	RESET	Hetero.
Belgium	(1,1) FIX	4.010	-4.787	ARDL	-0.012	0.872	0.008	*-0.028*	0.89	0.94	0.11	0.65	HW
					(-0.99)	(1.46)	(1.45)	(-1.92)		(0.63)			
France	(3,0,2,4,0) S	6.487	-6.208	ARDL	*-0.013*	-2.484	-0.002	*-0.016*	0.98	1.32	0.32	0.96	0.07^
					(-1.94)	(-3.18)	(-0.81)	(-1.78)		(0.52)			
Germany	(2,1) FIX	1.867		OLS	0.001	-0.295	0.002	-0.004	0.59	1.57	0.45	0.18	0.71^
					(2.81)	(-8.36)	(2.20)	(-2.33)		(0.46)			
Italy	(1,0,1,0,0) S	2.218		OLS	-0.002	-0.176	0.000	-0.002	0.57	2.68	0.58	0.45	0.61^
					(-2.79)	(-3.65)	(1.21)	(-1.23)		(0.26)			
Netherlands	(1,1,0,2,4) S	1.025		OLS	-0.001	-0.166	-0.001	-0.003	0.38	1.01	0.97	0.31	0.07*
					(-1.58)	(-1.15)	(-0.84)	(-1.44)		(0.60)			
New Zealand	(4,1) Fixed	4.951	-6.095	ARDL	0.003	*-2.616*	0.001	-0.015	0.93	1.20	0.24	0.08	0.19^
					(0.60)	(-1.93)	(0.28)	(-1.53)		(0.55)			
Portugal	(3,3,0,3,0) S	7.975	-6.695	ARDL	-0.005	0.412	*-0.002*	-0.002	0.80	4.17	0.11	0.45	0.39^
					(-1.29)	(1.21)	(-1.72)	(-0.56)		(0.12)			
Spain	(4,0,2,0,1) S	2.096		OLS	0.001	-0.125	0.000	-0.000	0.32	0.79	0.79	0.94	0.91^
					(3.48)	(-2.29)	(0.78)	(-0.39)		(0.67)			
Sweden	(2,1) FIX	1.792		OLS	-0.010	0.027	0.001	-0.018	0.67	0.27	0.55	0.25	0.99*
					(-7.74)	(6.35)	(0.89)	(-6.42)		(0.87)			
USA	(4,1,2,1,0) A	5.026	-6.265	ARDL	0.008	0.238	0.002	0.004	0.94	1.70	0.18	0.90	0.07^
					(2.97)	(2.20)	(1.86)	(1.57)		(0.43)			

Note: As per Table 7.

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Analysis of the investments made on the Romanian capital market by the privately managed pension funds – Pillar II

Alexandra DARMAZ-GUZUN
West University of Timisoara, Romania
alexandraguzun@yahoo.com

Abstract. *The Pillar II appeared on the Romanian market in order to provide to the population an alternative source of income at the retirement time on one hand, but also to stimulate the increase of the capital market liquidity through investments made by the private fund managers on the other hand. Through the current study, I wanted to make an analysis of the investments made on the Romanian capital market of the privately managed pension funds (pillar II). The subject is very topical at present and the purpose of the paper is to identify whether these funds are major players on the capital markets and what investment instruments they use. In this regard, we made a linear regression in Excel, with several factors influencing the results, as well as a regression in Eviews, using data between May 2008 and December 2017. The most representative was a statistically significant correlation between the value of the investments and the value of total assets of privately managed pension funds.*

Keywords: private pension funds, investments, capital markets, pillar II, occupational pension.

JEL Classification: G11, G28, J26, J32.

Introduction

Pension reform has taken place throughout the world, in Central and Eastern Europe, starting with 1994 when Hungary, Czech Republic and Bulgaria were the first countries which have adopted a private pension system. These reforms have started from the subject: the aging of the population due to the improvement of the quality of life. However, it seems that this phenomenon is not the only one that "disturbs", but there are also other reasons why countries choose to switch to private pensions, such as: population decrease, decrease in fertility rate.

On the other hand, there are countries such as those in Western Europe and the United States of America that have adopted the Occupational Pension Scheme (as an alternative to the facultative pension system), which differs from that of private pensions by addressing directly to the employer and the labor unions, being the ones who negotiate with the employee their future pension plans.

Adopting such schemes allows employees to obtain additional income reaching a maximum of 20-30% of the total pension, which is benefic considering that there already exists information showing that the public system, also called pay-as-you-go, will not have the force to cover the payment of the debts for the future pensioners.

1. Literature review

Although popular discussion often assumes that the annual growth in the value of pension funds represents an equivalent increase in national economies, the standard economic analysis indicates that the increase of pensions represents a change in the form of saving rather than an increase in the total value (Feldstein, 1978). According to Feldstein (1978), private pensions may be a reason why the national economy decrease if the employees involved reduce their savings by more than the amount of pension funded accumulation.

However, as there are always fluctuations in the financial market, it should be taken into account that pension funds, like investment funds, show variations in returns. In other words, there will always be times when pension funds will score less performing, but their advantage is that they do not only invest in the Romanian stock market but also outside the country, which leads to a diversification of the portfolio and therefore, better financial stability.

The positive evolution of pension fund returns over the 10 years of existence is that the periods in which they received negative results were short, positive results being present over a longer period of time, offsetting periods with negative outcomes.

A significant and growing literature in the field of financial economics seeks to understand the investment decisions and the subsequent performance of institutional investors (Lerner et al., 2007).

Traditionally, institutional investors have been seen as long-term capital sources with investment portfolios built around the two main classes of assets (bonds and shares) and an investment horizon related to the often long-term nature of their liabilities (Della Croce and Yermo, 2013).

I. Private pension system in Romania

With the emergence of the aging population in Romania that was already analyzed by J. Shoven (2008), overlapping with the tendency to reduce the population, there has been a reform of pensions, which is to change the mentality of the Romanians through education for a better money management when they are looking at the future and the desire to have a decent living at retirement.

This reform, supported and promoted by the World Bank, led to the extension of the pension system, which was limited to the public system (pillar I), by supplementing with two other sources of pensions: the second pillar and the third pillar.

Thus, the current situation of the pension system is based on three pillars:

A. Public system (Pillar I):
- about 80% of the mandatory contributions (administered by the State);
- the replacement value (basically the value of the pension point) are about 30-35% of the gross average salary in the economy.

B. Private mandatory system (Pillar II):
- about 20% of the mandatory contributions;
- pension funds are regulated by the Financial Supervisory Authority (ASF);
- there are used restrictive investment portfolio;
- undefined replacement value (fund-remittance).

C. Private pension system (Pillar III)
- consists in optional contribution from collective or individual employment contracts, encouraged by tax deductibility;
- practically, Pillar III is the extra saving potential that is materialized in the insurance of old-age risk;
- pension funds are regulated by ASF
- investment portfolio more freely than Pillar II.

The two directly concerned groups are, in fact, the main actors of this type of social contract based on solidarity between generations: employees and retirees.

Currently retired pensioners (on the market): for them, the pension comes only from Pillar I (state) and is departed from the pension point established (politically) annually in the law of the social insurance budget.

Future pensioners (current employees and their assimilation): for them, the pension would represent a cumulating of the three pillars, two of which are mandatory. The amount of replacement of their pension in relation to the last salary will therefore be dependent on the company's economic performance and average wage developments, as well as on the performance of mandatory and optional pension funds.

Any discussion about pensions cannot ignore the problem of dependency ratio between employees and retirees; the deterioration of this report is the main cause of the huge deficits registered by pension funds around the world, but especially those in the European Union and, of course, also from Romania.

Now, in Romania, each taxpayer maintains more than 1 pensioner, and the data show that this report changes with the passing of the years, reaching 2050, with 1 taxpayer will maintain more than two pensioners. Then there will be a 90% contribution to the gross wage to get a 45% replacement rate without subsidies.

II. The role of Pillar II in the light of capital market investments

The pension pillar II was thought from the beginning to help the state pension as a supplement to it, as an additional source of income. Therefore, all investment decisions must be well thought out so that at the end of the contribution period, i.e. at the time of retirement, the taxpayer receives the due amount.

In Romania, there are 7 pension fund managers active on the capital market. For market investments, they use 16 asset classes according to their portfolio structure. In Table 1 there are the classes of assets in which pension funds can invest.

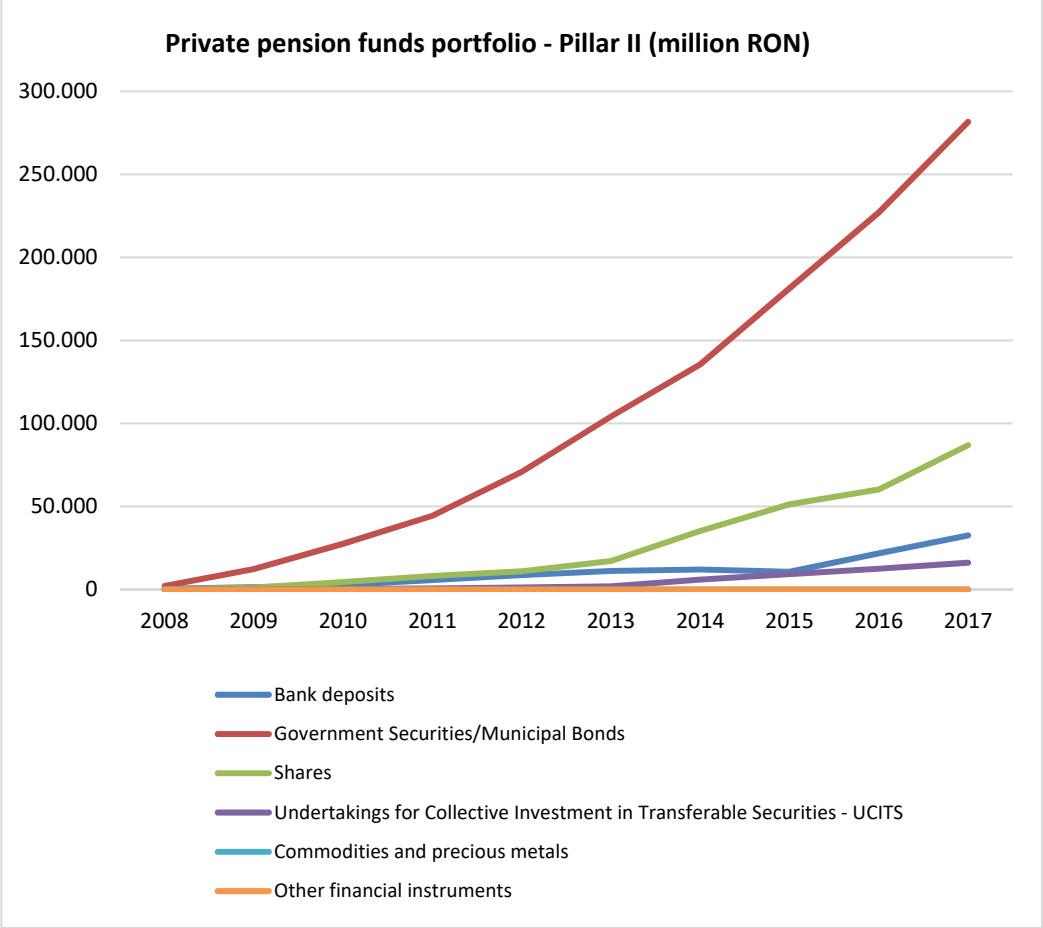
Table 1. *Allowed asset classes for Pillar II*

Pension funds
Bank deposits
Government Securities/Municipal Bonds
Government Securities
Corporate bonds
Supranational bonds
Shares
Undertakings for Collective Investment in Transferable Securities – UCITS
Other Collective Investment Undertakings – non UCITS
Commodities and Precious Metals
Commodities and Precious Metals Funds
Instruments for hedging risk
Private Equity
Infrastructure
Other financial instruments
Amounts in settlement at the end of reporting date

Source: Data from "Pension savings: The Real Return".

Romanian mandatory pension funds invest most in government securities and bonds, according to data taken from the ASF (Financial Supervisory Authority) database. The second asset class (in terms of portfolio structure) is that of shares and the third is that of bank deposits. The following three classes considered have a minimal impact on the performance of pension funds.

Figure 1. *Structure of private fund pension Pillar II (million RON)*



Source: Own calculation based on data available on www.asfromania.ro

After almost 10 years of Pillar II in Romania, the figures show very well in terms of the amount accumulated in the accounts of the private pension funds, of over RON 39 billion, and the total earnings are of approx. RON 7 billion at the end of 2017 according to the data provided by the Financial Supervisory Authority. According to data, currently about 70% of total investment by Pillar II pension funds are bond investment and about 18.7% are equity investments, followed by bank deposits, securities, commodities and precious metals and other instruments (Figure 1).

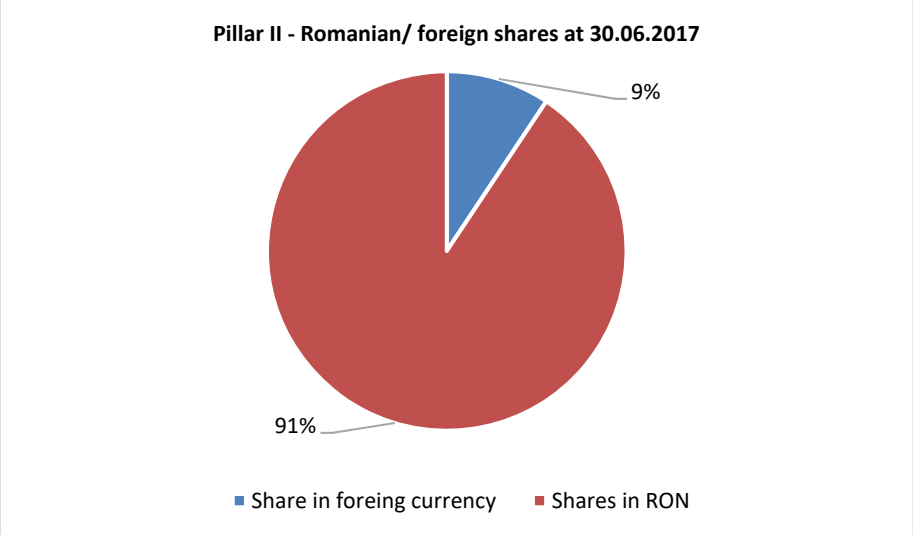
On the other hand, according to a report of Better Finance, the law imposes some strict rules on the classes of assets that mandatory funds must observe about the investment action:

- Pension funds can invest up to 20% in monetary policy instruments.
- Pension funds can invest up to 70% in government securities of Romania or the EU.
- Pension funds can invest up to 30% in bonds and other transferable securities issued on a market regulated by local public authorities from Romania or the EU.
- Pension funds can invest up to 50% in securities traded on a regulated market from Romania or the EU.
- Pension funds can invest up to 15% in bonds issued by third countries traded on a regulated market.

Over the years, we have seen that private pension funds have become major shareholders in the most liquid companies listed on the Bucharest Stock Exchange (BSE) and have shown willingness to subscribe to the initial public offers made so far. Through its continued presence on the capital market, it provides an alternative source of funding to the banking system for companies that choose to become public, thus encouraging the development of the local stock market.

Pillar II pension funds are the largest local institutional investors in shares listed on BSE with local investments in shares of over EUR 1.3 billion at the end of 2017. The attractiveness of the investment in shares listed on the BSE for international and local investors also resides in the existence of a segment of investors such as the Pillar II pension fund that acquires monthly shares and has a long-term investment horizon.

Figure 2. *Shares investments on the stock market*



Source: The Financial Supervisory Authority.

The majority of Pillar II pension funds choose to invest their assets in Romanian stocks listed on the BSE, about 91% and the remaining 9% in foreign shares, according to the data received from the Financial Supervisory Authority (Figure 2). According to them, Pillar II pension funds had an essential role in the success of listing the BSE, buying up to 20-25% of the value of the offers.

As for the issuance of Romanian shares, on the first three places were: Transilvania Bank (15.84%), Fondul Proprietatea SA (13.70%) and Romgaz SA (13.28%), and regarding the issuance of foreign shares there are: Erste Group Bank AG (9.52%), Siemens AG (5.21% and DeutscheTelekom AG (4.96%), according to a study of the Financial Supervisory Authority.

As a result of these investments on the stock market, but not only, the return on pension funds pillar II is very good, according to data taken from the ASF. For the third consecutive year, Romania was on the first place in terms of return on investments made by pillar II pension funds, obtaining excellent results, with a solid real yield of 5.3% over a period of 9 years, according to a study of Better Finance.

According to ASF, at the end of 2017, the nominal rate of return on privately managed pension funds (Pillar II) was 3.95% (calculated for the last 24 months), and the net asset value had an annual growth rate of over 30%. Return on equity allows the assessment of the equity investments efficiency of shareholders and the opportunity to maintain them (Table 2).

Table 2. *Annualized rate of return*

Risk rate	Private managed pension fund	Annualized rate of return at 31st December 2017
Balanced	BRD	3.12%
	METROPOLITAN LIFE	4.25%
	BCR	4.80%
	VITAL	3.86%
	AZT VIITORUL TĂU	3.50%
	NN	4.07%
Dynamic	ARIPI	3.93%

Source: The Financial Supervisory Authority.

In table no. 2 we can also see a classification of each pension fund in a certain degree of investment risk calculated according to the formula established by the Private Pensions Supervisory Commission (CSSPP). Starting in mid-2012, the mandatory private pension fund legislation has determined the degrees of risk to which each of the pillar II pension funds can fit. These are:

- CONSERVER: < 10% (inclusive)
- BALANCED: 10 - 25% (inclusive)
- DYNAMIC: 25 - 50% (inclusive)

2. Research methodology

For the present work, two data analysis options were used.

The first option was to apply a linear model of verification of the indicators used, namely the Regression procedure, using Excel. This procedure uses a linear regression equation written as:

$$y = X\beta + \varepsilon \quad (1)$$

where:
y is dependent variable.
X is independent variable vector (explanatory, exogenous) of 1× p dimension.
β is the vector of coefficients, of p × 1 dimension, the parameters of the model.
ε is a variable, interpreted as error (disturbance, measurement error).

Therefore, we used as a dependent variable the net asset of pension funds Pillar II, and the VUAN and the number of participants as independent variables. I mention that the observation period for this analysis was May 2008 - December 2017, and the series of data were not stagnated because of the fact that the amounts are very large and not comparable, but they are in trend.

Figure 3. *General statistics of the regression*

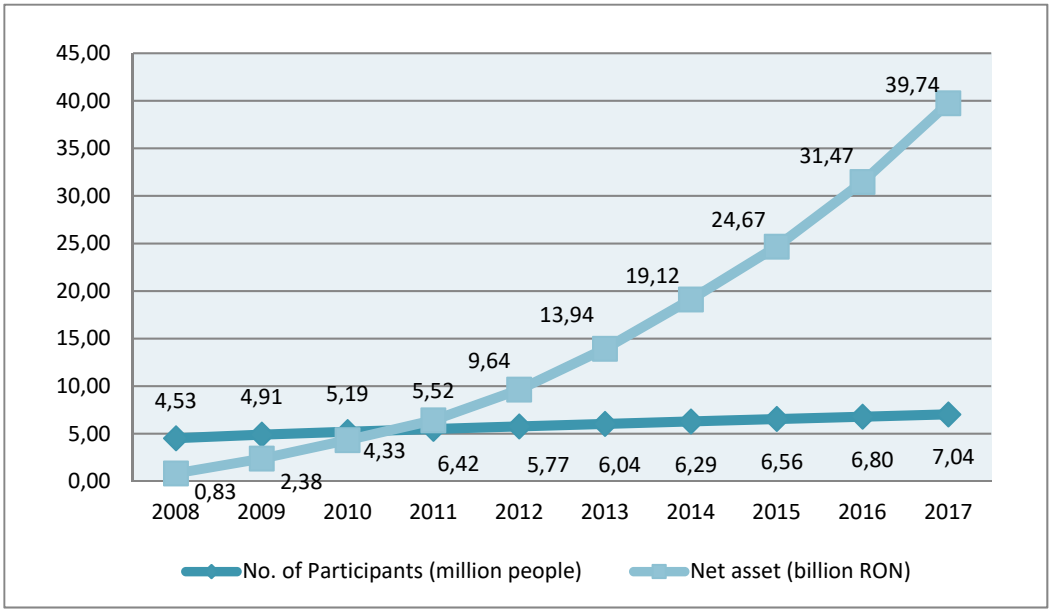
SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0,963158
R Square	0,927673
Adjusted R Squa	0,926393
Standard Error	3147475
Observations	116

Source: Own calculation based on ASF data.

Given that R Square is 0.92% (Figure 3) (value very close to 1), it expresses a direct correlation of the VUAN (the unit value of the net asset) and the number of pension fund participants at the Pillar II with their net assets.

In Figure 4 it is noticed that the number of participants at Pillar II had an impressive growth trend since the launch of the private pension system Pillar II, reaching approx. 7 million participants at the end of 2017, which means that the accumulated amount has also increased constantly, with net assets of more than 39 billion lei at that time.

Figure 4. *The evolution of the contributors and the net assets 2008-2017*



Source: Own calculation based on ASF data.

For the second option, the analysis was made on some possible factors of influence on the total assets of the privately administrated pension funds (Pillar II) (cumulated at market level) to determine the extent to which the investments made on the Romanian capital market by these funds are major players on the market. For this, Eviews was used as a tool of analysis.

The following aggregate variables were used in the analysis for the May 2008-December 2017 period (116 observations):

- Total market assets.
- Number of participants.
- Monthly yield index (calculated as the arithmetic mean of each month's returns for the seven funds that continued to exist for the entire analyzed period).
- Value of total investments.
- Investments in government securities.
- Investments in foreign non-government bonds.
- Investments in corporate bonds.
- Investments in municipal bonds.
- Investments in commodity funds.
- Investments in UCITS.
- Investments in shares.
- Investments in bank deposits.
- The value of instruments used for hedging.

All series were stagnated by applying the first difference, except for the monthly return series that was found to be stagnant at level.

Several linear regression variants (OLS) have been tested in various combinations of explanatory variables.

Figure 5. *The result of the regression in Eviews*

Dependent Variable: D_ACTIV_TOTAL
Method: Least Squares
Date: 02/22/18 Time: 12:22
Sample (adjusted): 2008M08 2017M12
Included observations: 113 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	53340958	12848732	4.151457	0.0001
D_INVESTITII	0.847184	0.028836	29.37979	0.0000

R-squared	0.886057	Mean dependent var	3.49E+08
Adjusted R-squared	0.885031	S.D. dependent var	2.50E+08
S.E. of regression	84769658	Akaike info criterion	39.36631
Sum squared resid	7.98E+17	Schwarz criterion	39.41459
Log likelihood	-2222.197	Hannan-Quinn criter.	39.38590
F-statistic	863.1721	Durbin-Watson stat	2.792201
Prob(F-statistic)	0.000000		

Source: Own calculation in Eviews based on ASF data.

The most relevant result obtained is a statistically significant correlation between the value of the investments and the value of the total assets (Figure 5). Residue tests indicate an acceptable level of autocorrelation of residues, but their distribution is not normal. Therefore, investments made by Pillar II pension funds have contributed to an increase in their assets.

The other combinations of regressions did not show statistically significant results, or if the coefficients are still statistically significant, the coefficient R2 is very low and the level of autocorrelation of the residues is very high, so overall these results cannot be accepted.

3. Conclusion

Taking into account that the issue of the pension system is a problem of Europe, and Romania cannot make an exception, it is important to understand that a population with a high level of financial education, in order to become informed decision-makers, can be a solution in this regard. Globally, we can see that in the Western European countries, but also at the level of the United States of America, the pension system has a different structure, focused on the occupational pension system, which could also be a solution for Romania.

Occupational pensions are an effective way to save, and according to a study by EIOPA (European Insurance and Occupational Pensions Authority), 90% of the 140 occupational schemes have benefited from specific tax incentives.

The retirement crisis is globally, so the pension system of each country should be open to changes, taking into account that most countries rely on the existence of a multi-pillar system. In order to face with this crisis, many countries have already implemented additional measures such as: increasing retirement age, limiting early retirement or offering other benefits in return for retirement, as is the case of Estonia, where a retired that look after a child under three-year-old earns an extra income.

According to a study by the OECD in 2012, the reform of the Pillar II pension from the Central and Eastern European countries included country-specific changes and led to imbalances in the pension system due to the redirection of a part of Pillar I to Pillar II. Thus, in 2011, Hungary has given away the Pillar II pension, many countries even lowering their contribution to the pension system.

According to the activity on the Romanian stock exchange, we can say that the stock market needs liquidity, and the mandatory private pension funds invest approximately 18% of the assets in shares, thus generating stability and reducing price volatility. At the same time, the share of assets of private pension funds-Pillar II in GDP was approx. 4.63% at the end of 2017 in Romania, this indicator having higher values in the others European countries.

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Exchange rate pass-through to macroeconomic indicators using Vector Auto Regression: Empirical evidence from Pakistan

Farhan AHMED
Shaheed Zulfikar Ali Bhutto Institute of Science & Technology (SZABIST), Pakistan
farhan.mba2013@gmail.com
Muhammad OWAIS
Sui Southern Gas Company Ltd., Pakistan
owaismemon627@gmail.com
Sandhya KUMARI
MCB Arif Habib Ltd., Pakistan
sandhya.chanchal@gmail.com
Rohit RAJJANI
Torrens University Brisbane, Australia
rohitkumarrajani@gmail.com

Abstract. *This study aims to examine the exchange rate pass-through to oil prices, import prices, money supply, consumer prices and interest rate in the context of Pakistani economy. By using, monthly data from July 2005 to December 2015, unrestricted VAR model is employed as suggested by McCarthy (2000). This study looks at the degree and existence of causality or shock between variables/series. The major shock was seen in money supply by one unit point in exchange rate and less impact of impulse response was seen in discount rate, consumer prices and oil prices. It was also found that causality exists between exchange rate and money supply and discount rate. Furthermore variance decomposition results indicate that nominal exchange rate was explained mainly by money supply shocks which were contributing to 15.10% at a lag period of 12. For the Consumer price index variance decomposition was around 7.19%, for discount rate and oil prices it was 3.4% and 3% respectively at the optimal lags selected for 12 periods. This study helps policymakers to take steps according to the extent of shocks caused in different times.*

Keywords: exchange rate; interest rate; oil prices; money supply.

JEL Classification: F41, E52, E31.

1. Introduction

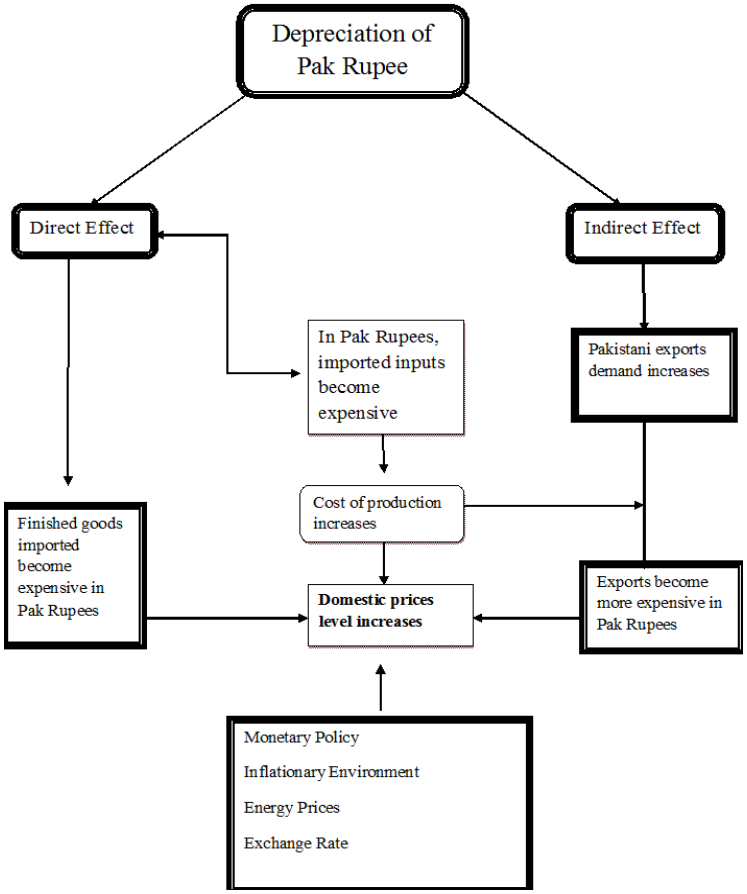
International trade plays an important role for the development of any economy. In this 21st century, technologies are rapidly changing, product life cycle is getting smaller, raising new need, demand which lead to increased production and the concept of viewing the world as single market has triggered the international trade. Frequent international trades, integration of world financial market, easy access of information, fast spread of random news have increased the competition as well as uncertainty across the world. A single new innovation can make the whole industry obsolete. Due to reducing trade barrier, companies are synergizing cross border to give maximum quality product with features at low price to cater the need of consumer. One very important factor in such international transaction is the difference of currency which is being evaluated under a concept called exchange rate. When a home country currency exchange rate appreciates, it benefits the importing country and under depreciation, it benefits exporting country. Recently, countries more often depreciate or devalue their currency to be more competitive in the world market. Exchange rate movements are considered as an instrument to determine the competitiveness of a country in the world market. It is of great importance to policy makers to know the channel and monetary policy variables which have impact on the exchange rate movement on inflation. In addition to this, many economists have been interested to examine the impact of exchange rate movements on domestic prices and output whose analysis is done through ERPT (exchange rate pass-through).

ERPT is referred to the degree to which exchange rate changes are reflected in domestic prices. There are number of important reasons to why it is essential to understand ERPT. First to forecast the inflation, setting monetary policy and the speed of pass through of shocks to domestic prices. Secondly, to design the macroeconomic policy to support the stabilization and those stabilization options can be like devaluation will depend on the speed of ERPT. A deviation in exchange rate impacts significantly on import and export prices of goods whether they are in raw form, immediate or finished goods. A country which trades in foreign market faces exchange rate risk and it has a significant impact of consumer price index (CPI) and wholesale price index (WPI). Due to Globalization, internet and technology, the world financial markets are now integrated and interdependent. A single change in one variable creates domino effect across the world. In order to reduce or mitigate such kind of risk, monetary policies are made to stabilize the internal and external value of the currency of a particular country. Pakistan is a net import based country.

According to Akbari and Rankaduwa (2006) Pakistan is small open economy operating below full employment and dependent on imports to meet the domestic demand of intermediate, consumer and capital goods. In Pakistan, there is more than 20,812 Million USD reserves as of December 2015 (http://www.sbp.org.pk/ecodata/forex.pdf). Net Foreign direct investment in Pakistan was 922.9 USD million in 2015 (http://www.sbp.org.pk/ecodata/FIS-FDI-Arch.xls). Comparatively Oil has major chunk in our import bills. Declining trend of oil prices from the past year 2015 has significantly

reduced the dollar value of import bills which resulted in improved balance of payment and reduction of transportation cost in the country which is good for overall economy and end consumers. State Bank of Pakistan has also reduced policy rate to 6% in Sept 2015 (http://www.sbp.org.pk/m_policy/2015/MPS-Sep-2015-Eng.pdf) which encourages households and corporation to go for more investments and spending. Through direct and indirect channels exchange rate movements can influence the domestic prices. Exchange rate movements can influence the domestic prices through changes in the price of not only imported finished goods but also imported inputs. If the cost of imported goods whether raw material or in the form of intermediate, are higher which is associated with depreciation in the exchange rate increase the marginal costs and result in higher domestic priced goods. Exchange rate depreciation in case of indirect channel influence the net exports which further influences the domestic prices through the change in aggregate demand causing upward pressure on domestic prices. As Choudhri and Hakura (2001) studied and identified that since 1982 under flexible exchange rate regimes, many developing countries like Pakistan experienced that domestic currencies depreciate sharply.

Figure 1. *Exchange rate pass through to domestic prices*



Source: Akinbobola and Fatai (2015), Aliyu et al. (2008), Hyder and Shah (2004), Laflèche (1997).

Through direct and indirect channels such depreciation can lead to increase in inflation. The speed of exchange rate pass through and its extent depends on various factors such as pricing policies, inflationary environment, market structure, relative share of imports in CPI basket, etc. For instance, in the export market a complete pass through can be seen when firms pass the changes in the exchange rate fully or completely to selling prices. Zero pass through comes when exchange rate changes are borne to keep the selling prices unchanged or combination will be known as partial pass through. In reality, substantial literature work is done which shows that exchange rate pass through is far distant from full or complete ERPT.

This research paper is organized as follows: Section 1: Introduction chapter consisting problem statement, research question and objectives of the study. Section 2 presents a review of literature on ERPT to consumer prices, producer prices and inflation. Section 3 describes the methodology carry out for the analysis purpose. Section 4 includes empirical analysis and major findings of the study. Section 5 is consisted of conclusion, policy recommendations and areas of further study

Pakistan is a net import country in which the oil has major chunk of import Bills. Deviation in oil prices affects significantly Pakistan's balance of payments and foreign reserves. In this way, the effect is passing through to home currency and domestic prices. The cost of transportation and other operating cost vary significantly which will be transferred to product price which benefit or burden to final consumer. In the past decade from 2005 to 2015, Oil has reacted in very uncertain way. In just 10 years, oil prices reached to $109.45/per Barrel in 2012 and drop to $49.49/per barrel in 2015 (http://www.opec.org/opec_web/en/data_graphs/40.htm). Such deviation of oil had significant impact on exchange rate, domestic prices and inflation level. In order to tackle and keep the situation under control, government makes different monetary policies. This study will help policy makers to understand the responsiveness of variable due to the changes in exchange rate.

Following are the questions which has been addressed in this study:

- What is the extent of Exchange rate pass through (ERPT) in Pakistan?
- What are the key variables which has strong, moderate and slightly impact from the changes in exchange rate?
- What is the speed of pass through to different domestic prices?
- What will be the impact of exchange rate shock on domestic prices?

The objective of the study is to examine and understand the pass through of exchange rate on macroeconomic indicators in Pakistan by using recursive VAR Model (Vector Autoregression proposed by McCarthy 2000). This study aims to determine the extent of exchange rate pass through (ERPT) and impact on selected macroeconomic indicators.

2. Literature review

In this study, exchange rate of pass through effect is seen to money supply, import prices, consumer prices, and discount rate and oil prices in the context of Pakistan market. The objective of conducting this research is to assist in designing monetary policies and examining the impact ERPT (Exchange rate pass through) to these variables. There is substantial theoretical and empirical literature work has been done on the exchange rate pass-through to consumer and domestic prices. Much of the work has done with advanced economies like USA and Japan. The last two decades have witnessed a huge economic literature on exchange rate pass-through. Therefore, this section focuses on reviewing related empirical and theoretical literature. Recent literature focuses more on the importance of exchange rate pass through in carrying out the effective exchange rate and monetary policies.

2.1. Literature related to Pakistan

Very few studies have been conducted in Pakistan on exchange rate pass through to consumer prices and many other macroeconomic variables like GDP (Gross Domestic Product), FDI (Foreign Direct Investment) etc. Most of the studies conducted shows that exchange rate pass through to consumer price is low. One of the study conducted in the context of Pakistani economy which studied the impact of exchange rate changes on consumer prices for the period 1995M1 to 2009M3. In this study long run and short run ERPT in Pakistan is estimated and also takes into account the (RERM) existing real exchange rate misalignment. It was found that in Pakistan ERPT to consumer price inflation is very low which is almost close to zero (Jaffri, 2010). Zaman et al. (2012) also studied the extent to which exchange rate movements affect the consumer prices in Pakistan for the period consists of quarterly data from 1982Q1 to 2010Q4. This study used the SVAR model to estimate the exchange rate pass through to inflation in Pakistan. It was found that ERPT to consumer prices in Pakistan is very low. Another study has also shows the similar results by taking monthly data from June 2005 to June 2011 using the variables wholesale price index, consumer price index, large scale manufacturing, fuel and lightening and the growth of money supply by employing VAR model. The result of impulse responses under their study showed that exchange rate pass through is high on wholesale price index and exchange rate pass through is lower on consumer price index. Variance decomposition results were 5.48% on consumer price index and 10.15% on Wholesale price index (Shaikh and Hussain, 2015). Causality is also analyzed in most of the study between exchange rate and macroeconomic variables as seen one of the research paper where the objective of the study is to analyze the causality between exchange rate and macroeconomic variables (inflation, trade, foreign direct investment and gross domestic product) by using series of models for the period of 1980-2009.

For long-run equilibrium relationship and to check the causality between variables co-integration test and unit root test for stationarity is applied. It is found in the study that there is long run equilibrium relationship between trade and exchange rate. Between exchange rate and inflation there is no long run equilibrium relationship. Causality runs in

both direction in case of exchange rate and foreign direct investment and also reflecting a long run equilibrium relationship between exchange rate and foreign direct investment. In case of gross domestic product causality does not run in either direction but there is long run equilibrium relationship is found between exchange rate and gross domestic product (Khan et al., 2012).

The nature of asymmetric pass-through of global food inflation to domestic inflation is also examined for the period of 1993M2 to 2012M2 in Pakistan. Augmented Dickey Fuller (ADF) test is used to check the stationarity of data. By using the ordinary least square (OLS) found that pass through of global food inflation in consumer prices is asymmetric in Pakistan that is global prices responded differently in the period when there is global surge in prices of food as compared to the period when there is fall in prices (Jaffri et al., 2014). Aliyu et al. (2010) studied the impact of ERPT to consumer and import prices in Pakistan during the period of 1986 and 2007 by using VECM (Vector Error Correction Model). Choudhri and Hakura (2012) by using VAR and regression-based estimates, this study found that ERPT is incomplete for a large number of countries and larger pass through to export prices. Ahmad et al. (2014) investigates the impact of exchange rate on balance of payments by taking Pakistan economy in consideration. Monthly data was taken from January 2007 to October 2013 from the website of (SBP) State Bank of Pakistan. Various tests such as ARDL, unit root and causality test are applied to ascertain the volatility impact of exchange rate on (BOP) balance of payment. It was found that there is significant positive relation between balance of payment and exchange rate.

2.2. Literature related to other countries

The trend of short run impact on consumer prices of exchange rate pass through remains low in other countries as well as reflected in the study conducted in Maldives over the period from 1994 to 2010. Using a nonparametric approach to estimate ERPT (exchange rate pass through) to consumer prices and then model both consumer and producer price changes by using a recursive vector autoregression. It was found that ERPT (exchange rate pass through) to producer and consumer is significant (Masha and Park, 2012). Another study also investigates the effect of exchange rate changes on consumer prices in Ghana during the period of 1990M01–2009M02 by applying VAR (Vector autoregressive) model. The study found that exchange rate pass through is low but significant in the short run. Another findings in this study reflect the impact of increased openness and tighter monetary policy which is pursued by the central bank over the period of 1990M01–2009M02 (Frimpong and Adam, 2010). Other studies not only investigates the impact of exchange rate pass through to consumer prices but also examine this impact to producer price index (PPI). One of the study is conducted in the context of Algeria economy in which investigation of ERPT (exchange rate pass through) on producer price index and consumer price index is carried out by using VAR (vector autoregressive) model during the period from 2002Q to 2011Q. The study found that when there is an appreciation in the foreign exchange rates against the Algerian Dinar, in

response to this consumer price increases. Another finding from this study is that supply shock (oil price) contribute around 30% to CPI (Consumer Price Index) fluctuation whereas 5% to PPI (Bendob et al., 2015).

In South Africa, effect of exchange rate pass through (ERPT) to producer, consumer and import prices is examined. Using the unrestricted VAR and accounting tools (variance decomposition and impulse response) to examine the effect of pass through and to look at the importance of variables in explaining changes in domestic prices. The study is conducted using monthly data from 2000M1 to 2009M5. It is found in the study that there is a link between CPI (consumer price inflation) and external factors. Consumer price inflation increases by 0.125 percent after one percent shock to exchange rate. After 24 months, 20 percent is the pass through elasticity of producer price suggesting favorable shocks to producer price inflation which can have moderate effect on consumer price inflation (Ocran, 2010). For nine OECD countries impact of exchange rate pass through into producer, import and consumer price index is carried out using the used the VAR (Vector Autoregression). It was found that ERPT is greatest for import price index and smallest for CPI (consumer price index). Other findings seen in this study is that greater exchange rate pass through is existed in an economy which has higher import share, smaller size, persistent exchange rate, higher inflation rate, volatile monetary policy and less volatile aggregate demand (Wang and An, 2011). It was found that there is presence of complete and incomplete pass through regimes depending on the appreciations of a currency and inflation rates both in the short and long run. Findings from this study also has important macroeconomic policy implications (Kılıç, 2010).

Money supply reflects the central bank reaction function and it has major implications in designing and implementing monetary policy. Most of the studies have taken growth in money supply as variable while looking at the impact of exchange rate pass through. In Nigeria, impact of exchange rate pass through is investigated to inflation, import prices and monetary policy in Nigeria during the period of 1986 to 2012. The study used VAR model and Variance Decomposition (VD) to estimate the Impulse Response Function. It was found that ERPT is moderate during the period under consideration, in case of inflation it is slow and short lived. In case of import prices ERPT (exchange rate of pass through) is significant and persistent (Fatai and Akinbobola, 2015). Mohammed et al. (2015) examines the exchange rate pass through (ERPT) on producer and consumer price indexes by using VAR model (Vector Autoregressive Model) in Algerian economy. Cozmanca and Manea (2010) investigates the exchange rate pass through (ERPT) into producer prices, import prices and consumer price of Romanian economy. Using econometric methods related to VAR to determine the size and find out the dynamics of exchange rate pass through. It is found in the study that there is an almost complete pass through in case of import prices and complete pass through both in consumer prices and producer prices. Jin (2012) estimate the exchange rate pass through (ERPT) and examine the relationship with monetary policy in China. To analyse the robustness, VAR and linear models are employed in the study. Shioji (2012) examines the influence of exchange rate pass through on exports, domestic and import prices by employing the VAR model. The study has employed the time period of January 1980 through January

2010. It was found that pass through rates trend downward both on import and domestic prices throughout the period. Exchange rate pass through impact to import prices on several sectors including chemicals, transport, machinery, metal manufactures, equipment and food processing sector (which is the 70 percent of India's total) is also carried out. For estimation, an economic framework was used. It was on simultaneous equation imperfect model. Panel data regression technique applied on data from different sources as econometric method. Due to up and down ERPT (exchange rate pass through) movement in India, it results is incomplete ERPT to the prices of import also. The data during research was on currency and prices for US import with conditional change on the price over the period of time (Pyne et al., (2011).

2.3. Vector auto regression model

This model is proposed by McCarthy (2000). It is an econometric model which measure and capture the linear interdependencies among multiple time series. In this model, each variable becomes the linear function of past lags of other variables and also of itself. Such model is used for forecasting purpose. To disentangle the relations between variables impulse responses and variance decompositions are typically used in VAR model(1). Here variance decomposition refers to volume of information of every variable contributes to other variable during autoregression. It assess forecasting error of variance described by exogenous shocks to the other variables. Whereas impulse response traces shock of one standard deviation to endogenous variables' current and future values. This study employs six variable VAR model to examine the influence of exchange rate pass through. The first variable taken in consumer price index. The second variable is growth in money supply so to incorporate monetary policy in this model(2). The other variables taken are oil prices, import prices and interest rate. All these variables are taken from literature review.

$$\Pi toil = Et\text{-}1\,[\Pi toil] + \varepsilon toil \quad (1)$$

$$\Delta M2t = Et\text{-}1[\Delta M2t] + \beta 1 \varepsilon toil + \varepsilon t \Delta M2 \quad (2)$$

$$\Delta et = Et\text{-}1[\Delta et] + \lambda 1 \varepsilon toil + \lambda 2 \varepsilon t \Delta M2 + \varepsilon t \Delta e \quad (3)$$

$$\Pi tcpi = Et\text{-}1[\Pi tcpi] + \gamma 1 \varepsilon toil + \gamma 2 \varepsilon t \Delta M2 + \gamma 3 \varepsilon t \Delta e + \varepsilon t \Pi cp \quad (4)$$

$$\Psi tDR = Et\text{-}1[\Psi tDR] + \partial 1 \varepsilon toil + \partial 2 \varepsilon t \Delta M2 + \partial 3 \varepsilon \Delta e + \partial 4 \varepsilon t \Pi cpi + \varepsilon t \Psi DR \quad (5)$$

$$\varphi timp = Et\text{-}1[\varphi timp] + \Omega 1 \varepsilon toil + \Omega 2 \varepsilon t \Delta M2 + \Omega 3 \varepsilon t \Delta e + \Omega 4 \varepsilon t \Pi cpi + \\ + \Omega 5 \varepsilon t \Psi DR + \varepsilon t \varphi imp \quad (6)$$

Here,

Yt – Vector of endogenous variables (Nominal Effective Exchange Rate Index (Δe), Oil Price Index; (Π_t^{oil}), Interest Rate (Ψ_t^{DR}), Inflation (Π_t^{cpii}), Money Supply ($\Delta M2_t$) and Import Prices (φ_t^{imp}));

A – vector of constants;

βi – Matrices of autoregressive parameters;

εt – Vector of white noise processes.

3. Methods

The monthly data is taken for the period from 2005M to 2015M, consisting of total 126 observations. The research philosophy of the study is positivist as based on quantitative analysis; from approach point of view it is deductive from general to specific in the sense of taking only six key variables which includes interest rate, money supply, oil price index, nominal exchange rate, and inflation and import prices. It is mono-method quantitative choice based on time series (monthly data from 2005 to 2015). In this study, VAR (Vector Auto regression) model is applied to examine the Impulse response function and variance decomposition to find out the impact of ERPT to consumer prices in Pakistan. In this study money supply, oil prices, interest rates, import prices, inflation are selected to assess the pass-through from exchange rate fluctuation. First, descriptive statistics has been computed. After, Unit root test applied to bring stationary in the data. Then lag structure tools Akaike information criterion (AIC) to find the optimal lags. Thereafter, VAR (Vector Autoregressive) is applied to assess the pass through from exchange rate fluctuations to macroeconomic variables which are taken in this study, two sets of statistics are used. First, impulse responses of money supply, oil prices, interest rates, import prices, CPI inflation to a one standard deviation shock of exchange rate are calculated. Secondly, variance decomposition of money supply, oil prices, import prices, interest rates are used to see how much of forecast variance is attributable to exchange rate fluctuations. This study employs secondary data covering the period from 2005 to 2015.

Monthly data on Import prices (IMP), Nominal exchange rate index, Money supply, interest rates and are obtained from the publication of SBP (State Bank of Pakistan). Monthly data on oil prices and inflation are obtained from Bloomberg. Many studies employing VAR model produce sensible results of impulse response and variance decomposition for obtaining shocks effect from ERPT (Exchange rate pass through) in individual countries (McCarthy). Ivanov and Kilian (2005) based on simulation design the study concludes the most accurate impulse response in terms of structure and semi structure for realistic sample sizes tends to be produced by the Akaike Information Criterion (AIC) for monthly VAR models. The optimal lags taken using AIC in this study is 12 periods so to come with accurate impulse responses results.

4. Results and discussion

4.1. Descriptive statistics

Table 1. *Descriptive statistics*

Variable	Mean	Median	STDIV	Skewness	Kurtosis
CPI	0.09	0.087854	0.042194	0.537121	3.311664
DR	0.1	0.1	0.02149	0.158335	2.209472
ER	67.21	61.582	13.12528	0.608011	1.991135
IMP	2935.40	3076.273	576.3493	-0.281468	1.944894
M2	6444.97	5851.017	2521.196	0.434988	1.980273
OP	82.82	77.84673	24.99339	0.006544	1.683392

Descriptive statistics is computed on 126 observations and results are summarized in Table 1 above.

4.2. Unit root test

Phillips and Perron (1988), and Dickey-Fuller (1981) assisted to avoid false results through time series stationarity tests. Results shown in Table 2 below which are drawn from stationary test reflects rejection of null hypothesis in the first difference which signifies that there is no stationary in all our variable series but at a level that enables us an acceptance that signifies integration of variables at first order.

Table 2. *Unit root test*

Factor	Remarks	ADF Test	PP Test
CPI	Series is stationary at first Difference	I(1)	I(1)
DR	Series is stationary at first Difference	I(1)	I(1)
ER	Series is stationary at first Difference	I(1)	I(1)
IMP	Series is stationary at first Difference in ADF and at Level in PP	I(1)	I(I)
M2	Series is stationary at Second Difference in ADF and at 1st Difference in PP	I(2)	I(1)
OP	Series is stationary at first Difference	I(1)	I(1)

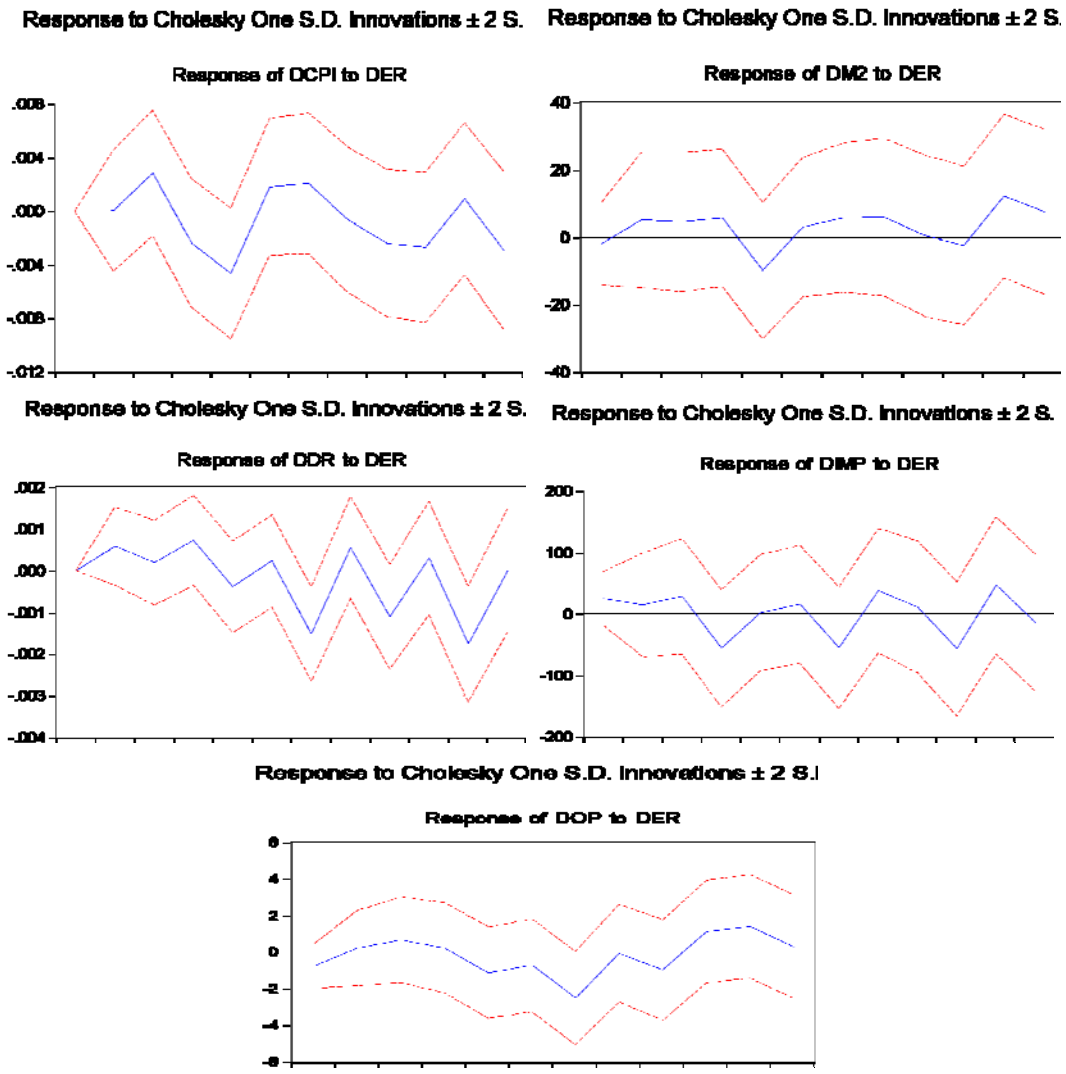
4.3. Granger-causality test

Granger causality test is used to examine the existence of causality from exchange rates to interest rates, money supply, consumer price index, import prices, oil prices and vice versa and also from each of these variables to exchange rates and vice versa in order to investigate the bidirectional causality in the variable series. The results showed that only oil price helps predict CPI with P value of 0.0040 while none of rest variable helping predict CPI which also found by in the study conducted by Zaman et al. (2012) that there is no long run causality exist between CPI inflation and exchange rate. Exchange Rate helps predict discount rate with P value of 0.0056 while none of remaining variable helping predict discount rate while Money Supply (M2) helps predict Exchange Rate with P value of 0.0114 while none of other variable under this study helps predicting Exchange Rate. For import prices, only oil price helps predict import prices with P Value of 0.0025 while none of other variable is helping predict import price. Money supply and oil prices are found the most independent variable as none of variable is helping predict money supply and oil prices under this study.

4.4. Impulse response

The results of impulse response are shown in Figure 2, it is seen that exchange rate pass through (ERPT) to consumer price index is low and is greatest for import prices which is also found in other studies (An and Wang, 2011).

Figure 2. *Impulse Responses of Macroeconomic Variables to One Standard Deviation Innovation in Exchange Rate ± 2 S.E.* (3)



Impulse responses in above graphs reflects inflation, discount rates, import prices and oil prices to a one standard deviation shock in exchange rate. The shock in exchange rate has no impact on CPI in short term as well as in long term, the shock is minimal. There is a rise in three months period afterward it started to decline to the level back. In impulse response of discount rate to a unit standard deviation shock is that till seven month period there is consistency of increase or decrease in the shocks. Along with the increase in the period of time there is an increase in the intensity of shocks as it started to move to 0.003 units. As it can been seen in the period of five, seven and eleven there is 0.001, 0.003 and

0.0035 unit shocks respectively. During period two and three, there is 100 units shocks and by the period four around 50 unit shocks and then in the period of 8, it has surged to 150 unit and plunge back to around 75 units which shows the major impact of one unit standard deviation change in exchange rate. By the period two, the shock went to around 30 units and sustained till the period of four and fall back around 15 units within one period and then rising trend is seen in the next three period till the month of 8. Surprisingly, there is a substantial surge afterwards crossing 30 units shocks which is seen in the previous periods. By the period three, the shock is around four units and by the period five it fell back below two unit shock and revert back in the seven period. In the very next period (8 month), the shock went to around 3 units adjusted to 2 units in the month 9 and then started rising again till the period eleven.

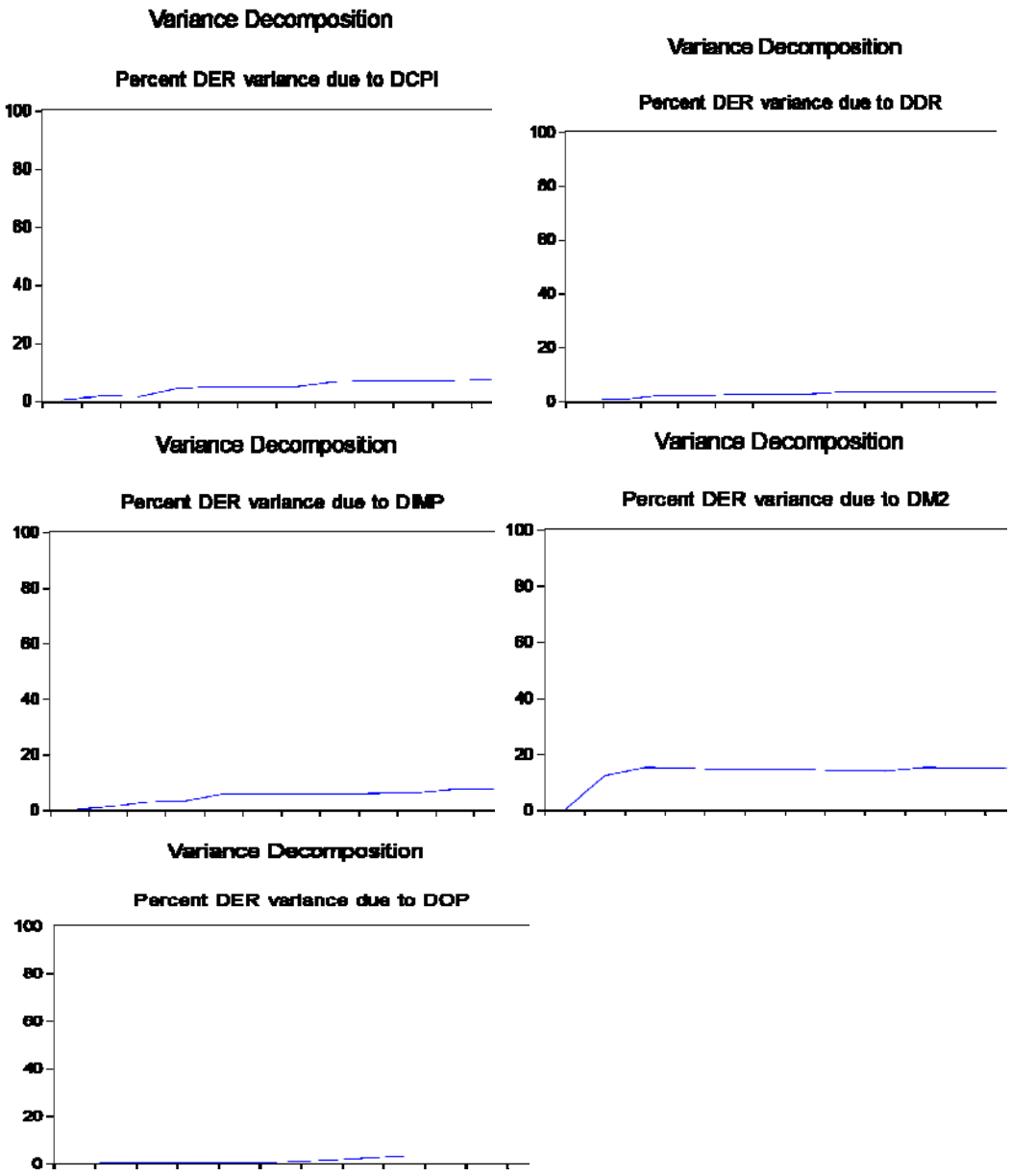
4.5. Variance decomposition

Variance decomposition method is slightly different from other methods being used in VAR model (Vector Autoregressive) where by taking all variables, proportion of shock of dependent variables is measured. In this way, shock will be transmitted to all other variables in the VAR system (Brooks, 2008). Results shown in (Table 3 and Figure 3) reflects the contribution of innovation in the exchange rate to the variability of money supply, oil prices, import prices, consumer price index and discount rate. As shown in Table 3, the exchange rate shock explains only about as much as 3.03 percent, 3.38 percent, 7.19 percent, and 7.61 percent of forecast variance of oil prices, discount rate, CPI inflation and import prices respectively. Among the variables taken the major exchange rate shock explains 15.13 percent of forecast variance of money supply. It is seen in the Table 3 that 99 percent of the variance is explained by its own innovation. Across 12 period lag these values slightly differ amounting to import prices of 7.6 percent, CPI 7.19 percent, discount rate 3.25%, oil prices 2.88 percent and money supply 14.74 percent explaining the exchange rate shock. These results provide support to the claim mentioned in literature that money supply has been considered major cause as reflected in the study by

Table 3. *Variance decomposition*

Period	S.E.	DCPI	DDR	DER	DIMP	DM2	DOP
1	0.015546	0.310552	0.490878	99.19857	0.000000	0.000000	0.000000
2	0.015895	1.609379	0.664854	84.43618	1.151205	12.11649	0.021894
3	0.017601	1.451339	2.049232	78.43763	2.888398	15.13254	0.040861
4	0.017964	4.186717	2.181837	75.28053	3.319656	14.80823	0.223029
5	0.019075	4.741251	2.436786	72.39554	5.798834	14.36041	0.267186
6	0.019676	4.706344	2.541832	72.24514	5.769879	14.20585	0.530950
7	0.020399	4.802194	2.686202	71.36894	5.714490	14.21533	1.212846
8	0.020834	6.509027	3.382785	68.27827	5.774313	13.98018	2.075421
9	0.021318	6.749643	3.304445	67.19958	5.949312	13.76717	3.029847
10	0.021690	6.859454	3.296273	65.52970	6.260577	15.10195	2.952049
11	0.022074	6.934344	3.246181	64.52803	7.535852	14.84973	2.905870
12	0.023833	7.193563	3.257307	64.30823	7.605788	14.74838	2.886733

Figure 3. *Variance decomposition*



4.6. Key findings

By employing VAR (Vector Auto Regressive) model following key findings have been explored: To check the random walk behavior and level of stationary Augmented Dickey Fuller test and Philip Pheron test have been used. At first difference all variable have become the unit cycle free while for money supply which is unit cycle free at first

difference in Phillip Pheron test. By using Granger causality test it is seen that money supply granger cause the exchange rate. The results of impulse response reflects that due to exchange rate shocks CPI has minimal impact in short run and long run which is also consistent in the study (see Fatai and Akinbobola, 2015; Wang and An, 2011; Zaman et al., 2012; Shaikh and Hussain, 2015), while discount rate has been impacted in long run and the impact intensify as period passes on. The reason can be to attract foreign investment and give boost to exports to improve balance of payment as Ahmad et al. (2014) also found the significant relationship between exchange rate and balance of payment in Pakistan scenario. Import prices are being impacted immediately along with exchange rate shock because of trade on exchange rate in this variable which is resulting volatility and correction in exchange rate as Fatai and Akinbobola (2015) also investigated the significant relationship between import prices and exchange rates in Nigerian economy. There is a rising trend in money supply along with exchange rate shock while money supply is being controlled upon the interval of every 2 to 3 lags mostly due to the fact that State Bank of Pakistan revises its monetary policy during this interval. State Bank of Pakistan comes up with monetary policy every two months. There is declining trend found in oil price by the mid period due to exchange rate shocks while there is raising trend in oil prices in long run as Kumar (2014) studied on Indian economy and found that domestic prices are significantly affected by energy prices.

The study investigates the extent and degree of exchange rate pass through to macroeconomic variables like money supply, consumer prices, oil prices, and interest rate and import prices. This study examines the effect of exchange rate shocks to these macroeconomic variables. To determine which shock better indicate the variance in import prices, money supply, oil prices, interest rate and consumer prices. In this study, for each price index forecast error variance decomposition have been studied. Another examination in this study is carried out on the degree and existence of causality from exchange rate to all other variables taken. The results from granger causality indicate that causality exists between money supply and exchange rate, oil prices and import and none in other variables. It is found that money supply granger cause nominal exchange rate. Among other variables maximum explanation of exchange rate shock is 15.13 percent of forecast variance of money supply. One of the major channels of monetary transmission mechanism which monetary authorities tend to see is exchange rate which affects the price levels for open economies like Pakistan. It is essential for policy maker to assess to what extent inflation is influenced by exchange rate. The results found in this study has useful implications related to the designing and implementation of monetary policy as there is significant relationship between money supply and exchange rate. State bank can intervene to control money supply through monetary policy which create impact on exchange rate which will be passed on import price, inflation and net trade in the economy.

More macroeconomic variables can be used or added like balance of payment, gross domestic product etc., as these variables have direct impact on the implications of monetary policy. Other econometric methodology can be employed to examine the long

term exchange rate pass through on other variables and the variables used in this study. To capture the monetary policy framework being used in Pakistan, foreign exchange inflows can be taken as a variable in the model as monetary policy plays a vital role in affecting the price levels. Different tests can also be applied like heteroscedasticity test and multicollinearity test. This study is conducted on macroeconomic variables like money supply, oil prices, import prices, interest rate and consumer prices. The extent and degree of exchange rate pass through can also examined at cross country level.

Notes

(1) McCarthy has analyzed the impact of exchange rate change & import price fluctuations on producer and consumer prices in six industrialized OECD countries from 1976:1 to 1998:4. The impulse response function and variance decomposition show that the exchange rate has a modest effect on domestic price over the post-Bretton Woods era.

(2) SBP (State Bank of Pakistan) use monetary aggregate M2 as intermediate target so to incorporate the SBP reaction in the model.

(3) The dashed lines are two standard error bands and impulse response estimated using Eviews 8.

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Analysis of the educational activity in Romania

Constantin ANGHELACHE
The Bucharest University of Economic Studies, Romania
"ARTIFEX" University of Bucharest, Romania
actincon@yahoo.com
Mădălina Gabriela ANGHEL
"ARTIFEX" University of Bucharest, Romania
madalinagabriela_anghel@yahoo.com

Abstract. *An important problem for each country is that of providing serious education in the field of education. This does not exclude the provision of health conditions that will lay the foundation of a profound and complex education. In fact, the Latin word Mens sana in sano body is to build the healthy future physically and intellectually. In this article, we intend to analyze the concrete situation, based on the results of the year, we call it educational, 2017-2018, to identify progress, some shortcomings and especially the short, medium and long term perspective of evolution in this domain. Education is the essential element for improving social behavior, understanding the evolution of the population in line with the complex (globalized) evolutionary trends of mankind. The educational process is one that, without much comment and argumentation, means the enrichment of individuals and generations with complex knowledge about universal evolution, evolution in specialized fields, and, last but not least, the perspective of individual evolution. Within this article, the authors proposed that on the basis of the study on the distribution of the school population by region and on the whole of the country, in the legally established, biologically existing, stages of the preparation and evolution of the population in Romania. In the alternative, elements concerning the distribution of the population by region, the educational level achieved, the availability of teaching staff, the results of the complex training program are just a few of the aspects that the authors propose to carry out and, consequently, bending over of these aspects, allowed some opinions and concretised some conclusions on how this process took place in the newly concluded 2017-2018 school/university year. The article is accompanied by a series of graphs and tables, containing clear data which in the context support the conclusions issued by the authors.*

Keywords: analysis, education, primary education, secondary education, tertiary education.

JEL Classification: I21, I23.

Introduction

The authors' study in this field is complex and refers to the concrete results recorded in the school/university year 2017-2018. On the basis of this framework-stopping element of the evolution in this field, the authors sought to highlight the evolution in all educational spheres by the year 2017-2018 and to forecast the perspective of the school/university education in Romania in the perspective of the following years, aiming at a prognosis on short, medium and long term.

The educational and vocational framework is closely correlated with the generations' inclinations for future professions, correlated with the structure of the workforce and the need for trained people, specialists, in all fields of the economy. Certainly there are no issues concerning the educational offer according to the criteria that can be controlled and covered by the central and local administration, but at the same time it reveals some shortcomings that are encountered in this field. There are a number of issues regarding the existing teaching staff, the quality of the teaching staff existing in the Romanian educational system at all levels, the situation of the graduates in the school/university field and their linking to the labor market, the needs of the national economy. In the course of the study we draw some conclusions that are true and important to be taken into account by the macroeconomic management. First of all, we can currently see that there is an inappropriate list or correlation between the needs of the labor market and the structure of educational education. Thus, there are missing links that refer to the need to have a concrete professional orientation starting with the secondary, high school and, ultimately, the university education.

The structure of graduates accepted in the workplace is edifying. There are general areas, specialized fields in which there are graduates with good degrees of theoretical training that do not find themselves in the workplace. On the other hand, it is important to bear in mind that vocational education is only a matter of principle, which is discussed but which does not result from a number of causes which can be easily removed. Firstly, fewer jobs are created in the workforce to urge the younger generation to pursue professional studies that give us the prospect of a future activity, specifically remunerated and of interest to the national economy. In other news, higher education maintains its attraction and level of competition, only in state higher education for stockpile (stock market) places for which, due to the level of training, material level and other considerations, active competition persists. Otherwise, for private higher education, whether it is in the state or in the private sector, there is only competition for the individual cost involved in the pursuit and graduation of these higher education institutions.

It is easy to understand if we compare the number of graduates with a baccalaureate diploma registered each year and the total job offer provided by the system of higher education institutions considered. The problem of education is a fair one, it is an urge for every individual to improve his/her training, but this must be correlated with the professional orientation and especially with the offer of the field of work (of the available or possibly occupational places). In this article, the authors strived and realized a concrete

presentation based on figures, materialized in graphs and tables that reveal the perspective of the educational system in Romania. We did not undertake in this article an international comparison on the education system in Romania compared to the other countries of the European Union. If we were to make such an analysis we would reach a paradox. It shows that Romania is not among the leading countries in the European Union in terms of the number of students, high school students, graduates compared to other states. But at the same time it is revealed that in this context there is a "surplus" of graduates who do not find a job according to the vocational training, and thus it is difficult to interpret the level of general training and especially at the final level, university graduates from Romania.

1. Literature review

Anghelache (2017) carried out a broad analysis of Romania's economic and social evolution. Anghelache and Anghel (2017) conducted a study of the education systems of the Member States of the European Union. Anghelache, Partachi and Anghel (2017) analyzed the EU education strategy. Anghelache, Gogu and Anghel (2017) analyzed the quantitative and qualitative development of the activity in the university education system in Romania. Batory and Lindstrom (2011) addressed issues related to financial incentives and European policy in the field of higher education. Belfield, Nores, Barnett and Schweinhart (2006) and Duncan and Magnuson (2013) discussed investment in preschool programs and their effects. Doepke and Zilibotti (2008) presented benchmarking of occupational choices. Jacob and Lefgren (2008) studied methods of assessing performance in education. McNamara, G. and O'Hara (2008) and Saarinen Ursin (2011) also dealt with some aspects of education policy. A similar theme is researched by Pépin (2007), which highlighted that lifelong learning has become a strategic goal. Papay and Kraft (2015) have been studying ways to improve their long-term careers. Slavin, Lake, Chambers, Cheung and Davis (2009) presented evidence of effective educational programs.

2. Research methodology, data, results and discussions

- **The main methodological notions**

According to the methodology of the National Institute of Statistics, the education system represents the ensemble of educational units and institutions of different types, levels and forms of organization of the education and training activity that ensure the educational process of the school population at all levels of education for the purpose of professional training.

Educational level is an educational level in which elementary, medium or higher education is conducted, according to the curriculum. According to the International Standard Classification of Education (ISCED 2011) applicable after 2013, existing levels in the National Education System are: pre-primary education (ISCED level 01), preschool (ISCED level 02), primary (ISCED level 1), gymnasium ISCED level 3, ISCED level 3, ISCED level 3, ISCED level 4, ISCED level 4, ISCED level 6, 7 and 8 ISCED levels).

In the field of formal education, statistical surveys are carried out with exhaustive character, encompassing all educational units in each educational level, irrespective of the form of ownership, public or private, or the residential environment in which they have their headquarters, urban or rural.

The school population represents the total number of children in nurseries and nurseries, pupils and students enrolled in the education/training process of a school/university year of formal education, irrespective of the forms of education they attend (day, evening, reduced and distance), study program and age. The school age population comprises the resident population aged within the official education age of each educational level.

Starting with the school year 2012-2013, according to the legislation in force (Education Law no.1/2011 with subsequent amendments and supplements), the age groups for the school age population are: 0-2 years, 3-5 years, 6-10 years, 11-14 years, 15-18 years old, 19-23 years old and over.

By resident population we understand the total of Romanian, foreign and non-citizens, who are habitually resident in Romania.

- **School population in the school/university year 2017-2018**

According to data published by the National Institute of Statistics, the school population in the national education system was 3578.6 thousand pupils and students in the school/university year 2017-2018, decreasing by 18.7 thousand compared to the school/university year the school population increased (by 6.9% and 1.4%, respectively) compared to the previous school year, and the number of graduates in the year 2017 was 497.6 thousand pupils and students, down 0.3% year-on-year.

In the school/university year 2017-2018, almost half of the school population was found in primary and secondary education (46.9%), and about one third in high school and pre-school and pre-school education (17.8% and 15.1%). Of the total school population in the education system, 50.1% were male students and 71.4% studied in the urban environment.

Compared with the previous school/university year, higher education and vocational education registered increases in the school population (+7.3 thousand students/trainees, respectively +5.8 thousand pupils), 90.2 thousand pupils enrolled in vocational education.

The most significant decreases in the number of pupils enrolled in the school year 2017-2018 compared to the previous one (-17.5 thousand, respectively -13.1 thousand) were in primary and lower secondary education.

The educational units that functioned in the school/university year 2017-2018 were allocated to primary and lower secondary education (57.2%), high school (21.2%), pre-primary and pre-primary (17.1%). 95.4% of the school population were enrolled in the public school units. Students in the 11-14 age group recorded 89.8%, compared to the other age groups. In 2017-2018, 538.9 thousand students were enrolled in higher education, of which 54.2% were students.

According to ISCED-F, higher education predominated in specialized fields of business, administration and law (23.8% of all students), respectively in engineering, processing and construction (21.0% of total students).

Territorial, in the school/university year 2017-2018, the North-East regions (623.0 thousand people) and Bucharest-Ilfov (506.8 thousand persons) registered the highest values of the school population.

The distribution of the school population by development regions and educational levels compared to the total of each region shows that the highest share was in primary and secondary education in the South Muntenia region (54.4%). Higher education was predominant in the Bucharest-Ilfov region (34.8%), and the lowest shares were registered in post-secondary education and foremen in the Central, North-East and Bucharest-Ilfov regions (2.0% region).

In the school/university year 2017-2018, the teaching staff was 236.2 thousand people. The average ratio of the school population to the number of teachers was 15 pupils/students per teacher. The number of graduates from the 2016-2017 school year at the secondary, high school, postgraduate level, post-graduate and post-doctoral programs was 497.6 thousand pupils and students.

In the regional profile, 171.4 thousand pupils graduated from gymnasium, of which the North-East Region (20.3%). In the urban area, secondary school graduates account for 53.9% of the total graduates, with the North-East and South Muntenia regions registering higher shares of rural graduates (60.0% and 57.2% respectively).

In high school education, they graduated 153.6 thousand students, up 0.5% compared to the previous year, most of them attended the daily education courses (89.7%).

Half of the high school graduates attended the theoretical courses (51.3%), 41.1% the technological ones, and 7.6% the vocational courses. At the baccalaureate exam, 141.2 thousand graduates were present, out of which 121.8 thousand came from the 2017 promotion (86.3%). 100.8 thousand persons were declared successful (71.4%). Of the graduates of the 2017 promotion, 94.6 thousand people (77.6%) were declared successful.

In vocational education, 19.4 thousand pupils graduated, of which 97.2% attended the courses of the public school units. Graduates of post-secondary education and foremen have graduated 32.0 thousand pupils, of which 64.3% attended the courses of public units and 35.7% private ones.

The number of graduates with higher education diplomas was 121.3 thousand students, of which 27.7% from faculties with business, administration and law, engineering, manufacturing and construction 18.2%, health and social care 11.6%. Funding for education was provided by public funds (from the state budget and local budgets) (90.5%).

- **Highlights of school/university activity in the school/university year 2017-2018**

The school/university population in Romania, in accordance with the legal regulations in force, is divided into six age groups, namely: 0 - 2 years, 3-5 years, 6-10 years, 11-14 years old, 15-18 years old, 19-23 years and over. Individuals in each age group belong to a class in the educational structure in Romania. The extent of coverage is shown in Table 1.

Table 1. *Degree of enrollment of the school-age population in the school/university year 2017/2018*[*)]

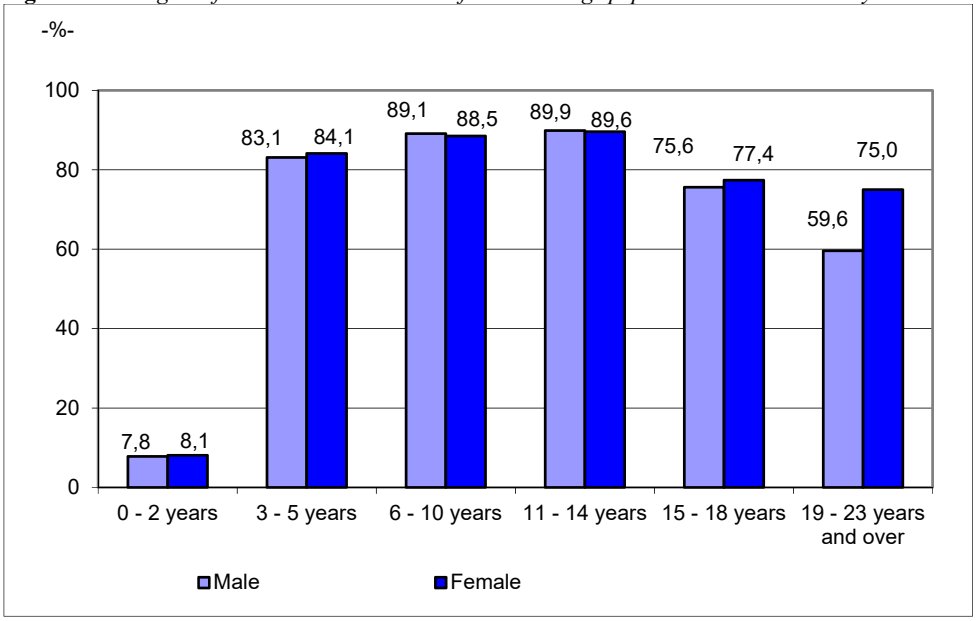
- percent -

Age groups	Male	Female
0 - 2 years	7.8	8.1
3 - 5 years	83.1	84.1
6 - 10 years	89.1	88.5
11 - 14 years	89.9	89.6
15 - 18 years	75.6	77.4
19 - 23 years and over	59.6	75.0

*) The resident population was used on 1 January 2017 (provisional data).
Source: National Institute of Statistics, Comprehensive Statistical Surveys on Education Statistics in the School/University Year 2017-2018.

In Figure 1 is a graphical presentation of the state of school enrollment of the population of school age in the academic year 2017-2018.

Figure 1. *The degree of enrollment in education of the school age population in the academic year 2017-2018*



Source: National Institute of Statistics, Press release no. 157/06.25.2018.

The data in Figure 1 graphically transpose the situation in Table 1.

The data on the distribution by region of the school population is shown in Table 2.

Table 2. *Distribution by region of the school population by levels, in the school/university year 2017/2018*

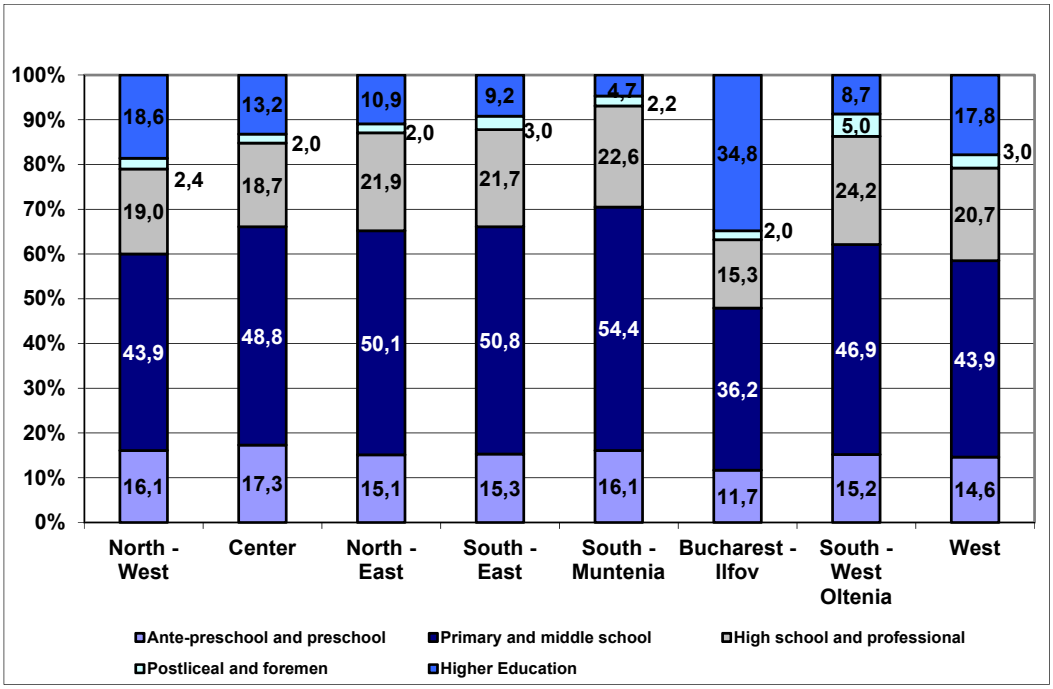
– percent –

Development Region	Ante-preschool and preschool	Primary and middle school	High school and professional	Post-liceal and foremen	Higher Education
North-West	16.1	43.9	19.0	2.4	18.6
Center	17.3	48.8	18.7	2.0	13.2
North-East	15.1	50.1	21.9	2.0	10.9
South-East	15.3	50.8	21.7	3.0	9.2
South Muntenia	16.1	54.4	22.6	2.2	4.7
Bucharest-Ilfov	11.7	36.2	15.3	2.0	34.8
South-West Oltenia	15.2	46.9	24.2	5.0	8.7
West	14.6	43.9	20.7	3.0	17.8

Source: National Institute of Statistics, Exhaustive statistical surveys on education statistics in the school year 2017/2018.

The distribution by region of development of the school population highlights an imbalance from one region to another. Thus, the North-West region has a high share of pre-school and pre-school education (16.1%). In Primary and Secondary Education, the South Muntenia region ranks first (54.4%), followed by the South-East (50.8%) and North-East (50.1%). High-school and vocational education is the most active in the South-West Oltenia region (24.2%), followed by the South Muntenia region (22.6%), the North-East (21.9% South-East (21.7%) and West (20.7%). In post-secondary education and foremen, the level is very low, only the South-West Oltenia region comprising 5% of the population able to follow these courses. In higher education, the Bucharest-Ilfov (34.8%), North-West (18.6%) and West (17.8%) regions are leading.

Figure 2. *Distribution by region of the school population by educational level, in the school/university year 2017-2018*



Source: National Institute of Statistics, Press release no. 157/06.25.2018.

In Figure 2 we presented graphically the data included in Table 2. Graphical representation is more suggestive. In the following, we will carry out an analysis of the school population taking into account the ISCED level that applies in all EU Member States. The study is also based on the structure of the school population by gender and urban and rural environment. Starting from the total population of the school population it was found that it was 3,578,561 persons, out of which 1,785,568 females and 1,792,993 males. On average, 2,556,054 people were in the urban area and only 1,022,507 in rural areas. This structure by medium is in line with the structure of the entire population of the country. The rural population has shrunk as a result of population migration, especially younger generations, to the city, as well as cities of many communes.

By levels of education, we find that women have a higher share in high school, post-secondary/higher education and higher education. Male students and students had a higher share in pre-primary and primary education, primary and secondary and vocational education. On average, the overwhelming share in all levels of education is held by the urban environment. Thus, in higher education only 186 students were enrolled in rural areas. Data analyzed are summarized in Table 3.

Table 3. *School population by educational levels in the school/university year 2017-2018*

- persons -

Educational levels	ISCED Level	Total	Female	Male	Urban[2)]	Rural[2)]
Total[1)]		*3578561*	*1785568*	*1792993*	*2556054*	*1022507*
Ante-preschool and preschool education	ISCED 0	541922	263443	278479	317719	224203
Primary and Secondary Education	ISCED 1 and 2	1677968	809566	868402	938042	739926
High school education	ISCED 3	637706	330064	307642	595804	41902
Professional education	ISCED 3	90205	28222	61983	76113	14092
Post-secondary education and foremen	ISCED 4	91889	62430	29459	89691	2198
Higher education	ISCED 6,7,8	538871	291843	247028	538685	186

[1)] Starting with the school year/school year 2014-2015, the school population includes nursery children and, besides the undergraduate students, the students enrolled in master's degree studies, postgraduate studies and postgraduate studies, postgraduate doctoral studies and postdoctoral programs.

[2)] According to the NUTS classification of territorial units. The distribution of children/pupils/students in the territorial and urban/rural areas is based on the geographic location of the school units or faculties, not their domicile or residence.

Source: National Institute of Statistics, Comprehensive Statistical Surveys on Education Statistics in the School/University Year 2017-2018.

Another important structure of the school population is by forms of ownership of total education or educational levels. The private sector is still underdeveloped in Romania because of the poor financial resources of organizing education.

In higher education (bachelor, master, doctorate and postdoctoral), private higher education had a rapid pace of development, after which some universities closed their activity or were dismantled by the Ministry of National Education. These data are summarized in Table 4.

Table 4. *School population by educational levels and forms of ownership in the school/university year 2017-2018*

- persons -

Educational levels	ISCED Level	Total	Public property	Private property
Total		*3578561*	*3413076*	*165485*
Ante-preschool and preschool education	ISCED 0	541922	515215	26707
Primary and Secondary Education	ISCED 1 and 2	1677968	1659361	18607
High school education	ISCED 3	637706	627310	10396
Professional education	ISCED 3	90205	87841	2364
Post-secondary education and foremen	ISCED 4	91889	51973	39916
Higher education	ISCED 6, 7, 8	538871	471376	67495

Source: National Institute of Statistics, Comprehensive Statistical Surveys on Education Statistics in the School/University Year 2017-2018.

Evolution by educational development regions, by educational levels, is presented in Table 5. It is noted that the highest number of pupils/students was in the school/university year in 2017-2018 in the North-East and Bucharest-Ilfov regions, while the lowest figures were registered in the West and South-West Oltenia.

At pre-school and pre-school level, the North-East, North-West and Center regions have the largest share, and the lowest weights were recorded in the West and South-West Oltenia regions. There is the same distribution of the school population and the level of primary and secondary education.

In high-school education, the highest shares are in the North-East, South Muntenia and North-East regions.

At post-secondary level and foremen, the number of students in South-West Oltenia, South-East, North-East and South Muntenia predominates, while in Bucharest-Ilfov region almost one third of the students.

Table 5. *School population by educational levels and development regions in the school/university year 2017-2018*

- persons -

Development regions*)	Total	Ante-preschool and preschool	Primary and secondary school	High school and professional	Post-liceal and foremen	Higher
TOTAL	*3578561*	*541922*	*1677968*	*727911*	*91889*	*538871*
North-West	498257	80397	218638	94446	11914	92862
Center	429541	74367	209448	80426	8497	56803
North-East	622986	93858	312316	136496	12544	67772
South East	423192	64828	214806	91946	12704	38908
South Muntenia	454205	73107	246929	102481	10206	21482
Bucharest-Ilfov	506791	59495	183574	77352	9985	176385
South-West Oltenia	329735	50146	154575	79729	16417	28868
West	313854	45724	137682	65035	9622	55791

*) According to the NUTS (Nomenclature of Territorial Statistical Units). The distribution of children/pupils/students in the territorial and urban/rural areas is based on the geographic location of the school units or faculties, not their domicile or residence.

Source: National Institute of Statistics, Comprehensive Statistical Surveys on Education Statistics in the School/University Year 2017-2018.

Regarding the teaching staff enrolled in the academic year 2017-2018, on the ISCED educational levels, on the structures by gender and after the environment, the situation is presented in Table 6.

Note that in the analyzed school/academic year there were 236,208 teachers in all Romanian education, out of which 183,720 were female and only 52,488 male. In the urban area there were 158,747 teachers and in the rural area, specific for the lower levels, only 77,461 persons. The share is held by the first three levels of education, both in total and in both genres or averages. In the higher education there were 26,266 teachers, in balanced proportions by gender (13,469 females and 12,797 male), and after only 14 teachers were in the rural area.

Table 6. *Teaching staff during the school/university year 2017-2018*

- persons -

Educational levels	ISCED Level	Total	Female	Male	Urban*)	Rural*)
Total		*236208*	*183720*	*52488*	*158747*	*77461*
Ante-preschool and preschool education	ISCED 0	35468	35349	119	22597	12871
Primary and Secondary Education	ISCED 1 and 2	117183	93870	23313	57171	60012
High school education	ISCED 3	54257	38798	15459	50101	4156
Professional education	ISCED 3	1155	788	367	775	380
Post-secondary education and foremen	ISCED 4	1879	1446	433	1851	28
Higher education	ISCED 6,7,8	26266	13469	12797	26252	14

*) According to the NUTS (Nomenclature of Territorial Statistical Units). The distribution of children/pupils/students in the territorial and urban/rural areas is based on the geographic location of the school units or faculties, not their domicile or residence.

Source: National Institute of Statistics, Comprehensive Statistical Surveys on Education Statistics in the School/University Year 2017-2018.

The material basis is presented in Table 7 and reflects the current educational system (educational) situation. The structure of the material base is synthesized on classrooms, school labs, swimming pools, gymnasiums, school workshops and sports fields. The data are presented in total and in ownership forms. The most suitable facilities are schools for primary and secondary education, high school and university level in public education, as well as those for secondary and high school education.

Table 7. *The material basis of the school/university year 2017-2018*

- number -

Educational levels Property form	ISCED Level	Classrooms	School laboratories	Swimming pools	Gymnasiums	School workshops	Sports field
Total		*146977*	*26526*	*51*	*4845*	*4863*	*5494*
Ante-preschool and preschool education	ISCED 0	28725	-	-	-	-	-
Primary and Secondary Education	ISCED 1 and 2	71127	8168	21	3184	535	3617
High school education	ISCED 3	37551	8036	11	1416	3545	1547
Professional education	ISCED 3	773	143	-	29	201	28
Post-secondary education and foremen	ISCED 4	1078	400	3	12	26	10
Higher education	ISCED 6,7,8	7723	9779	16	204	556	292
Form of public property		*141134*	*25268*	*35*	*4642*	*4763*	*5312*
Ante-preschool and preschool education	ISCED 0	26685	-	-	-	-	-

Educational levels Property form	ISCED Level	Classrooms	School laboratories	Swimming pools	Gymnasiums	School workshops	Sports field
Primary and Secondary Education	ISCED 1 and 2	69936	8021	11	3064	505	3520
High school education	ISCED 3	36962	7898	8	1375	3512	1508
Professional education	ISCED 3	740	135	-	26	185	26
Post-secondary education and foremen	ISCED 4	290	119	2	6	18	7
Higher education	ISCED 6,7,8	6521	9095	14	171	543	251
Form of private property		*5843*	*1258*	*16*	*203*	*100*	*182*
Ante-preschool and preschool education	ISCED 0	2040	-	-	-	-	-
Primary and Secondary Education (including special education)	ISCED 1 and 2	1191	147	10	120	30	97
High school education	ISCED 3	589	138	3	41	33	39
Professional education	ISCED 3	33	8	-	3	16	2
Post-secondary education and foremen	ISCED 4	788	281	1	6	8	3
Higher education	ISCED 6,7,8	1202	684	2	33	13	41

Source: National Institute of Statistics, Comprehensive Statistical Surveys on Education Statistics in the School/University Year 2017-2018.

Table 8 presents the situation of graduates at the end of the school/university level 2017-2018 by levels of education. As a result, in this academic year, a total of 497,632 pupils and students graduated, the share of gymnasium, upper secondary and upper secondary education for both female and male graduates.

The two areas are clear, according to the number of students, the high share of the urban environment at all levels of education.

Table 8. *Number of graduates at the end of school/university year 2016-2017*

- persons -

Educational levels	ISCED Level	Total	Female	Male	Urban[1)]	Rural[1)]
Total		*497632*	*260587*	*237045*	*404177*	*93455*
Gymnasium education	ISCED 2	171387	84029	87358	92412	78975
High school education	ISCED 3	153590	79129	74461	143158	10432
Professional education	ISCED 3	19423	5492	13931	16251	3172
Post-secondary education and foremen	ISCED 4	31982	20216	11766	31161	821
Higher education[2)]	ISCED 6,7,8	121250	71721	49529	121195	55

[1)] According to the NUTS (Nomenclature of Territorial Statistical Units). The distribution of children/pupils/students in the territorial and urban/rural areas is based on the geographic location of the school units or faculties, not their domicile or residence.

[2)] Higher education data refers to graduates with a diploma.

Source: National Institute of Statistics, Exhaustive statistical surveys on education statistics at the end of school/university year 2016-2017.

The same distribution of graduates meets and their structure according to ownership, see Table 9.

Table 9. *Number of graduates by form of ownership at the end of school/university year 2016-2017*

- persons -

Educational levels	ISCED Level	Total	Public property	Private property
Total		*497632*	*464182*	*33450*
Gymnasium education	ISCED 2	171387	170498	889
High school education	ISCED 3	153590	150687	2903
Professional education	ISCED 3	19423	18880	543
Post-secondary education and foremen	ISCED 4	31982	20557	11425
Higher education*)	ISCED 6,7,8	121250	103560	17690

*) Higher education data refers to graduates with a diploma.

Source: National Institute of Statistics, Exhaustive statistical surveys on education statistics at the end of school/university year 2016-2017.

It is noted that from the total number of the graduates, the one in the public institutions was predominant, the ones in the private sector being used less frequently, on most educational levels, except for the post-secondary education and foremen. In higher education, out of a total of 121,250 graduates, 103,560 come from public institutions and only 17,690 from private ones. We use the notion of an individual because in higher education we find a particular form of "tax education" from public institutions, which can be considered by those who follow these courses to be "on their own/private" from the point of view material.

Table 10. *Number of graduates in higher education, by education and gender, at the end of the academic year 2016-2017*

Education domain	Undergraduate education		Higher education, postgraduate courses and postgraduate studies		Doctoral studies and postdoctoral programs	
	Total	from which: female	Total	from which: female	Total	from which: female
T O T A L	*80035*	*46515*	*39327*	*24179*	*1888*	*1027*
Education sciences	3260	3036	2710	2227	46	31
Arts and Humanities	7027	4624	3589	2287	357	183
Social sciences, journalism and information	6374	4768	3895	3081	205	132
Business, administration and law	21460	14257	11871	8367	219	134
Natural sciences, mathematics and statistics	3829	2520	2479	1797	156	100
Information and Communication Technologies (ICT)	4891	1589	1821	695	38	22
Engineering, processing and construction	14522	4919	7236	2906	348	139
Agriculture, forestry, fish farming and veterinary sciences	3840	1598	1408	619	92	49
Health and social assistance	11485	8126	2227	1593	355	213
Services	3347	1078	2091	607	72	24

Source: National Institute of Statistics, Comprehensive Statistical Surveys on Higher Education (ISCED 6, 7 and 8) at the end of the academic year 2016-2017.

In Table 10 we distributed the graduates with a degree, by fields (specializations) by total, by gender, by levels (bachelor, master, postgraduate, doctoral and postdoctoral). From the point of view of the field of higher education, ten such fields were considered, most of them graduates from the fields of business, administration and law (21,460 graduates, of which 14,257 female), engineering, manufacturing and construction (14,522 graduates of which 4,919 females) and health and social assistance (11,485 graduates, out of which 8,126 females).

Conclusions

The authors' study shows that the analysis of the evolution of the places of the population in the educational field is of great importance.

The ability to cover and attract younger generations to all grades is delicate. First of all, due to the labor market situation, a number of young people give up training and especially deep training for the profession they are targeting for the future.

The second conclusion is that in the field of vocational guidance the results are inconclusive and there is no correlation between the situation of the generations who go through national education and job offers. On the other hand, the lack of interest in some forms of training, the slightly inconclusive teaching staff level, have made the illiteracy level increase.

The article suggests that vocational guidance needs to be improved, the high school and vocational education network needs to be better structured, and better links between the areas where younger generations are trained and the labor market offer. We do not refer here to the professional reconversion but we appreciate that in a general context, for graduates, there should be no question of professional reconversion as long as they complete the studies in the field they wanted and should be correlated with the labor market.

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Macroeconomic variables and stock prices in emerging economies: A panel analysis

Raghutla CHANDRASHEKAR
Central University of Tamil Nadu, India
chandrashekareco@gmail.com
P. SAKTHIVEL
Sastra University, Tamil Nadu, India
sakthivel@mba.sastra.edu
T. SAMPATH
Telangana University, India
sampatheco@gmail.com
Krishna Reddy CHITTEDI
University of Hyderabad, Telangana, India
krc@uohyd.ac.in

Abstract. *This study aim to explore the role of the macroeconomic variables and stock prices for emerging economies perspective. Further, the study examines the association between the macroeconomic variable and stock prices across the panel of India and Brazil. The study utilizes monthly data from 2000M1-2016M08. We employ various panel econometric techniques. The findings confirm that the long run relationship between variables and unidirectional causality. The results also reveal that GDP, inflation, exchange rate, interest rate and stock prices play an important role in economic development.*

Keywords: macroeconomic variables, stock prices, panel analysis.

JEL Classification: E00, E44.

1. Introduction

The stock market has become an important indicator of the performance of the emerging economies over the few decades. However, the working of the stock market has become a vital subject for investment professionals, academics, and monetary policymakers. The stock market works with the sentiments of participants, which depend on several factors, making it a very sensitive segment of the economy. Globalization and financial sector reforms have added to the sensitivity by increasing determinants of the stock market movement manifold (Panda, 2008). The framework of economic policies started changing from 1985, with a shift towards market-oriented policies. This has been referred to as the process of economic liberalization. As parts of this initiative, a number of policy changes have been instituted that has gradually shifted control of resources allocation from the government to the markets. These measures, elimination of prices controls and elimination of government control on the exchange rate have had a major impact on the emerging market countries corporate sector and on the evaluation of traded securities. These changes have had the most important effects that have directly affected the stock market.

The present study focus on the association between the stock prices and macroeconomic variables in the prospective of emerging countries. Both variables are depends on present market condition due to the instability of the open economy. This implies that change in aggregate macroeconomic activities will be strongly influence the changes in stock price occurring. In both financial crisis and global economic has stimulated investigation about the relationship between the macro-economy and financial markets. Although, economists would agree that financing decision explore along with the study of the behavior of financial markets are within the sphere of finance. The macroeconomic emphasize of analyzes the behavior of the aggregate or entire economy. While the uncertainty is play a crucial role in each of these areas, Thereby, there is sophisticated empirical evidence in the finance literature that positive uncertainty shocks can predict a slowdown of economic activities. However, the literature does not establish whether this association is stable over time. In this study investigating monthly data from the beginning of 1994: M1 to 2016: M6. We analysis that macroeconomic variables response to changes in stock market prices from our sample period. To investigates this issue especially, we important to explore such unparalleled macroeconomic response pattern.

Given this background, the present paper aims to investigate the impact of stock prices on macroeconomic variables in two emerging economies. More specifically, best of our knowledge, no study so far has examine the relationship between stock prices and macroeconomic variables in two emerging countries. Therefore, the study key findings add to the literature in terms identifying the role of key macroeconomic variables on stock prices. More specifically, it will be important for the policy makers to know to what extent increases output, increases interest rate impact on stock prices and depreciation in exchange rate impact on stock prices. These findings will assist the policy makers to take additional initiatives to promote the key macroeconomic variables to stock market without harming the economic development in those economies.

The remainder of the paper structure is organized as follows. Section 2 discusses the review of the literature. Section 3 documents the data empirical methodology. Section 4 reports results and discussion. Finally, section 5 provides conclusion and remarks of the study.

2. Literature review

Stock market through increases investment may transfer the technology; it leads the innovative production process, increases export and managerial skill to the host economies. Given that, the stock market can have a positive impact on economic output, increases interest rate and depreciation in the exchange rate can have a positive impact on stock prices. Which may then may have a considerable effect on stock market. For instance, Tripathi and Kumar (2016) documented that stock returns and money supply has a positive impact on GDP in BRICS during 1995 Q1 to 2014 Q4. Authors also find interest rate, the rate of exchange rate, and rate of inflation has a negative impact on stock returns. Mohapatra and Rath (2015) examine the relationships between stock prices and key macroeconomic variables in three emerging countries namely such as India, Brazil, and China during from 2000-2012. The results reveal unidirectional causality from interest rate to stock prices; exchange rate to stock prices; exchange rate to inflation; exchange rate to interest rate; inflation to interest rate and long-run unidirectional causality between all the four selected macroeconomic variables and stock prices. However, Tripathi and Kumar (2014) find that inflation has no long-run impact on stock returns in 5 emerging market economies, spanning the period March 2000 to September 2013. Most recently, Riadh El Abed (2017) report that interest rate, inflation rate, and FDI has a positive impact on stock prices in the both short run as well as long run and exchange rate has a significantly negative impact on stock prices in the short run in two emerging countries during 1995:Q1 to 2015:Q1. Further, they document that monetary aggregate has a negative impact on stock prices in the long run.

Similarly, macroeconomic variables may affect negatively or positively stock market via inflation, exchange rate, interest rate and output. Investment increases additional source of funding for economic activities. Therefore, macroeconomic variables may play a major role in the stock market. Tripathi and Kumar (2014) find that unidirectional causality between stock returns and inflation rate, GDP growth rate, exchange rate and money supply in BRICS. Pethe and Karnik (2000) explored the relationship between stock prices and macroeconomic variables in India, during April 1992 to December 1997. Their find no long run relationship between stock prices and macroeconomic variable. Bhattacharya and Mukherjee (2002) investigated the relationship between stock prices and macroeconomic aggregates in India, spanning from April 1990 to March 2001. They find no causal linkage between stock prices and foreign exchange reserves, real effective exchange rate, and trade balance. Sangeeta Chakravarty (2006) examine the causal relationship between macroeconomic variables and stock prices in India during April 1991 to December 2005. Author report that unidirectional causality from money supply to stock prices. Furthermore, document that no unidirectional causality running between stock price and inflation, index of industrial production. Robert (2008) document that exchange rate and the oil price has no significant impact on the stock market in BRIC economies. Further author finds

bidirectional causality stock prices and rate of inflation in India during 1992-1993 to 2000-2001. Ahmed (2008) state that macroeconomic variable has a significant impact on the stock market in India during the period 1995:03 to 2007:03. A very recent study by Jamaludin et al. (2017) investigate the effect of macroeconomic variables and stock market returns in a panel of 3 nations. Authors make use of panel least square regression econometric techniques and monthly data from January 2005 to December 2015. Their findings confirm that the stock market returns has a positive impact on both interest rate and inflation, and stock market returns has an insignificant impact on money supply in Singapore, Malaysia, Indonesia economies, respectively.

Authors suggest that the macroeconomic variables in emerging countries has not reached at the level. Macroeconomic variables where it can effectively impact its adverse effect on the environment. It is clear from the existing literature that there is no research, which investigates the role of the stock market and key macroeconomic variables in major emerging market economies.

3. Data and empirical methodology

Nature of data and measurement

This present study uses monthly data for two emerging nations, spanning the period from 2000M1-2016M08. The selection of data samples are based on the availability; we selected the two emerging nations such as Brazil and India. To meet the study objective, we collect the time series data on stock prices (SP), index of industrial production (IIP) proxy for GDP, consumer price index proxy for rate of inflation (INF), and lending rate (LR) proxy for interest rate, real effective exchange rate (REER) proxy for exchange rate. We obtained data from the World Development Indicators (WDI) online database. We considered variables are converted into natural logarithms (LN) (see Chandrashekar et al., 2018; Ummalla and Chandrashekar, 2015). Because before the empirical investigation begin to avoid the problems related to the selected data measurement.

3.1. Econometric methodology

To examine the interaction between the stock prices, index of industrial production, consumer price index, lending rate, and real effective exchange rate. We frame the following equations:

$$SP_{it} = f(IIP_{it}, INF_{it}, REER_{it}, LR_{it}, e_{it})$$

$$\ln SP_{it} = \beta_{1i} \ln IIP_{it,} + \beta_{2i} \ln INF_{it} + \beta_{3i} \ln REER_{it} + \beta_{4i} \ln LR_{it} + e_{it}$$

Where, SP, IIP, CPI, REER, and LR represent for stock prices, index of industrial production, consumer price index, lending rate, and real effective exchange rate, respectively. Similarly, countries which are selected and time period are indicated by the subscripts i (i = 1, …, N) and t (t = 1,…, T), respectively. While e_{it}, is denote the residuals which are represent deviations from the long-run equilibrium relationships.

As the given, nature of our panel data first step of the empirical analysis, we make use of the two-panel unit root tests to investigate the order of integration across the variables under study. For instance, we determine selection of econometric models employed the Levin, Lin, and Chu (LLC) (2002) test for common unit root process, while I'm, Pesaran, and Shin (IPS) (2003) test for an individual unit root process to investigated. For both LLC and IPS tests, the null hypothesis of a unit root is tested as against the alternative hypothesis of no unit root. If all the sample variables are integrated in the same order, i.e., I (1), then LLC, IPS tests indicates that all the sample variables are nonstationary at levels of data and stationary at their I(1) first-order differentials. Further, this findings suggest that these sample variables, as a group, which may have a positive cointegration equilibrium relationship in the long-run.

Therefore, to employs the long run cointegration relationship between variables of the equation (1), for this purpose, we test the Fisher-type panel cointegration test, the model based on the methodology which is suggested by Maddala and Wu (1999). This model has been developed and using by the Johansen (1991) framework. According to Maddala and Wu (1999), Fisher-type panel cointegration test performs better than the other panel cointegration tests. Because of which are based on the Engle-Granger two-step procedure. Pioneer researchers (e.g., Alam and Paramati, 2015; Alam et al., 2017; Paramati et al., 2017; Kutan et al., 2017). Moreover, these authors suggest that Fisher-type panel cointegration test provides, reliable findings on the long-run association among the variables.

Further, we aim to find out the long run stock price, economic growth, inflation, exchange rate and interest rate; we estimate a single cointegration model based on the equations (1) in the model. For the estimation of long-run elasticities, we are employing dynamic ordinary least squares (DOLS) framework. Finally, we aim, to examine the direction of the short run panel causality among stock price, economic growth, inflation, exchange rate and interest rate are using a model that supports the existence of heterogeneity across the cross-sections variables. We employ this test based on Dumitrescu and Hurlin (2012) approach. This test requires sample variables to be stationary for which propose; we converted all the variables into first differenced. The null hypothesis of no causality in any cross-section is tested against the alternative hypothesis of causality at least for some cross-sections. The suitable lag length criteria for this test is selected based on the Schwarz information criterion (SIC).

3.2. Descriptive statistics

Table 1. *Descriptive statistics of the variables, 2000M1-2016M08*

variables	SP	INF	IIP	LR	REER
Mean	9.884	4.472	4.414	3.127	4.419
Std. Dev.	0.891	0.324	0.250	0.739	0.181
Skewness	-0.457	0.100	-0.844	0.111	-1.119
Kurtosis	2.342	1.803	2.795	1.213	3.843
Jarque-Bera	21.160	24.540	48.185	53.999	95.379
Sum.	3953.621	1788.860	1765.702	1251.125	1767.738

Note: The growth rates were calculated using natural logarithm data.

Table 1 provides panel descriptive statistics, namely standard deviation, skewness, kurtosis, mean and Jarque-Bera for selected nations. Mean for the most of variables in the panel are positive including stock returns of sample countries. The negative skewness coefficients are the panel of stock returns, industrial production, and real exchange rate indicates that the frequency distribution of real value of these variables is fat-tailed or left skewed. However, positive skewness coefficient for inflation and interest rate implies frequency distribution is right-skewed. The kurtosis value exceeds more than three which the distribution of returns is leptokurtic. Jarque-Bera test statistics show that rejects the null hypothesis of a normal distribution for the most of series.

4. Results and discussion

4.1. Order of integration of the variables

To check stationary process of each variables as follows, Im, Pesaran, and Shin (2003) and Levin, Lin and Chu (2002) panel unit root tests were used. The panel unit root tests helps to combine both time series data as well as cross-sectional data which leads to improve power of test. The result of panel unit root tests is presented in Table 2. The result shows that all log variables of stock prices, inflation, industrial production, real exchange rates and interest rate were nonstationary at the level form. In other words, all variables are panel contain unit root since null hypothesis is accepted in all cases. However, all variables are integrated order of one and have a possible cointegrating relationship to be investigated by Johansen-Fisher panel co-integration test.

Table 2. *Panel unit root tests results*

Variable	Level				First difference			
	LLC test		IPS test		LLC test		IPS test	
	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.
SP	0.585	0.720	0.737	0.769	-23.688***	0.000	-19.089***	0.000
IIP	4.588	1.000	2.299	0.989	-3.513***	0.000	-2.604***	0.004
INF	0.019	0.508	2.786	0.997	-9.414***	0.000	-11.750***	0.000
REER	0.018	0.507	-0.676	0.249	-24.153***	0.000	-17.871***	0.000
LR	2.512	0.994	0.946	0.828	-23.565***	0.000	-18.909***	0.000

Note: *** indicate the rejection of the null hypothesis of a unit root at the 1% significance levels.

4.2. The Johansen-Fisher panel long-run equilibrium relationship.

The non-stationarity series are used to examine the presence of the long run relationship between stock prices, inflation, industrial production, real exchange rates and interest rate. For this purpose, the study is applied Johansen-Fisher panel co-integration test. The results are reported in Table 3; the results reveal that both trace and maximum-eigen value statistics have rejects null hypothesis no long-run equilibrium relationship among variables. Also panel co-integration test exhibit trace and maximum-eigen value statistics identify two co-integration vectors. It implies that the all variables are co integrated and move together in the long run. In other words presence of long-run equilibrium exists among stock prices, inflation, industrial production, real exchange rates and interest rate in selected countries namely India and Brazil.

Table 3. *Johansen-Fisher panel cointegration test*

Hypothesized: No. of CE(s)	trace test	Prob.	max-eigen test	Prob.
None	46.23***	0.000	45.26***	0.000
At most 1	12.27	0.015	11.49	0.021
At most 2	4.202	0.379	3.682	0.450
At most 3	2.596	0.627	2.459	0.651
At most 4	2.724	0.605	2.724	0.605

Note: *** indicates the rejection of the null hypothesis of no cointegration at the 1% significance level.

4.3. The long-run elasticities of stock prices

Once cointegration is confirmed, long-run elasticities of stock prices, inflation, industrial production, exchange rates and interest rate are investigated by use of panel dynamic ordinary least squared (DOLS) method. The panel regression results are presented in Table 4. The result reveals that most of the key macroeconomic variables had a positive and significant impact on stock prices when the study conducts analysis those two countries as a group. This shows that industrial production, and exchange rate positivity affecting stock prices. However, inflation and interest rate has no significant impact on stock prices.

Table 4. *Panel data analysis of long-run stock prices elasticities*

Variable	Coefficient	t-statistics
Dependent variable: Stock Price		
IIP	1.179***	5.687
INF	0.446	2.530
REER	0.633***	3.511
LR	0.070	0.413
R-squared	0.442	

Note: *** indicate the significance level at the 1% level.

4.4. The direction of causality

The heterogeneous panel causality test is used to investigate the short-run relationship between stock prices, inflation, industrial production, real exchange rates and interest rate. Table 5 provides result of panel causality test. Its shows unidirectional causality from stock returns to inflation, industrial production, interest rate and real exchange rates. On the other hand, reverse causality is not found from those variables to stock returns. The existence of short-run relationship among those variables in selected countries namely India and Brazil.

Table 5. *Heterogeneous panel causality test*

Null Hypothesis:	Zbar-Stat.	Prob.
INF does not homogeneously cause SP	0.705	0.480
SP does not homogeneously cause INF	3.432	0.000***
IIP does not homogeneously cause SP	0.227	0.820
SP does not homogeneously cause IIP	8.916	0.000***
LR does not homogeneously cause SP	0.079	0.936
SP does not homogeneously cause LR	3.486	0.000***
REER does not homogeneously cause SP	-0.438	0.661
SP does not homogeneously cause REER	14.402	0.000***

Note: *** indicate the significance levels at the 1%.

5. Concluding remarks

The relationship between stock prices and macroeconomic variables has received high attention from regulators, investors, and academicians because it has wide implications for hedging and speculation. This study empirically investigates the relationship between key macroeconomic variables and stock prices of selected countries namely India and Brazil. We used Monthly data on stock prices, inflation, industrial production, real exchange rates are taken from January 2000 to August 2016. Both short and long-run equilibrium relationship is examined by panel Granger causality test and Johansen-Fisher panel co-integration test. The empirical results suggest that presence of long-run equilibrium among the stock prices, inflation, industrial production, real exchange rates and interest rate of selected countries namely India and Brazil. The result from dynamic ordinary least squared (DOLS) method reveals that most of key macroeconomic such as stocks prices and the exchange rate is positive and statistically significant. This result is emphasize with the result of Mohapatra and Badri (2015). Industrial production positive effect on stocks prices, this empirical result is consistent with the result of Mohapatra and Badri (2015). Other variables had positively impacts on stock prices but statistically insignificant. Moreover, empirical result from panel Granger causality test shows that the existence of unidirectional causality from stock returns to interest rate, this result is consistent with the result of Mohamed et al. (2011). Stock returns to exchange rates; those empirical results is consistent with the results of Abdalla and Murinde (1997), Mohamed et al. (2011), Tripathi and Kumar (2015). Stock returns to industrial production, those empirical result is emphasize with the result of Fama (1981), Tripathi and Kumar (2015). Stock returns to interest rate, this empirical result is underline with the result of Fama (1981). Finally, those variables are follows unidirectional causality stock returns to inflation, industrial production, interest rate and real exchange rates.

Given these findings, we argue that the interaction between index of industrial production, inflation, exchange rate, and interest rate have a significant role in stock prices. Hence, GDP economic growth (index of industrial production (IIP)) positively impact on stock returns, because of stock returns as any increase favorable affects on demand. Increasing inflation rate negatively impact on stocks returns, because of inflation rate as increases input cost. Increasing interest rate many ways to attract the investors to invest in stocks markets, it will give a required rate of returns. Both interest rate and inflation rate are causes raise in financial costs. Moreover, a depreciation (Increasing) in the exchange rate can be favorable for an economy. Thus, the exchange rate can positively impact on stock returns.

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Consumerism and exclusion in a throw-away culture

Alexandru TAŞNADI
The Bucharest University of Economic Studies, Romania
relationistul@yahoo.com
Iustin Emanuel ALEXANDRU
The Bucharest University of Economic Studies, Romania
iustin_alex89@yahoo.com
Gheorghe USTINESCU
The Bucharest University of Economic Studies, Romania
geousti@yahoo.com
Petru Ciprian BRADU
The Bucharest University of Economic Studies, Romania
pcbradu@gmail.com

Abstract. *Various sources draw our attention to contemporary problems such as irrational use of resources, pollution, and, even more alarming, the application of the market logic to human relations. Given this unfolding, we ask ourselves if the prevailing economic model has a human purpose. We show that consumerism, as an important feature of nowadays lifestyle, generates corruption, squandering, and addictions, which in turn lead people to an existential void, as psychiatrist Viktor Frankl put it. This being the status, we argue for a leap of conscience – a thorough consideration of how we act now and how we should behave if we want to maintain the various balances that make possible life on Earth.*

Keywords: consumerism, needs, lifestyle, throw-away, conscience.

JEL Classification: E21, Q56, Z12.

1. Introduction

Economy textbooks teach us that all economic goods go through a circuit that is specific to the "linear economy", of the type extraction – production – distribution – consumption – disposal. Analyzing it with attention, let us notice that it is no longer sustainable. Several reports to the Club of Rome, beginning with "The limits to growth" (Meadows et al., 1972), demonstrate us that resources are limited, thus, exhaustible, the logical conclusion being that we cannot sustain endlessly a linear system on a finite planet. Annie Leonard, an international expert on problems of sustainability and environmental health, has put in scene a short documentary called "The story of stuff" (2007). Her documentary, whose ideas were expanded in a book published in 2010, brings about the toxic impact which consumerism and materialism have on nature, economy and their sustainability.

The onwards maintaining of a linear economic model will direct society towards collapse (especially due to some irreversible processes) because of the amplification of wasting and the severe damage of ecosystems and of the biosphere's health. Conscious members of the human community have united their voices in order to signal the problem and the disaster to come, if not for the present generations, but eventually for those to come. Already from the 2012 World Economic Forum in Davos, the main theme of the summit was urging the participants to think about a "great transformation" meant for "shaping new models".

Consumerism, as a process, caught roots within a modern ideology that daily brings us pollution, the irrational exploitation of resources, the corruption of governments, manipulation of minds and behaviors through advertising, the enslavement of technology and fashion, the "disease of shopping".

Last, but not the least our papers draws from an Address of Pope Francis (2013a) in which H.H. highlighted a "deficient human perspective, which reduces man to one of his needs alone, namely, consumption". Besides denouncing this strong orientation towards consumption, Francis, as other predecessors of him (see for example John Paul II in "Evangelium Vitae", 1995), is concerned about the application of the market logic to human relations: "Worse yet, human beings themselves are nowadays considered as consumer goods which can be used and thrown away. We have started a throw-away culture". Other concern thoroughly considered by Francis in "Laudato Si'" encyclical letter (2015a) brings about the problem of environmental degradation.

Taking into consideration the signals that are coming, as we have seen, from activists, economists, the business environment, politicians and the clergy, we proposed to highlight through our paper the danger that the linear economic model involves for our present and future.

2. An economy of exclusion that instills suffering

We have previously exposed some considerations made by H.H. Francis on consumption, but there is much more to be discovered in the economic reflections of this religious leader. In fact, his writings and discourses abound in references to economics and one of these made the front page: "This economy kills" (Evangelii gaudium, 2013). The remark was about exclusion, a feature of the actual society and economy: "How can it be that it is not a news item when an elderly homeless person dies of exposure, but it is news when the stock market loses two points?". This reflection also gave the name of a book written by two journalists of La Stampa – "Questa economia uccide" (Tornielli and Galeazzi, 2015). According to Francis, the global crisis has its roots within a profound anthropological crisis. This manifests itself through the creation of new idols, the fetishizing of money and strengthening of the dictatorship of an economy without a face and without a human purpose. The attribute "without a face", associated with the contemporary economy, is understood as being the expression of its carelessness and indifference towards the vulnerable persons that have entered in the category of excluded (the poor, unemployed, seek, old, persons with disabilities, etc.).

Although consumerism is being associated with abundance and happiness, a great part of the world's population is living in conditions of daily precarity. These conditions amplify fear and despair which envelop the hearts of numerous persons, reaching the point where they live under their dignity of human beings. Although it is a mirror of material abundance, consumerism has provoked on a social scale a true "cancer of despair" which devours society. This social disease dwells within the inhuman economic models. In such an economy, "tentacular corruption" and "selfish fiscal evasion" have extended progressively to the point in which, for the time being, they have reached huge dimensions. There are attempts to neutralize this expansion of the economy without a face through ethics and solidarity (concepts that are considered outdated, obsolete). Ethics opposes the subjugation of human person by the consumerism ideology. Such an ideology promotes absolute autonomy of the markets and of financial speculations (which account today for a great portion of the total volume of transactions); neither has solidarity chances of triumphing in such an economy because it is declared as opposed to financial and economic rationality.

A change in the world's economy supposes the change of attitude of the decision makers who are responsible for the economic and public policies. Regarding the new idol of the world's economy, i.e. money, Francis states that it should serve and not govern. Here we talk about the various forms through which greed manifests itself.

The linear model associated with consumerism disrupts the authentic spirit of competition, continuously generating selfishness and conflicts.

Nowadays it circulates more and more the concept of "lost generation", with reference to youth. By means of aggressive advertising, youth are being more and more attracted to the mirage of materialism with the consequence that they do not engage enough in a

life plan that would help them live a plenary life. This suppresses the authentic spiritual and cultural values of people. Having in mind the imperatives of life, highlighted by psychologist Alfred Adler: life lived in society, labor and love, we could declare that a person without a job or other fruitful activity lives under his dignity of human being. If the current global economy system has in its center a new "idol", there are very few chances that people will occupy this center. Perpetuating such an economic system, without a face and without human purpose, generates daily suffering. This system shatters the trust in its "virtues" and deprives of hope a great mass of people. And then, fairly, economy students ask us why this globalized economic system that makes us so much harm is still accepted?

The economic-financial crisis that haunts the world for some years now, has amplified even more the fear and despair, has reduced the joy of life and increased violence and poverty. The linear model of economic development, based on consumerism, has gradually become a mentality that was accepted in a passive way, i.e. a form of resignation. Therefore, the adoption of a new economic model is required – one that opposes, to put it as Francis, „the economy of exclusion, the culture of throwaway, the culture of death".

3. Interference of consumerism with corruption, squandering and addiction

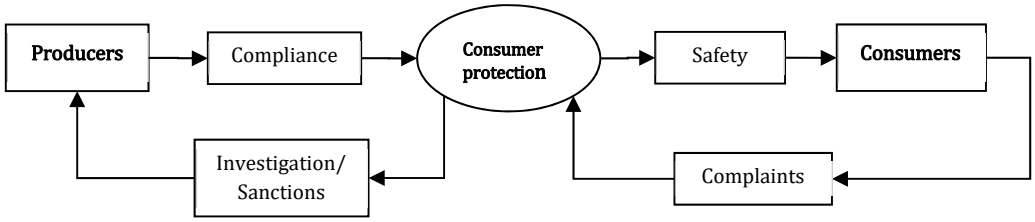
It is obvious that one of the basic traits of contemporary capitalism is consumerism. The doctrine on which it is based states that the degree of society's civility is directly proportional with the volume of goods and services purchased by the people of that society. According to the consumerism doctrine, thus you become a cultivated, serious, valuable person (see Figure 1).

Figure 1. *Alleged degree of civility*

Therefore, society must protect you, thus appearing the idea of "consumer protection". Behind it, stands a mountain of laws and regulations, and the attempt to apply them, through a heavy bureaucracy. But with all these measures taken to protect consumers from products

and services that could endanger them, are consumers really safe? Let us think just at the margarine assortments that are full of "E"-s, harmful to health. Here examples could continue with faulty financial practices or faulty agreements due to asymmetrical information. Seeing the great number of various consumer complaints, we ask ourselves if do institutions really protect consumers or do they mimic it? As it can be seen in Figure 2, consumer protection should be an important mediator between consumers and producers.

Figure 2. *The mediator role of consumer protection*



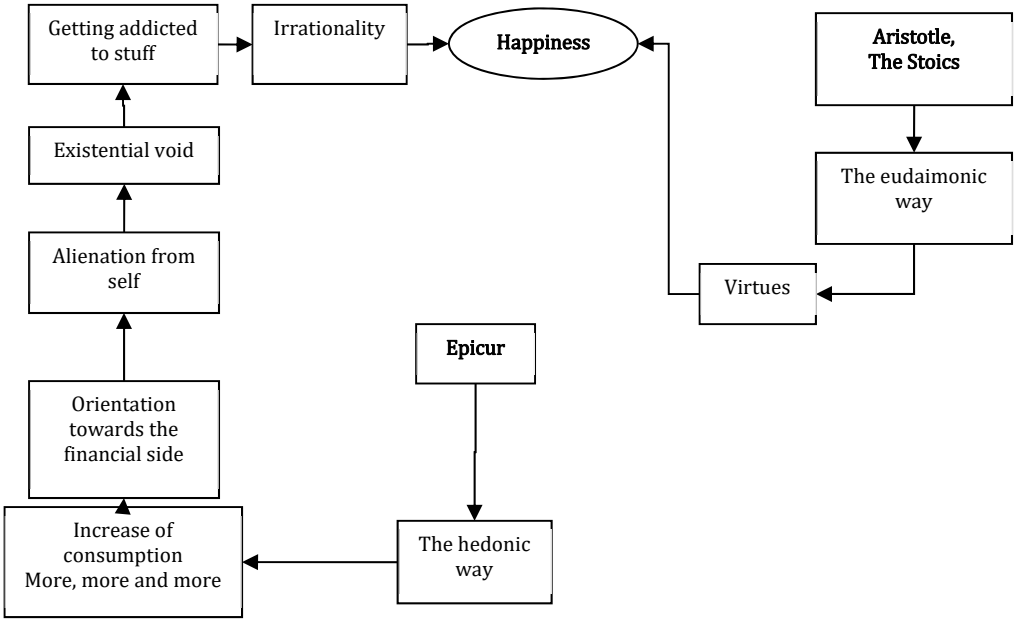
The consumer protection inspectors "warn" population to keep away from poisonous nourishment, but these lie further in shelves and windows. In other words, producers care for their job and further sell, on the way out being expected by profit. Consumer protection takes action when "the joke" gets serious and public opinion is offended. However, factories of toxic nourishment work round the clock (Séverac, 2010). This situation is due to the fact that producers are in a fierce competition to market products, in many cases traders resorting to corrupt means in order to sell them (see, for example, the Microsoft scandal in Romania). Within the systems that declare themselves democratic, population seems abandoned by the coalition in power: governments – corporations. Corporations make us feel that governments will be to some extent left out of business, as nowadays economy is global, whereas the latter are national. Gradually, corporations will become even more powerful and will control, at a global scale, investment and innovations.

A reliable partner of consumerism is advertising. This is the root of consumerism propaganda. The purpose of this partner is to convince more and more people to buy more useless goods that in fact we do not need. Under this influence, which sometimes is not perceived, and in the most of cases is underestimated, human behavior in consumer culture is often irrational and immoral. It is found to be in contradiction with the Christian view of human behavior, being in fact dominated by the passions (addictions) of wealth, power and pleasure. Society establishes what is moral or not based on arguments of current order, being however slightly willing to consider older wisdom. Living in the servitude of consumerism, men, as consumers, came to paraphrase a well-known assertion of Descartes (I think, therefore I am): "I shop, therefore I am!" – it is a motto appropriated by modern man. It seems that we have developed an instinct of consuming or possessing more and more stuff, although often we do not need these.

From a theological point of view, passions (to be understood as addictions), are considered responsible for overwhelming will, so that man is no longer a man of will, but

it is said about him to be subdued by addictions (Stăniloae, 2002). On a philosophical level, research on happiness developed on two directions: eudaimonic and hedonic. Beginning with antiquity, Aristotle considered that only man living within virtues (as principles and personal values) will obtain happiness. In the same time, Epicur considered that obtaining happiness is possible if pleasure is maximized and sufferance is minimized (Figure 3).

Figure 3. *In search of happiness*



Nowadays, a series of studies show that in this mercantile universe those who are extremely materialistic are not that happy, as advertising so often promises. This extreme materialism is connected to numerous artificial needs that lead towards maximization of pleasure (satisfaction – in economic terms).

In time, man becomes addicted in his attempt to maximize pleasure and this addiction determines a growing consumption which is larger than the natural needs of the body and of the soul. Thus, man becomes the servant of goods and services purchases. The climax of consumerism is reflected by Black Friday or China Singles' Day, when all prices are discounted and you furiously buy all that you do not need.

Consumer society is sustainable as long as consumers run money at an ever growing speed. Capitalism to be found in this phase passes through an acute crisis of resources because the process unfolds according to the principle: consume, consume… throw away. Humanity is being suffocated by waste.

As witness of a world that is going in a wrong direction, of a world that is exhausted by crises, the natural environment suffers, as well, because of the individualistic spirit and greed. Natural capital is being regarded as a business in liquidation with economic

liberalism reaching its limits. In society and economic activity, the spirit of indifference, of neglect is being instilled more with each day.

To sum up what has been said until now, the rush for profit generates anarchy in production that in turn generates the anarchy of consumption, exhaustion of resources and the increase of the quantity of waste. However, the toughest reality is that much of the foodstuff produced globally is thrown away in affluent societies, whereas hunger instills in the poor ones (to the time being, Yemenite people suffer enormously do to this plague). Pope Francis condemned consumerism and the "culture of squandering", arguing that "whenever food is thrown out it is as if it were stolen from the table of the poor, from the hungry!" (Francis, 2013b).

The "shopaholism" dictated by consumerism is inspired by mass-media, by advertisement and financed by corporations. These suggest the consumer how to dress, what to eat or even how to think. Searching the meaning of life, man aspires towards considering that material well-being might be the supreme way of his liberation. The consumer society promises an affluent life. However, reality highlights the presence of an "existential void", i.e. a life that lacks meaning (Frankl, 2009). In this context, we need to promote a new lifestyle, abandoning economic pressure and consumerism (Adamakis, 2010) and adopt a responsible ethic of our lives, leading to sustainable development (Georgescu, 2014).

4. The leap of conscience

Numerous studies highlight more and more the lack of sustainability of the traditional production – consumption models on which is based the linear economy. Some of them bring about the proliferation of consumption as lifestyle. Had we more planets, we could not have created a sustainable society in the context of present patterns of production and consumption.

The phenomena in often criticized, as we have already shown, from theological positions, with the goal of reaching to the conscience of every man. Let us see another excerpt of Francis, addressed at a moment in which the reach was very wide (on the occasion of the Nativity of the Lord, 2015b): "In a society so often intoxicated by consumerism and hedonism, wealth and extravagance, appearances and narcissism, this Child calls us to act soberly, in other words, in a way that is simple, balanced, consistent, capable of seeing and doing what is essential".

With these words, Pope Francis tried to sensitize the consciences of the more than 1.2 billion catholic from all over the world. According to him, we need to pass from squandering and exacerbated consumption to simplicity, modesty, moderation and decency.

But this passing supposes a leap of conscience. In 1991, Vaclav Havel (at the time president of Czechoslovakia) addressed the following words to the joint chambers of the

U.S. Congress: "Without a global revolution in the sphere of human consciousness, nothing will emerge for the better in the sphere of our Being as humans, and the catastrophe toward which this world is headed, whether it be ecological, social, demographic, or a general breakdown of civilization, will be unavoidable". Here, through "revolution of consciousness", we understand a leap in conscience, a change of mentality, equivalent with Einstein's thesis according to which actual problems cannot be solved with the thought that generated them.

There is a need of another thought. The option for another behavior in the process of consumption is highlighted by attitude. There is an interdependence of the type cause – effect between thought/philosophy of life (T), attitude (A), behavior (B) and the human beings' lifestyle (LS), as follows: $LS = f(T, A, B)$. The leap of conscience supposes, in the first place, parting from the traditional paradigms through a process of unlearning (Popescu et al., 2016).

From this perspective, the spiritual dimension again acquires importance in our thinking. We have at hand the reservoirs of principles, values, ideals and Christian virtues. For instance, we should take into consideration when evaluating economic behaviors, some new "variables" such as greed, moderation, selfishness, hedonism, especially those known as passions (addictions): wealth, power, pleasure (Taşnadi, 2016).

Mankind's objective for the XXI century resides in ensuring the common well. To this end, the survival of human being in the space of uncertainties and risks implies the development of a planetary conscience – it is desirable that it may be creative and full of compassion. The revolution of conscience entails a passing from opulence, from exaggerated consumerism to moderation, decency, wisdom or simplicity.

From a philosophical standpoint, consumerism is related to the philosophy of "to have", and spirituality to the philosophy of "to be". The material – spiritual binomial which develops with this occasion could be reflected by the binomial science – religion, whose essence is captured by a consideration of Albert Einstein: "Science without religion is lame, religion without science is blind" (Einstein, 1995). Now, when being "consumed by consumerism", a fundamental transformation of mankind implies the assimilation of a new vision. Years in a row, especially in the XX century, science tended opposing spirituality.

The latter was considered impossible to be proven because it was expressed from subjective positions. In those times, spirituality was ignored also because it could not be measured. As a result, all human experience accumulated in time that was of spiritual, mystical nature, was excluded from approaches, from the equation. But here comes, for example, a researcher who is known to the Romanian research community, Dumitru Constantin Dulcan, M.D., Ph.D., arguing that "thinking means transforming what is not seen in what is seen. The thought is creator, it is the most powerful weapon in the universe" (Dulcan, 2015). In other words, science, starting with quantum physics, discovers that subjectivity creates the universe.

After Renaissance, material imposed itself more and more in social philosophy. Today, the passing from needs to desires (boosted by the manipulative creation of Edward Bernays – Freud's nephew), has gradually transformed consumerism in a genuine ideology of our days. The world that we have created is based on the features of classical, mechanical science. It is a cold world - dominated by calculation, rationality, narrow laws, where man is objectified. In a universe in which men are objects or numbers, only fear is perceived and the human being becomes more and more lonely (Stăniloae, 2002).

Some considerations that Pope Francis made in his address to The European Parliament (2014) are telling: "(…) there are still too many situations in which human beings are treated as objects whose conception, configuration and utility can be programmed, and who can then be discarded when no longer useful, due to weakness, illness or old age" – here it is again about the "principle of throw-away". Furthermore, as a sharp observer, he emphasizes: "In my view, one of the most common diseases in Europe today is the loneliness typical of those who have no connection with others". Interpreting this message in the context of our subject, let us observe that the expansion of consumerism will not lead to the healing of these social diseases – fear, hatred, indifference, or loneliness – as consumerism promotes a lifestyle that is strongly centered on personal needs, desires and interests.

We compensate the states of fear, distrust, and anxiety with an exacerbated consumerism, with "to have". In this philosophy, we treat the living planet such as we treat ourselves or our peers: as something that must be subdued, controlled, manipulated or even killed if it does not respond to certain interests (it is about the will of power that was highlighted by Viktor Frankl, 2009). Mankind passes an interior crisis, a spiritual one, generated by the deficit of love, communion and compassion. This spiritual crisis generated an exterior crisis that pushes the living planet towards collapse. While humanity destroys its own house, we plead for a leap of conscience.

There is need of a profound change of the human being so as to perceive more and more the need of tolerance, compassion, kindness and love. Studies on the theme of happiness (its index) show men's desire to increase their capacity of enjoying life. This responds to the need of joy emphasized by renowned French psychiatrist Christophe André (2013) and stated in a unique way by professor Dulcan: "We need joy as much as we need the daily bread". Therefore, it seems that the merchandising of daily life, the density of events such as "Black Friday", "Chinese Singles' Day" – feasts with commercial flavor – do not fill the inner void, which is to be resolved through proper means, i.e. a balanced combination of material and spiritual.

Therefore, we have a lot of reasons to suppose that there might be a counter relation between the joy of living and the belief in "to have" (Figure 4).

Figure 4. *The convex combination material – spiritual*

Creation is a living integer formed by the profound link between people, other species, the natural and created environment, finally, the whole universe. In "the chaos point", Erwin Laszlo (2006) was talking about the threshold of some irreversibilities, when something unrepairable can break in the balance of planetary life. Thus, it is obvious that the leap of conscious is a most urgent need of our times, this is if we want to save what we still have. However, as Schopenhauer pointed, "we seldom think of what we have, but always of what we lack" (Schopenhauer, 1896). The leap of conscience proposes the return towards inside and discovering the joy of living in balanced material - spiritual dimension of existence. Contrarily, in our journey through life we risk coming across with the "existential void" that was analyzed by Frankl in his famous book.

Conclusions

Within consumerism, happiness is assimilated with the volume of accumulated stuff, meaning that we are happy inasmuch as we have fewer unfulfilled wishes. However, mass-media in general, and advertising in particular, which constitute the reliable partners of consumerism, bring to our attention, every day, new products and services that we "must" experience in order to be a fulfilled person. This situation induces to the consumer a standard lifestyle for which a medium Romanian salary in not sufficient. This consumer complies without noticing to this standard and begins to desire things that he does not afford or that he even does not need. From here starts the rush for money. And when you cannot have what you wished, in the mentioned context, what else can you do but to become unhappy? From here starts a new problem: the relation between consumerism and depression, going up to existential questions.

Because the linear model of development that sustains consumerism is exhausting the planet of its resources, yet we think that things are still recoverable, we could conclude with a remarkable characterization of the creation which was made by Metropolitan

Emmanuel of France: "Ridiculed, beaten, and left dying of hunger, nature looks like the man whom the merciful Samaritan found and helped. Because behind the wounds hides the mysterious power of regeneration in the light of resurrection" (Adamakis, 2010). It seems that still there is hope, the question being, for how long will it still be?

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The effects of microeconomic factors on the stock market: A panel for the stock exchange in Istanbul ARDL analysis

Khatereh SADEGHZADEH
Ataturk University, Humanities and Social Sciences Faculty of Oltu, Erzurum, Turkey
k.sadeghzadeh@grv.atauni.edu.tr

Abstract. *In this study, microeconomic factors affecting the average returns of stocks traded in Stock Exchange Istanbul (BIST) were analyzed by panel ARDL method. For this purpose, 25 microeconomic variables owned by 130 companies which operate in the manufacturing sector and being processed continuous trade on stock exchange in the 2000:Q1 – 2017:Q3 period and 4 dummy variables belonging to Turkey's economy were used and there were established 23 different econometric models to investigate the relationships between these variables. In this study, of time series analysis methods Levin, Lin and Chu (2002), Im, Pesaran and Shin (2003) and Hadri (2000) Panel unit root tests and Panel ARDL methods were used with Carrion-i Silvestre et al. (2009) multiple structural fractured unit root tests. As a result of the analyzes made, it was found that the rise in stock turnover rate and net profit to total assets ratio affected positively share earnings both in the short term and in the long term and it was seen that the effect in the short term was higher. It was designated that total sales increased share earnings of growth of increase rate and increases in the growth of total assets in the long term. It was determined that increases of on current ratio, on the ratio of equity capital ratio to tangible assets, on the ratio of own capital to assets, on accounts receivables turnover rate, net profits, on the ratio of equity, the marketing values of companies, on the ratio of book value increased share earnings in a short term and increases of on the ratio of debt to tangible assets and asset turnover decreased share earnings in a short term significantly.*

Keywords: stock exchange, microeconomic factors, liquidity ratios, multiple structural breakdown unit root test, panel ARDL.

JEL Classification: E44, G12, G32, M40.

1. Introduction

The stock market is a common and easy-to-use investment tool that everyone can easily access and evaluate their savings. In this respect, it has always attracted the attention of both companies and individuals and it has always found a wide space in printed and visual prints. However, it is very important to choose the correct equality issues and designate buying – selling periods of stocks when operating in the stock market. In this study, what were the factors of microeconomic (unique) effecting share earnings and while creating portfolio of investors, from these factors most of which are required to pay attention, 25 microeconomic variables owned by 130 companies which operate in the manufacturing sector in Turkey and being processed continuous trade on stock exchange in the 2000:Q1 – 2017:Q3 period and 4 dummy variables belonging to Turkey's economy were used, was established 23 different econometric model to investigate the relationships between these variables. Because the number of variables is so large, there is no way to use all the variables in a single model. For this reason, the variables that should be constantly included in the models were determined by the help of the collage matrix, and the other variables were added and removed as the control variables one by one.

During Analysis, crises closely related to Turkey and the world economy, international developments and political events which have taken place make think that this period may be present structural breaks affecting the stock market. In such cases, it is useful to include these effects in analyzes with dummy variables. Rather than visually determining the structural breakage dates required for this process, it was preferred to use the BIST 100 index at the center of the study, the multi-structural fractured unit root test of Carrion-i Silvestre et al. (2009) one of the time series analysis method. Thus, the dates of economic shocks which occurred and affected the stock market were determined by a scientific method, not based on observations.

In the second part following the entry of the work, information about expectations about the issue of stock return was given. In the third chapter; the studies in the literature on macroeconomic factors affecting stock returns were examined. In the fourth chapter; econometric analyzes were carried out. In the study; it was broken new ground on literature by using a combination of structural break-through time series analysis and panel data analysis. This study will contribute to the literature even if it is small because of the breadth of the data set used and the econometric analyzes made. It is also expected that by presenting essential information, findings obtained from this study will provide a small contribution to individual investors who deal with the stock market, to the representatives of the financial intermediary institutions and to the economy management.

2. Expectations related to stock return

The return of equity traded on financial markets is divided into two parts: the first of them is the expected return on equity investment under normal circumstances; this return is the return which the investor expects to obtain as an estimate and depends on the investor's

knowledge of the stock. The second part of the equity is an uncertain (risky) return and is due to unexpected information explained. Depending on these explanations, the return of equity is as following (Ross et al., 1999):

$$R = E(R) + u \quad (1) \qquad (1)$$

R in this equation shows true return, E (R) shows the expected part of return, and u shows the unexpected part of return. Real return (R) can be different from expected return (E (R)) due to future surprises. Unexpected return for any year may be positive or negative, but when a given period is considered, the average of u will be zero and it will not have an effect to a real return. In other words, the recognized return will be equal to the average expected return. Whereas, a real risk of any investment is due to the unpredictable part of the return, that is, the part that comes into play as a result of surprises. If the expected return is achieved as planned, this investment is a fully predictable or risk-free investment. When examining the risk of each entity, it can be seen that there are two types of risks: systematic and non-systematic risks. While systematic risk affects all assets in the economy leastwise, non-systematic risk affects a small number of assets at a high level. From here, the basic principle of diversified portfolios contain virtually no systematic risk is deduced. If there is no complete positive correlation between the individual stocks constituting the portfolio, the risk of diversification and portfolio can be reduced below the weighted average of the risks of all stocks. However, since most stocks have a positive correlation with returns on the market, it is not possible to completely remove the portfolio risk. As general economic conditions improve, the return of a majority of stocks will be on the rise. Besides these, every stock has its own differentiations in terms of return rates. That is, apart from the economic factors affecting all stocks, only the factors that affect a certain stock will play a role in determining the return rates. Hence, all stocks carry two types of risks: systematic (inevitable) and non-systematic (avoidable) risks (Tükenmez, 1999). In other words, systematic risk is the portion of macroeconomic factors, such as interest and inflation that is the total change in the value of a share. Shortly, this risk is the risk created by all factors such as purchasing power risk, interest rate risk, market risk, foreign exchange risk and political risk affecting the market (Aktaş and Akdağ, 2005).

3. Literature review

A brief summary of the studies aimed at revealing the determinants of the returns of stocks traded on the stock exchange is presented below by date.

Lewellen (2004) investigated the power to predict stock returns of the ratio of dividend yield, MV/BV and P/E by using a comprehensive data set between 1946 and 2000. Lewellen stated that the financial ratios could be used as a strong explanatory factor in anticipation of stock returns in that period and considered the effects of the variables used in the research as long term and short term. As a result of the study, it is argued that although with the MV/BV rate long term returns can be estimated, short term returns

cannot be estimated. He pointed out the best financial ratios were the dividend yield describing the long term returns and the F/K ratio describing the short term returns.

Çıtak (2004) investigated whether share earnings belonged to 1986: M01-2003 M06 periods have relations with P/E ratios and BIST 100 index. Monthly returns of the BIST 100 index and the end of month values of P/E ratio of the index for the P/E ratios were used to represent share earnings. The regression equations were used to estimate the relationship between P/E rates at the beginning of the period and 3, 6-month, 1, 2, 3, 4 and 5-year retention periods. As a result of the analysis, significant correlations were found for holding periods except for 3-month holding period and the strongest correlation between P/E ratios and holding period returns was observed in 2-year holding period. As a result of the study, since the retention periods used have been intertwined and there has not yet been a consensus about this situation's effect on return rates about the estimation results in the literature, it was deduced that it was necessary to investigate results and the relations occurred between the P/E ratios and returns of ISE 100 index were not certain, they were only suggestive.

Campbell and Yogo (2006) found that stock returns are predictable, but it is difficult to determine without using effective statistical tests carefully, and they claimed that traditional tests used to predict stock returns lead to false conclusions. For this reason, a new test has been developed that explains stock returns by being used variables such as dividend yield and P/E ratio, and with the P/E ratio variable in the result of the study, stock returns can be estimated monthly and yearly, they designated that with also the variable of dividend yield by only using yearly data, share earnings could be estimated.

Şamiloğlu (2006) examined the relationship between earnings per share and with share prices belonged to 1999-2002 period of 58 companies operating in the leather and food sector, whose stocks are traded at BIST, earnings, cash flows, earnings per share and book value per share. The data used in the study in which three separate multiple regression models were used were obtained from the ISE and the financial statements of the companies. Financial tables of the companies covered by the research have been adjusted according to inflation to mitigate the effects of high inflation on financial tables. According to the research findings, there was generally no significant relationship between stock returns based on 1999-2002 of 58 companies operating in the food and leather sectors and cash flows, operating profits and annual growth, but it was found that there was a significant correlation between the share prices of the same companies and their earnings per share and book value per share when partial correlation coefficients, r^2, F test, t test results were taken into consideration.

Aktaş (2008) examined the relationship between stock returns and financial ratios by determining the financial ratios associated with stock returns in BIST. In two separate analysis periods, 1995 and 1999 and 2003 and 2006, 91 and 158 companies were tested by using the Logistic Regression Analysis Method, respectively. The periodic average annual turnover of the shares and the annual financial ratios of the shares (dividing the yearly aggregate of the yearly earnings per year by the number of years and dividing the

yearly financial ratios of the current year by the number of years) and the corrected monthly stocks data from the ISE website were used. The average annual returns of the companies were calculated firstly by taking the average of the annual adjusted returns for each period, then the average of these annual returns. As a result of analysis; in the period 1995-1999, while as the financial ratios associated with the mid-term share earnings were found cash flow/capital stock from the acid test and activities, gross profit/sales and net profit/sales were found in the 2003-2006 period.

Barnhart and Giannetti (2009) attempted to estimate the future stock returns by calculating the price/earnings ratios of the companies in the S & P 500 index. As a result of the study, it was stated that P/E ratio could be used for estimating the increase of future gains and returns. According to the results of the estimation by using the vector error correction model in the study in which the companies split into two subgroups with positive and negative gains (winners and losers), the group with negative winner was ascertained to have higher prediction power than the group with positive winner.

Nargelecekenler (2011) investigated whether there is a significant correlation between P/E ratio and stock prices on sectorial basis by using series of 24 sub-sectors covering the period 2000-2008. The stock price and P/E ratios in the study were formed by year-end closing prices of the companies taken on sector basis and price earning ratios. Two different P/E ratios were used in the study; The P/E ratio, which is defined as PE1, represents the net profit-loss sum of the market value of the last two six-month of the share and Fk2 represents the net profit-loss sum of the market value of the last four quarters of the market value. According findings of analysis, while for banks price earning ratio was significant in financial leasing and clothing sectors only in terms of six monthly turnover, it was found to be significant for real estate investment trusts, telecommunications and holding sectors in both six-month and three-month periods; and for mine and metal goods sectors, only for three-month periods. Therefore, as the significance of the P/E ratios calculated differs by six months or three months depending on the sector's behavior, it was inferred that while investing, it is necessary to consider which is significant for the relevant sector.

Güngör and Kaygın (2015), in their study in which they investigated the macroeconomic factors affecting stock price in 2005-2011 period, used as macroeconomic factors; exchange rate, inflation rate, money supply, interest rate, GDP, gold prices, oil prices, foreign trade balance and industrial production index. In the results of study; while a positive relationship was found between exchange rate, money supply, oil prices and industrial production index and stock price. there was designated a negative relationship between inflation rate, interest rate, GDP, gold prices, foreign trade balance and stock price.

In their study, Alper and Kara (2017) investigated the effects of data of interest rate, exchange rate, gold prices, inflation rate, money supply, oil prices, foreign trade balance and industrial production index data on stocks in Istanbul Stock Exchange in the context of BIST Industrial Index, in the study that they examined for 2003:Q01 – 2017:Q02

period, they found that real equity stocks are mostly influenced by their lagged values, and that gold prices, trade balance, industrial production index and interest rate are also influential on real stock returns.

Rjoub, Civcir and Reşatoğlu (2017) attempted to identify variables affecting stock prices by using data belonged to the Turkish banking sector. In the study in which 1995:Q3 – 2015:Q4 period data was used, the factors associated with stock prices were asset quality, management quality, profitability, size, money supply and interest rates. Moreover, it was also determined that bank stocks had a negative reaction to economic crises.

4. Methodology

4.1. Data set

In the study as a dependent variable; stocks' return (RETURN) variable was used by quarterly periods. In order to create this variable, daily closing prices data of stocks taken from Finnet were used.

$$\text{Return}_{i,t} = \left(\frac{F_{it} - F_{i,t-1}}{F_{i,t-1}}\right) x100 \quad (2)$$

In the equation, $F_{i,t;}i.$ represents the closing price of the firm's stock at the end of day t on the day; $F_{i,t-1;}i.$ represents firm's share of the closing price at the end of day in $t - 1$ period. Macroeconomic independence (explanatory) variables used in the study and symbols representing these variables in the analysis are shown in Table 1 in aggregate form.

Table 1. *Microeconomic variables used in analysis*

LIQUIDITY RATIOS
Current Ratio (CR)
Cash Ratio (CR1)
Acid-Test Ratio (ATR)
REMOVAL RATIOS
Total of Foreign Assets/Total Assets (TFA_TA(1))
Total of Foreign Assets/Total Assets (TFA_TA(2))
Tangible Assets/Equity (TA_E(3))
Equity/Assets (E_A)
Total Debt/Total Equity Ratio (TD_TE)
ACTIVITY RATIOS
Accounts Receivable Turnover (ART)
Asset Turnover (AT)
Stock Turnover Rate (STR)
RATIO OF PROFITABILITY
Net Profit/Equity Ratio (NP_ER)
Net Profit/Total Assets Ratio (NP_TAR)
Net Profit/Net Sales Ratio (NP_NSR)*
EXCHANGE PERFORMANCE RATES
Market Value/Book Value (MV_BV)
GROWTH RATE
Increase Rate of Total Sales (IRTS)
Growth Rate of Total Assets (GRTA)
OTHER SIZE
Return (R)
Transaction Volume (TV)8

Transaction Amount (TA)
Company Age (CA)
Stock Exchange Duration (SED) Processing Time (BIGS)
Profit Per Share (PPS)
Rate Of Open To Public(ROP)

Note: The sources of these variables, the transformations and corrections made to the variables, and the anticipations about these variables as a result of the analysis are in the author's thesis.

4.2. Method

Since there are a number of explanatory variables in this study, in order to decide which of these variables will be included in all models in the first phase of the analysis and which will be used as the control variable, the correlation between the dependent variable and the independent variables was investigated. In the second phase; Carrion-i Silvestre et al. (2009), multi-structural fractured unit root tests were performed to the BIS100 index data to determine the dates of economic and political shocks affecting the stock market and dummy variables related to these dates were established. In the third phase; economic models to be used in analyzes were established. In the fourth stage; Levin, Lin and Chu (2002), Im, Pesaran and Shin (2003) and Hadri (2000) panel unit root tests were applied to the series taking part in models. In the fifth stage; the co-integration test for the existence of co-integration relations among the series in the models, long-term and short-term analyzes was carried out with the panel ARDL method.

5. Correlation analysis and findings

At this stage of the study; correlation coefficients between dependent variable and macro-economic variables were determined. Correlation coefficients show a measure of the degree of the two variables co-movement. These coefficients vary in the range [-1, + 1] and the value approaches -1 or +1, which means that the correlation is large (Köse, 2015). Correlation coefficients were calculated in the study, the absolute value was sorted from large to small, and the findings were presented in Table 2.

Table 2. *Correlation between dependent variable and microeconomic variables*

	RETURN
RETURN	1
Transaction volume (LogTV)	0.176
Transaction Amount (LogTA)	0.124
Market Value/Book Value (MV/BV)	0.108
Growth Rate of Total Assets (GRTA)	0.062
Growth Rate of Total Sales (IRTS)	0.029
Company Age (CA)	-0.029
Stock Exchange Duration (SED)	-0.027
Profit Ratio 2 (NP_TAR)	0.025
Equity Capital Multiplier (E_A)	-0.023
Acid Test Ratio (ATR)	-0.019
Equity Capital Productivity Ratio (NP_ER)	0.019
Current Ratio (CR)	-0.018
Cash Ratio (CR1)	-0.016
Leverage Ratio 3 (TA_E(3))	-0.012
Profit Per Share (PPS)	0.012
Leverage Rate 2 (TFA_TA(2))	-0.012
Accounts Receivable Turnover (ART)	0.011

Rate Of Open To Public(ROP)	0.010
Profitability Ratio 1 (NP_NSR)	-0.010
Financing Rate (TD_TE)	-0.009
Asset Turnover (AT)	0.006
Stock Turnover Rate (STR)	-0.001
Leverage Ratio 1 (TFA_TA)	0.001

According to the findings in Table 2, the variable having the closest relationship with the RETURN variable is the trading volume of stocks (LogTV). For this reason, it has been decided that this variable should be included in all models.

5.1. Composing dummy variables

In the Analysis period, Turkey's economy experienced events such as the February 2001 banking and currency crises, September 15, 2008 global financial crisis and July 15, 2016 coup attempt that may affect the stock market closely. In the study, the effects of these events are desired to reflect models with dummy variables. For this purpose; Carrion-i Silvestre et al. (2009) multi-structural fracture unit root test was performed to BIST100 index day end closing values series (BIS100), and the obtained structural fracture histories were included in analyzes with dummy variables. It is not appropriate to determine the structural break dates based on observations because events in the economy take time to reflect economic growths and different series may react to the same shock in different delays and in different periods. Here, the truest way to determine the dates of structural breaks in the series examined is using scientific means. For this purpose, multiple structural fractured Carrion-i Silvestre et al. (2009) unit root test was applied to BIST100 series, which is the basis of the study, and the structural break dates were determined. The reason of preference of Carrion-i Silvestre et al. (2009)[(1)] method in the unit root test is that this method is able to determine the structural breaks up to 5 in the series internally.

Table 3. *Results of Carrion-i-Silvestre et al. (2009) multiple structural breakdown unit root test*

	PT Test Statistic	MPT Test Statistic	MZA Test Statistic	MSB Test Statistic	MZT Test Statistic	Structural Breakdown Dates
LogBIST100	17.28 (7.64)	16.04 (7.64)	-18.37 (-38.10)	0.16 (0.11)	-3.02 (-4.36)	2001:Q3; 2009:Q1; 2013:Q1; 2015:Q4

In the result of Carrion-i-Sivestre et al. (2009) multiple structural fracture unit root test in Table 3, one of the dates obtained in the BIST100 index of structural fracture, 2001:Q3 includes the effects of the banking and foreign exchange crisis experienced in February 2001 and the effects of the Strong Economy Transition Program announced on 15 April 2001.

2009:Q1 – points to February 2009, when unemployment rose to 16.2% due to the 2008 global financial crisis.

2013:Q1 emphasizes the period of the US Central Bank FED announced that it would end its quantitative expansion (expansionary monetary policy) implementation which it started to apply after the 2008 global economic crisis, and afterwards the dollar exchange rate started to rise rapidly.

2015:Q4 points to the period for FED's accelerating interest rate hikes. Four different dummy variables (K_{2001}, K_{2009}, K_{2013} and K_{2015}) were created for these dates. Equation (11) is used to construct the dummy variables.

$$K_t = \begin{cases} 1, & t = T_B if \\ 0, & t \neq T_B \ if \end{cases} \quad (3)$$

Here, T_D refers to the date of structural break. The econometric models used in the study are listed below.

$$Model\ 1: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 K_{2001} + \alpha_3 K_{2009} + \\ + \alpha_4 K_{2013} + \alpha_5 K_{2015} + u_{it} \quad (4)$$

$$Model\ 2: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTA_{it} + \alpha_2 K_{2001} + \alpha_3 K_{2009} + \\ + \alpha_4 K_{2013} + \alpha_5 K_{2015} + u_{it} \quad (5)$$

$$Model\ 3: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 MV_{BV\,it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (6)$$

$$Model\ 4: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 GRTA_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (7)$$

$$Model\ 5: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 IRTS_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (8)$$

$$Model\ 6: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 CA_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (9)$$

$$Model\ 7: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 SED_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (10)$$

$$Model\ 8: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 NP\_TAR + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (11)$$

$$Model\ 9: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 E\_A_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (12)$$

$$Model\ 10: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 ATR_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (13)$$

$$Model\ 11: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 NP\_ER_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (14)$$

$$Model\ 12: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 CR_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (15)$$

$$Model\ 13: RETURN_{i,t} = \alpha_0 + \alpha_1 LnTV_{it} + \alpha_2 CR1_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (16)$$

$$Model\ 14: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 TA\_E_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (17)$$

$$Model\ 15: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 PPS_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (18)$$

$$Model\ 16: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 \text{TFA\_TA}(2))_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (19)$$

$$Model\ 17: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 ART_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (20)$$

$$Model\ 18: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 ROP_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (21)$$

$$Model\ 19: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 NP\_NS_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (22)$$

$$Model\ 20: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 TD\_TE_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (23)$$

$$Model\ 21: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 ART_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (24)$$

$$Model\ 22: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 STR_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (25)$$

$$Model\ 23: RETURN_{i,t} = \alpha_0 + \alpha_1 LogTV_{it} + \alpha_2 \text{TFA\_TA}(1))_{it} + \alpha_3 K_{2001} + \\ + \alpha_4 K_{2009} + \alpha_5 K_{2013} + \alpha_6 K_{2015} + u_{it} \quad (26)$$

Because the transaction size and transaction volume variables were closely related to each other, they were used in separate models so that they do not cause multiple linear connection problems if they are used in the same model. When the rate variables used in the models were created by using similar quantities and because more than one rate variable was used in the same econometric model, the control variable was added to the transaction volume variable at each time at these models as it was difficult to find the effects of these variables on dependent variable. Thus, the real effects of the independent variables on the dependent variable are tried to be revealed.

5.2. Panel unit root tests

In order for the prediction results of created models to be reliable, the series must be stationary or co-integrated (Engle and Granger, 1987). For this reason, panel unit root tests were done. In the panel unit root tests, it was tried to determine how the value of the series at time *t* was affected by the value at time *t-1*.

Equation (27) is used for this purpose:

$$y_{it} = \rho_i y_{it-1} + X_{it}\delta_i + \epsilon_{it} \quad (27)$$

Here i = 1, 2, ..., N refers to horizontal sections (firms), t = 1, 2, ..., T refers to time dimension, X_{it} refers to external variables, ρ_i refers to autoregressive unit root parameter and ε_{it} refers to the series of error terms which have the power of white noise process (problem-free in terms of econometric). Since the autocorrelation problem can often be encountered in Equation (27), it can be extended by adding delayed values of the dependent variable to the model:

$$y_{i,t} = \rho_i y_{i,t-1} + \sum_{j=1}^{m_i} \beta_{ij}\Delta Y_{i,t-j} + X_{it}\delta_i + \epsilon_{it} \quad (28)$$

From the panel unit root tests, Levin, Lin, Chu (2002) (LLC) assume that ρ_i s which are the unit root parameters are homogeneous in all horizontal sections forming the panel and H_0 hypothesis is in the form of $|\rho| = 1$ series are not stable. In Im, Pesaran and Shin (2003) (IPS) test, it is accepted that the unit root parameter ρ_i s may vary among horizontal sections and H_0 hypothesis is in the form of $|\rho_i| = 1$ series are not stable. Hadri (2000) hypotheses of the panel unit root test are opposite to those of LLC and IPS tests. With this aspect, it is a test by way of examining the LLC and IPS tests. That is, H_0 is in the form of $|\rho_i| < 1$ *is the serial stop.* In the study, LLC, IPS and Hadri (2000) tests were conducted and the results were presented in Table 4.

Table 4. *Results of panel unit root tests*

	LLC		IPS		Hadri		Decision
	Level Values	First Differences	Level Values	First Differences	Level Values	First Differences	
RETURN	0.998	0.000***	0.099	0.000***	0.024	1.000***	I(1)
LnTV	0.000***	-	0.000***	-	0.000	0.106***	I(0)
LnTA	0.000***	-	0.000***	-	0.000	0.989***	I(0)
MV/BV	0.000***	-	0.000***	-	0.446***	-	I(0)
GRTA	0.000***	-	0.000***	-	0.000	0.967	I(0)
IRTS	1.000		0.000***	-	0.000	0.999	I(1)
CA	0.000***	-	0.000***	-	0.659***	-	I(0)
SED	0.000***	-	0.000***	-	0.149***	-	I(0)
NP_TAR	0.000***	-	0.000***	-	0.000	0.070*	I(0)
E_A	0.001***	-	0.000***	-	0.000	0.129***	I(0)
ATR	0.611	0.000***	0.000***	-	0.000	0.999***	I(1)
NP_ER	1.000	0.000***	0.000***	-	0.014**	-	I(0)
CR	0.000***	-	0.000***	-	0.000	0.998	I(0)
CR1	0.000***	-	0.000***	-	0.000	0.999***	I(0)
TA_E(3)	0.267	0.000***	0.000***	-	0.000	0.366	I(1)
PPS	0.099	0.000***	0.000***	-	0.000	0.192***	I(0)
TFA_TA(2)	0.503	0.000***	0.000***	-	0.000	0.998***	I(1)

ART	0.999	0.000***	0.000***	-	0.000	0.988***	I(1)
ROP	0.000***	-	0.000***	-	0.000	0.657***	I(0)
NP_NSR	0.000***	-	0.000***	-	0.000	0.999***	I(0)
TD_TE	0.000***	-	0.000***	-	0.000	0.989***	I(0)
AT	0.000***	-	0.000***	-	0.000	0.297***	I(0)
STR	0.998	0.000***	0.000***	-	0.000	0.999***	I(1)
TFA_AT(1)	0.000***	-	0.000***	-	0.000	0.216***	I(0)

Note: The results in the table are probability values belonged to the relevant test statistic. *, **, and *** mean that the relevant series are stable at the level of significance of 10%, 5% and 1%, respectively. For the series that are stationary at the level, there were not conducted stationarity tests in the first difference.

While the results in Table 4 were evaluated, the most overlapping results from 3 tests were accepted. According to this, it was found that LnTV, LnTA, MV/BV, GRTA, CA, SED, NP_TAR, E_A, NP_ER, CR, CR1, PPS, ROP, NP_NSR, TD_TE, AT and TFA_TA (1)series were stationary in other words I (0) in the level values. Whereas, RETURN, IRTS ATR, TA_E(3), TFA_TA(2), ART and STR series were not stationary in the level values but they were found to become stationary in other words I(1) when the first differences were taken. Since all of the series are not I (0), there is a risk of encountering a false regression problem in the regression analysis to be performed with the level values of these data. For this reason, the existence of a co-integration relationship between the series in each model should be investigated.

5.3. Panel co-integration test, long and short term analysis

According to the co-integration theory developed by Engle and Granger (1987); if the series which are stationary at the same level are co-integrated (if they are acting together in the long term), analyzes to be made with the level values of these series will not contain the problem of false regression. This theory was later further developed by Johansen (1988), Johansen and Juselius (1990) and others. Panel co-integration tests were also been created with studies such as Johansen (1995), Kao (1999) and Pedroni (2004), as well as being suitable tests for the time series analysis of the first developed co-integration tests. A prerequisite for applying both the time series co-integration tests, such as Engle and Granger (1987) and Johansen (1988); and panel co-integration tests such as Johansen (1995), Kao (1999) and Pedroni (2004) is that all series are stable at the same level. In this study, these methods can not be used because some of the series are I (0) and some are I (1). Panel ARDL approach developed by Pesaran, Shin and Smith (1999) is suitable to test the existence of co-integration relation between the series which are stationary at different levels and to detect long and short term relationships between these series.

Table 5. *Panel ARDL analysis results*

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients
LnTV	1.937*** (0.000)	5.235*** (0.000)	-	-	0.087 (0.488)	3.961*** (0.000)	2.105*** (0.000)	5.153*** (0.000)	1.999*** (0.000)	5.190*** (0.000)	2.420*** (0.000)	4.978*** (0.000)
K_{2001}	50.407*** (0.000)	-71.613*** (0.000)	-34.926*** (0.000)	-68.254*** (0.000)	48.850*** (0.000)	-55.523*** (0.000)	46.608*** (0.000)	-71.060*** (0.000)	47.804*** (0.000)	-69.918*** (0.000)	46.066*** (0.000)	-69.400***
K_{2009}	49.097***	-36.574***	8.956***	-42.514***	32.809***	-28.000***	51.562***	-37.248***	50.217***	-41.497***	48.557***	-36.639***

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
K_{2013}	-13.827*** (0.000)	9.749*** (0.000)	-2.124 (0.463)	11.527*** (0.000)	-11.854*** (0.000)	6.279*** (0.000)	-13.724*** (0.000)	9.321*** (0.000)	-12.978*** (0.000)	9.579*** (0.000)	-11.261*** (0.000)	8.590*** (0.000)
K_{2015}	0.250* (0.085)	5.620*** (0.000)	1.645 (0.573)	2.149 (0.249)	-3.902* (0.068)	9.601*** (0.000)	0.838 (0.773)	5.737*** (0.000)	1.308 (0.651)	5.365*** (0.000)	4.901 (0.102)	3.408** (0.010)
Error Adjustment Coefficient (ϕ_i)	-	-0.952*** (0.000)	-	-0.971*** (0.000)	-	-0.942*** (0.000)	-	-0.944*** (0.000)	-	-0.958*** (0.000)	-	-0.960*** (0.000)
LnTA	-	-	1.042*** (0.000)	4.284*** (0.000)	-	-	-	-	-	-	-	-
MV/BV	-	-			-0.002 (0.154)	31.693*** (0.000)	-	-	-	-	-	-
GRTA	-	-	-	-	-	-	0.251*** (0.000)	-0.101*** (0.000)	-	-	-	-
IRTS	-	-	-	-	-	-	-	-	0.019*** (0.000)	0.024 (0.119)	-	-
CA	-	-	-	-	-	-	-	-	-	-	-0.349*** (0.000)	19.057*** (0.000)
R^2	0.042		0.029		0.042		0.045		0.044		0.043	
$\bar{R}^2$	0.042		0.028		0.042		0.044		0.043		0.043	
F Statistic	82.555 (0.000)		54.708 (0.000)		68.846 (0.000)		72.547 (0.000)		70.836 (0.000)		70.278 (0.000)	
DW	1.999		2.048		1.999		2.004		2.000		1.998	

Note: The Akaike Information Criterion (AIC) is used at determining the optimal delay length. ***, ** and * represent the existence of the co-integration relationship between the variables included in the model at the significance levels of 1%, 5% and 10%, respectively. The values in the parentheses are the probability values.

Table 5 (Continued)

	Model 7		Model 8		Model 9		Model 10		Model 11		Model 12	
	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients
LnTV	2.420*** (0.000)	4.978*** (0.000)	1.886*** (0.000)	5.337*** (0.000)	1.984*** (0.000)	5.229*** (0.000)	1.927*** (0.000)	5.293*** (0.000)	1.897*** (0.000)	5.292*** (0.000)	1.962*** (0.000)	5.250*** (0.000)
K_{2001}	46.066*** (0.000)	-69.400*** (0.000)	49.804*** (0.000)	-71.568*** (0.000)	49.903*** (0.000)	-70.015*** (0.000)	50.336*** (0.000)	-71.559*** (0.000)	48.601*** (0.000)	-338.293 (0.203)	50.242*** (0.000)	-71.219*** (0.000)
K_{2009}	48.557*** (0.000)	-36.639*** (0.000)	49.104*** (0.000)	-36.297*** (0.000)	48.075*** (0.000)	-35.335*** (0.000)	48.893*** (0.000)	-35.905*** (0.000)	49.465*** (0.000)	-36.395*** (0.000)	49.740*** (0.000)	-36.386*** (0.000)
K_{2013}	-11.26*** (0.000)	8.590*** (0.000)	-13.565*** (0.000)	10.255*** (0.000)	-12.848*** (0.000)	9.384*** (0.000)	-13.733*** (0.000)	9.451*** (0.000)	-13.84*** (0.000)	10.410*** (0.000)	-13.374*** (0.000)	9.446*** (0.000)
K_{2015}	4.901 (0.102)	3.408** (0.001)	0.612 (0.834)	4.598*** (0.001)	-1.079 (0.710)	4.724*** (0.001)	0.785 (0.788)	5.271*** (0.000)	0.277 (0.924)	4.863*** (0.000)	0.510 (0.861)	5.233*** (0.000)
Error Adjustment Coefficient (ϕ_i)	-	-0.960*** (0.000)	-	-0.950*** (0.000)	-	-0.955*** (0.000)	-	-0.949*** (0.000)	-	-0.948*** (0.000)	-	-0.949*** (0.000)
SED	-0.349*** (0.000)	-10.943*** (0.000)	-	-	-	-	-	-	-	-	-	-
NP_TAR	-	-	9.184*** (0.000)	38.968*** (0.000)	-	-	-	-	-	-	-	-
E_A	-	-	-		0.011 (0.560)	0.561*** (0.000)	-	-	-	-	-	-
ATR	-	-	-	-	-	-	-0.042 (0.000)	1.647 (0.428)	-	-	-	-
NP_ER	-	-	-	-	-	-			0.009 (0.650)	21.923*** (0.000)	-	-

CR			-	-	-	-					-0009 (0.347)	3.793** (0.045)
R^2	0.051		0.043		0.043		0.042		0.042		0.042	
$\overline{R}^2$	0.050		0.042		0.042		0.042		0.042		0.042	
F Statistic	82.788 (0.000)		66.126 (0.000)		69.181 (0.000)		68.907 (0.000)		68.800 (0.000)		68.977 (0.000)	
DW	1.992		1.997		1.998		1.999		1.999		1.999	

Note: The Akaike Information Criterion (AIC) is used at determining the optimal delay length. ***, ** and * represent the existence of the co-integration relationship between the variables included in the model at the significance levels of 1%, 5% and 10%, respectively. The values in the parentheses are the probability values.

Table 5 (Continued)

	Model 13		Model 14		Model 15		Model 16		Model 17		Model 18	
	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients
LnTV	1.919* (0.000)	5.298*** (0.000)	1.885*** (0.000)	5.275*** (0.000)	1.855*** (0.000)	5.178*** (0.000)	1.968*** (0.000)	5.195*** (0.000)	1.910*** (0.000)	5.173*** (0.000)	1.896*** (0.000)	5.227*** (0.000)
K_{2001}	50.286*** (0.000)	-71.391*** (0.000)	49.495*** (0.000)	-71.275*** (0.000)	48.552*** (0.000)	-70.587*** (0.000)	49.506*** (0.000)	-70.493*** (0.000)	49.946*** (0.000)	-71.287*** (0.000)	50.292*** (0.000)	-71.893*** (0.000)
K_{2009}	48.593*** (0.000)	-36.036*** (0.000)	48.798*** (0.000)	-35.947*** (0.000)	51.908*** (0.000)	-37.374*** (0.000)	48.596*** (0.000)	-35.898*** (0.000)	48.707*** (0.000)	-36.790*** (0.000)	49.002*** (0.000)	-36.570*** (0.000)
K_{2013}	-13.625*** (0.000)	9.535*** (0.000)	-13.172*** (0.000)	9.241*** (0.000)	-13.392*** (0.000)	9.298*** (0.000)	-13.364*** (0.000)	9.725*** (0.000)	-13.14*** (0.000)	9.735*** (0.000)	-13.897*** (0.000)	9.987*** (0.000)
K_{2015}	0.360 (0.902)	6.024*** (0.000)	0.410 (0.886)	4.812*** (0.000)	-0.377 (0.896)	5.764*** (0.000)	0.290 (0.920)	4.877*** (0.000)	0.313 (0.913)	5.297*** (0.000)	0.185 (0.949)	5.572*** (0.000)
Error Adjustment Coefficient (ϕ_i)	-	-0.950*** (0.000)	-	-0.956*** (0.000)	-	-0.952*** (0.000)	-	-0.952*** (0.000)	-	-0.958*** (0.000)	-	-0.952*** (0.000)
NO	-0.0004 (0.697)	0.043 (0.290)	-	-	-	-	-	-	-	-	-	-
TA_E(3)	-	-	-0.023 (0.000)	12.152*** (0.000)	-	-	-	-	-	-	-	-
PPS	-	-	-	-	0.132 (0.000)	10.155*** (0.000)	-	-	-	-	-	-
TFA_TA(2)	-	-	-	-	-	-	0.096 (0.923)	-33.490*** (0.000)	-	-	-	-
ART	-	-	-	-	-	-	-	-	0.001 (0.284)	2.730** (0.015)	-	-
ROP	-	-	-	-	-	-	-	-	-	-	0.008 (0.696)	-0.677 (0.342)
R^2	0.042		0.043		0.042		0.043		0.042		0.043	
$\overline{R}^2$	0.042		0.042		0.042		0.042		0.042		0.042	
F Statistic	68.963 (0.000)		69.147 (0.000)		68.873 (0.000)		69.509 (0.000)		68.912 (0.000)		69.336 (0.000)	
DW	1.999		1.999		1.999		1.998		1.999		1.998	

Note: The Akaike Information Criterion (AIC) is used at determining the optimal delay length. ***, ** and * represent the existence of the co-integration relationship between the variables included in the model at the significance levels of 1%, 5% and 10%, respectively. The values in the parentheses are the probability values.

Table 5 (Continued)

	Model 19	Model 20	Model 21	Model 22	Model 23

	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients	Long Term Coef-ficients	Short Term Coef-ficients
LnTV	1.920*** (0.000)	5.330*** (0.000)	1.995*** (0.000)	5.292*** (0.000)	2.064*** (0.000)	5.143*** (0.000)	1.915*** (0.000)	5.208*** (0.000)	2.013*** (0.000)	5.225*** (0.000)
K_{2001}	50.149*** (0.000)	-75.372*** (0.000)	50.228*** (0.000)	-70.661*** (0.000)	51.314*** (0.000)	-72.067*** (0.000)	49.124*** (0.000)	-70.771*** (0.000)	49.887*** (0.000)	-70.121*** (0.000)
K_{2009}	49.804*** (0.000)	-36.490*** (0.000)	48.202*** (0.000)	-35.175*** (0.000)	49.922*** (0.000)	-36.959*** (0.000)	50.214*** (0.000)	-37.282*** (0.000)	47.639*** (0.000)	-34.931*** (0.000)
K_{2013}	-14.804*** (0.000)	9.855*** (0.000)	-13.125*** (0.000)	9.253*** (0.000)	-12.935*** (0.000)	9.646*** (0.000)	-12.790*** (0.000)	8.961*** (0.000)	-12.61*** (0.000)	9.426*** (0.000)
K_{2015}	-0.060 (0.983)	5.736*** (0.000)	-0.673 (0.816)	5.025*** (0.000)	1.475 (0.611)	5.216*** (0.000)	0.425 (0.882)	5.676*** (0.000)	-0.951 (0.742)	4.943*** (0.000)
Error Adjustment Coefficient (ϕ_i)	-	-0.950*** (0.000)	-	-0.954*** (0.000)	-	-0.951*** (0.000)	-	-0.960*** (0.000)	-	-0.955*** (0.000)
NP_NSR	0.144 (0.450)	-6.802 (0.126)	-	-	-	-	-	-	-	-
TD_TE	-	-	-0.006 (0.941)	11.863*** (0.000)	-	-	-	-	-	-
AT	-	-	-	-	1.958*** (0.000)	-11.022* (0.089)	-	-	-	-
STR	-	-	-	-	-	-	0.004*** (0.000)	2.680*** (0.001)	-	-
TFA_TA(1)	-	-	-	-	-	-	-	-	0.384 (0.738)	-51.740*** (0.000)
R^2	0.042		0.042		0.043		0.044		0.043	
$\overline{R}^2$	0.042		0.042		0.043		0.043		0.042	
F Statistic	68.914 (0.000)		68.643 (0.000)		70.233 (0.000)		71.563 (0.000)		69.364 (0.000)	
DW	1.999		2.000		1.999		1.998		1.998	

Note: The Akaike Information Criterion (AIC) is used at determining the optimal delay length. ***, ** and * represent the existence of the co-integration relationship between the variables included in the model at the significance levels of 1%, 5% and 10%, respectively. The values in the parentheses are the probability values.

When generally viewing the model estimates in Table 5, it was found that from models R^2 and corrected R^2 values were slightly lower. It is considered that this was due to the use of a large number of dummy variables in the models. In addition, the horizontal dimension of the panel was very higher than the time dimension, which was also influential on the lowering of the R^2 values (Gujarati, 2003). It was seen that the F statistics of the models were high and the probability values of the F statistics were less than 0.05. In this case; it can be said that the independent variables in the models affect the dependent variable collectively at a significant level. The Durbin-Watson test statistics of the models are quite good. This situation suggests that there is no autocorrelation problem in the models, in other words the estimation results are reliable.

Error correcting terms of all models were found to be negative and statistically significant. This situation shows that there is a long-term relationship between the series in the models, that is, the series are co-integrated. Therefore, false regression problems will not be encountered in the regression analysis and the estimation results are reliable. At the same time as error correction terms are negative and statistically significant, among the series acting together in the long term, the short-term drifts disappear and the series are again close to long-term equilibrium values. This proves that the results of the

model predictions made are reliable. Based on the fact that the error correction terms are negative and statistically significant, it can be said that there are causality relations from the independent variables included in the models to the RETURN variable, which supports the idea that the variables taken in the model are mutually related variables and that the establishment of the models is correct.

In Model 1 – it was determined that the effect of the stock trading volume on stock return was positive and significant both in the long term and short term and the short term effect was higher. This result is in line with our theoretical expectations because the effects of news and data on the stock market are usually short-lived; investors are long-term positions according to new expectations and new news.

In Model 2 – similar to Model 1, it was seen that the effect of trading volume stock return was also positive and significant both in the long run and short term, the short term effect was higher.

In Model 3 – it was seen that increases in the market value of the companies and in the ratio of their book values increased share stocks considerably in the short term. But this effect disappears in the long term. This result obtained is consistent with our theoretical expectation. This is because the increasing market value indicates that the profitability of the company also increases, and the interest of the investors will increase in such shares, which will increase the stock returns. It was determined that the effect of the stock trading volume on the stock return was positive and meaningful in the short term and there was no meaningful effect in the long term.

In Model 4 – it was seen that increases in the trading volume of stocks positively and significantly affected the stock return in the short term as well as the long term, but the stock return was higher in the short term. It was realized that the increases in total assets (GRTA) decreased stock returns in short term but decreased in the long term. The cause of this situation is estimated that stock investors are dissatisfied with this situation in the short term, especially on the situations when paying the company's debts or investing in new investments, rather than distributing the profits of the companies as dividends, but the stocks of the companies whose asset structures become stronger in this way are more demanded in the long term.

In Model 5 – it was seen that again increases in the trading volume of stocks positively and significantly affected the stock return in the short term as well as the long term, but the stock return was higher in the short term. It was seen that the crises of 2001 and 2009 significantly reduced short-term equity stock gains, but increased in the long run which reminded the base effect of the economy. The increases in the IRTS variable, which was calculated with the increase in sales, were found to have a positive effect on stock returns in both periods, meaningless in the short term.

In Model 6 – it was seen that the firm age affects the stock return in a short period positively, meaningfully and at a quite high level, and this result was in line with our theoretical expectations. Because firms that continue to exist in the market for a longer

period are more resilient to institutionalization and economic shocks. This effect turned to negative in the long term. This result indicates that when investors making long-term investment decisions, they consider different criteria rather than just firm age.

In Model 7 – it was observed that the share of the company stocks decreased in the short term as well as in the long term when the firm's trading period in the stock market increased. This result is the opposite of our theoretical expectation. Normally, it is expected that the returns of stocks trading on the stock market for a longer period will be more. Behind this result; it is thought that companies that have already traded on the stock market will start to move away from advertising, promotional activities and new developments that will attract investor's interest in time and excite them.

In Model 8 – it was seen that the increases in the profitability ratio (NP_TAR which was obtained by dividing the net profit by the total assets, increased in both periods, but the stock returns were much more in the short term, and this increase was statistically significant. This result obtained is in line with our theoretical expectations. However, the increase in profitability and the increase in stock return are already terms related to each other. The conclusion to be drawn from this analysis is that it is important to remember that investors consider/need to consider the relationship between net profits and assets while creating portfolios of investors.

In Model 9 – it was seen that increases in equity multiplier affected the stock returns positively and meaningfully in the short-term, and this effect was meaningless in the long term. This result obtained is a totally rational result and is compatible with our theoretical expectations. Because the increase in the equity capital within the assets will increase the firmness of the firms against the crises and this situation will direct the interest of the investor towards this firm. The results which are seen generally in the ratio analysis are that the effects are significant in the short term. This is also normal, because investors use the data about disclosures of companies' financial statements only to identify their short-term positions. More different micro and macro variables will be effective on long-term investor decisions.

In Model 10 – it was determined that increases in the acid test ratio did not have a significant effect on stock returns. In that case, it is not necessary for companies to consider the acid test rate data when forming the portfolios of stock market investors.

In Model 11 – it was seen that the equity efficiency ratio had a short-term positive and significant effect on stock returns, but it lost this effect's statistical significance in the long run. In this case, it would be more rational for investors to use the data of equity efficiency ratio only to determine their short-term positions.

In Model 12 – it was observed that the increases in the current ratio affected the stock returns positively and significantly in the short term but there was an insignificant effect in the long term. In this case, it is logical for investors to use current rate data only to determine their short-term positions.

In Model 13 – it was determined that the changes in the cash ratio had no significant effect on the returns of the stocks. In that case, companies do not need to consider the cash rate data while forming the portfolios of stock market investors.

In Model 14 – it was seen that the increases in leverage ratio (MDR_OK) obtained by dividing tangible assets into equity capital ratios affects the short term returns of equities positively; effect in the long-term turned to negative and was insignificant. It will then be useful for companies to consider the leverage ratio while forming short-term portfolios of stock market investors.

In Model 15 – it was seen that the increases in the amount of profits per share affected the short-term returns of the stocks positively but it had not a significant effect in the long term. It was then useful for companies to consider the amount of profit per share while forming the short term portfolios of stock market investors.

In Model 16 – it was determined that increases in total leverage ratio (TFA_TA(2)) obtained by dividing total short-term liabilities into total liabilities affected the short-term returns of stocks negatively and statistically significantly, they had an insignificant effect in long term by increasing the riskiness of the firm. This is in line with our theoretical expectations. Because the increasing amount of foreign debt will reduce the firm's resilience to external economic shocks, which will move investors away from that company's stocks. Therefore, while forming short-term portfolios of stock market investors, it will be useful for companies to consider the ratio of short-term liabilities to total liabilities in terms of a more accurate selection.

In Model 17 – it was determined that the increase in the turnover rate increased shareholder returns in the short term and didn't have a significant effect in the long term. It will be beneficial for the stock market investors to consider this data while making short-term investment decisions.

In Model 18 – it was seen that the effect of increases in the free float ratio of the companies on the stock return were insignificant both in the short term and in the long run. This result means that investors in the stock market did not consider the variable of free float ratio of the companies when making their portfolio decisions. In Section 5.1.2, where the microeconomic data set was introduced, it was stated in advance that there was no precise expectation about this variable and the net effect of this variable on the return of stocks would be determined according to the values resulting from the analysis. So, the free float ratio had no significant effect on the return of stocks.

In Model 19 – it was designated that NP_NSR variable obtained by dividing net profits of companies into net sales had no significant effect on stock returns both in the short term and long term. Therefore, it would not be a problem for the individuals and intermediary institutions who want to trade in the stock exchange to ignore this variable in the selection of firm.

In Model 20 – increases in the financing rate (TD_TE), which is obtained by dividing the total debts into total own funds, increased the average short term returns of the companies. This result is not consistent with our theoretical expectation. Because it is expected that the increased amount of debt will increase the riskiness of the companies and thus reduce their income. There is such a negative relationship between long-term funding rate and return, but this is not statistically significant. Therefore, it is considered that the average return of stocks traded in BIST is independent from the financing rate and influenced by other factors.

In Model 21 – it was seen that increases in the asset turnover rate affected the stock returns negatively in the short term and in the long term positively. When considering that the short-term effect is reliable at the level of 10% significance, it can be said that investors will only need to consider this variable while forming long-term portfolios.

In Model 22 – it was seen that the increases in the stock turnover rate affected the average return of stocks both in the short term and the long term positively and significantly, the short term effect was higher. This result is in line with our theoretical expectation. However, the increase in the stock turnover rate means that the production and sales are accelerated in the firms, which will lead the investors to the shares of these companies and increase the return of the related shares. It is then useful for the people who will be operating on the stock exchange to consider the stock turnover rates of businesses, especially when they are making short-term portfolio decisions.

In Model 23 – it is seen that the increases in the leverage ratio (TFA_TA(1)) obtained by proportioning the long term debts of companies to their own resources reduced share earnings significantly in the short term, and this result is in line with our theoretical expectations. Because the increased leverage ratio will increase the riskiness of companies in the face of crises, which will remove investors from the stocks of these firms. For this reason, while choosing a firm it useful for investors to consider particularly the leverage ratio variable. In the long term, the effect of the leverage ratio on the stock returns was found insignificant.

6. Conclusions

In this study, it was aimed to determine what may be macroeconomic variables affecting stock returns and to provide investors with findings that could help in this matter. In this context, the macroeconomic factors affecting the average returns of the stocks operating in BIST were analyzed econometrically. For this purpose, stock returns belonged to 130 companies which operated in the manufacturing sector and was offered to public before 2000, being processed continuous trade on stock exchange in the 2000:Q1 – 2017:Q3 period and 25 microeconomic variables and 4 dummy variables belonging to Turkey and other countries were used and there were established 23 different econometric models.

As a result of the analysis made to determine the microeconomic factors affecting the shareholder returns, it was determined that the increases of current ratio from liquidity

rates affected the stock returns positively and significantly in a short period but it did not have a significant effect in the long term and changes in cash rate and acid test ratio did not have a significant effect on stock returns.

From leverage ratios, it was seen that the increases in the ratio of total foreign sources (debts) to the total assets decreased share earnings in the short term significantly. By increasing the riskiness of the firm, increases in the ratio of short term foreign sources to the total liabilities affected the stocks returns negatively and statistically significantly in short term and did not have a significant effect in the long term. The increases in the ratio of tangible assets to own funds affected the short-term stock returns positively and in the long-term the effect turned to negative and it was seen as insignificant. It was seen that increases in the ratio of capital stock to assets affected stock returns positively and significantly in the short term and this effect was insignificant in the long term. Increases in the ratio of total debts to total own funds increased the average short-term returns of companies.

In analyzes made about activity ratios, it was determined that the increase in the accounts receivables turnover rate increased the stock returns in the short term and there was no significant effect in the long term. It was seen that increases in the asset turnover rate affected the stock returns in the short term negatively, in the long term positively. It was seen that the increases in the stock turnover rate affected the average turnover of the stocks positively and significantly in the short term as well as in the long term and the short term effect was higher.

In analyzes made for profitability ratios, it was seen that there is a positive and significant effect of short-term net profits on increases in shareholders equity ratio and but in the long run this effect lost its statistical significance. It was found that increases in the ratio of net profit to total assets increased stocks returns in both periods but mostly in short term and it was seen that this increase was also statistically significant. It was designated that the increase in the ratio of net profit to net sales did not have a significant effect on stock returns both in the short term and long term.

The stock market performance ratio was based on the ratio of the market value of companies' to book value, and it was seen that the increases in this ratio increased the stock returns in a very short period of time considerably, but this effect removed in the long term.

When considering the effects of growth rates related to companies on stocks returns, it was seen that the growth of total sales in growth rate affected stock returns in both periods positively, but insignificant in the short term. It was found that the increases in the growth rate of the total assets, on the other hand, decreased shareholder returns in the short term and increased in the long term.

On the other hand, in the analysis results of other microeconomic variables affecting the stocks, it was determined that the effect of increases in stock trading volume on stock return was positive and significant in the both short term and long term but the short term

effect was higher. It was seen that the effect of the share transaction amount on the stock return was also positive and meaningful in the both short term and long term and the short term effect was higher. It was seen that firm age affected stock returns in a short period of time, positively, significantly and at a very high level. When the firms' trading period in the stock market increased, it was seen that the stock returns decreased both in the short term and in the long run. It was understood that increases in the amount of profits per share affected short-term returns of equities positively, but they did not have a significant effect in the long term. It was found that the effect of the increase in the free float ratio of companies on the stock return was insignificant both in the short term and in the long run. The table which is seen generally in the ratio analysis shows that the effects are significant in the short term. This is also normal because investors use the data about the financial statements of companies' disclosures only to identify their short-term positions. More different micro and macro variables will be effective on long-term investor decisions.

Note

(1) In addition to that the analysis made was panel data analysis was made, Carrion-i Silvestre et al. (2009) test used here was a time series test. Since the BIST100 index was also a time series, this test had to be used. The study is the first in the literature with regards to combining panel data analysis with time series.

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Return, shock and volatility spillovers between the bond markets of Turkey and developed countries

Selçuk BAYRACI
C/S Information Technologies, Istanbul, Turkey
selcuk.bayraci@cybersoft.com.tr

Abstract. *In this study, we present a VAR-BEKK model to investigate the comovements of long-term interest rates between Turkey and four developed (Germany, Japan, USA and UK) markets. We use weekly rates on the 5-year maturity government bonds for the period of February 10, 2006 to September 12, 2014 containing 448 observations. We empirically document that, while Turkish bond market is only correlated with Japanese and the US markets, there are strong ties between the returns and volatility of developed bond markets. Our findings indicate most of the movements in international government bond markets are a product of global risk factors rather than country specific factors.*

Keywords: bond market co-movement; volatility spillover; BEKK-GARCH model.

JEL Classification: C32; C51; G15.

1. Introduction

There has been growing interest on studying the interconnections in international financial markets during last several years due to recent global financial crises of US sub-prime mortgage crisis and European sovereign debt crisis. Identifying the linkages among the international interest rates is of pivotal importance for both financial economics and macroeconomics aspects. As proposed by Yang (2005), studying co-movements of international interest rates may shed a light on the cost of fiscal deficit, monetary policy-making, forecasting interest rate movements and benefits of bond portfolio diversification.

Barassi et al. (2001) point out that bond rates can be treated as either financial assets or macroeconomic policy instruments. Bond rates as financial assets may tend to move together with the increasing globalization and capital flows across international financial markets. Conversely, if bond rates are seen as a macroeconomic instruments, the co-movement of bond rates are perplexed by the degree of national monetary and fiscal policy decisions. Therefore, it might be worthwhile to empirically test the co-movement dynamics of the international bond rates for a number of reasons. First of all, understanding the interdependence in international bond markets is important to know how economic and financial shocks are transmitted across the globe. Secondly, interconnectedness of international bond markets is vital in terms of managing monetary policies; because, the domestic monetary policies are highly related to the degree of co-movement between domestic and foreign interest rates. Therefore, co-movements of bond rates across times and frequencies are crucial for both public and private economic agents as well as for international investors to build a well-diversified portfolio.

In this study, we investigate the dynamics of the sovereign interest rate co-movements by applying a VAR(1)-BEKK(1,1) model which will enable us to assess time-varying conditional correlations and spillover effects of return, shock and volatility dynamics. The rest of this paper is organized as follows. The summary of the related literature is given in 2. Section 3 presents the details of the methodological framework. Data and empirical results are presented and analysed in 4 and 5; and section 6 concludes.

2. Literature review

There are several studies in the literature that carried out on exploring the linkages of international bond markets. There are mixed empirical results depending on sample period and econometric methodology used. While, some of them argue that bond yield and returns across different countries are positively correlated and move together. There are some studies contradict this argument as finding no significant evidence on the bond market integration. Furthermore, some researchers also assert that integration is more likely to increase during the turmoil periods or after the certain events (for example; introduction of Euro, September 11, Lehman Brothers collapse). In this part, we will summarize the results of some existing studies in the field.

Yang (2005) conducted a research to recognize the government bond market linkages among the six European (Germany, France, Italy, the UK, Belgium and the Netherlands) with using co-integration, Granger causality and forecast error variance decomposition methods. The study reports the weak existence of a long-term relationship among the European bond markets. However, according to the results from the forecast error decomposition analysis there are generally co-movements among the markets without a distinctive leadership.

Kim et al. (2006) looked into integration dynamics of EU countries by utilizing Kalman filter and bivariate EGARCH models and found evidences of strong linkages between German and EU markets. The study also reveals that the relationship between the UK and German markets are weaker than those of the UK and other EU members.

Ciner (2007) explored interactions among the government bond markets of four major developed countries (US, Germany, Japan and the UK) between 1988 and 2005. He detects no empirical evidence of co-integration among the bond markets for the full period. However, he demonstrates that there are strong causal associations between markets for the period of 1996-2005.

Skintzi and Refenes (2006) conducted a research to shed a light on the integration dynamics and volatility spillover effects of European and US bond markets. They support the idea of spillover effect from the US to European bond markets. They also remark that integration among European bond markets has multiplied after the introduction of Euro. The empirical results of strong co-movements among European bond markets after the circulation of single currency were also documented in the studies of Cappiello et al. (2006) and Christiansen (2007).

Laopodis (2008) also studied the government bond market linkages among the European countries by using Granger causality tests. He posits several bi-directional linkages among the European bond markets. The results of the analysis also suggest unidirectional causal effects from the US bond market to the European markets. On the other hand, Abad et al. (2010) analysed the impact of single currency Euro on European bond market integration by utilizing CAPM based linear regression model and found EU and US sovereign bond markets display a weak level of integration for the period of 1999-2008. However, their results suggest that there is a strong link between the US and German bond yields.

A recent study of Matei (2013) employs multivariate Granger causality analysis to explore the bond market ties among EU countries for the period between 2003 and 2013. She argues that although, the bond market integration among EU countries became stronger after the initiation of Euro, not all the bond markets have strong relationship in the long-run. The results from the study show that “core” countries (Germany, France, and Italy etc.) are more integrated than the “periphery” countries (Ireland, Greece and Portugal). Overall, she found a weak degree of integration among the EU markets and direction of causality changes during the turbulent periods which can be interpreted as a contagion effect. Therefore, it is a difficult task for European Central Bank's monetary authorities to manage the long-term interest rates to maintain the price stability.

Apart from studies examining the relationship between developed bond markets, there are few studies that investigating the emerging and frontier markets. A study on the integration dynamics of emerging bond markets has been carried out by Cifarelli and Paladino (2006). They applied principal component analysis (PCA) and orthogonal GARCH (O-GARCH) methods to the daily spreads of the sovereign emerging bonds. They claim that conditional covariance among the emerging bond spreads tend to increase during the crisis times.

Thupayagale and Molalapata (2012) investigated the degree of interdependence among three emerging bond markets (Mexico, South Africa, and South Korea) and the US with vector autoregressive (VAR) and DCC-GARCH methods. They indicate that emerging market bonds are not co-integrated in the long-run. They also found no statistically significant short-run relationship among the markets. Moreover, impacts of the US bond rates on these emerging market bonds are limited.

Piljak (2013) assess the time-varying evolution of the correlations of the then emerging and four frontier bond returns with the US bond returns between October 2000 and December 2011 with DCC-GARCH model. His results validate that only Malaysian market returns show positive correlation with the US returns during the whole period. China, Mexico, Poland and South Africa have generally show positive correlation while Brazil, Russia, Turkey and Ecuador have predominantly negative correlations with the US.

Integration of Asian bond markets with the US and Australian markets has been studied by Vo (2009). Their empirical results do not show a high level of integration between the Asian bond markets with the US and Australian markets which can be accredited to home country bias in Asian markets

3. Methodology

In order to capture the joint process between international bond yield returns, we consider the following econometric model.

$$\boldsymbol{X_t = \omega + \Theta_1 X_{t-1} + \Theta_2 X_{t-2} + \ldots + \Theta_p X_{t-p} + \varepsilon_t}$$
$$\boldsymbol{\varepsilon_t | \Omega_{t-1} \approx N(0, H_t)} \quad (1)$$

with $\boldsymbol{X_t}$ is an $(\boldsymbol{nx1})$ vector of daily returns at time $\boldsymbol{t}$ and $\boldsymbol{\Theta}$ is a $(\boldsymbol{nxn})$ matrix containing the coefficients related with the lagged returns. For the five variable VAR(1) model, which we apply in this study, the Eq.1 can be represented as;

$$\begin{pmatrix} x_{1,t} \\ x_{2,t} \\ x_{3,t} \\ x_{4,t} \\ x_{5,t} \end{pmatrix} = \begin{pmatrix} \omega_1 \\ \omega_2 \\ \omega_3 \\ \omega_4 \\ \omega_5 \end{pmatrix} + \begin{pmatrix} \theta_{11} & \theta_{12} & \theta_{13} & \theta_{14} & \theta_{15} \\ \theta_{21} & \theta_{22} & \theta_{23} & \theta_{24} & \theta_{25} \\ \theta_{31} & \theta_{32} & \theta_{33} & \theta_{34} & \theta_{35} \\ \theta_{41} & \theta_{42} & \theta_{43} & \theta_{44} & \theta_{45} \\ \theta_{51} & \theta_{52} & \theta_{53} & \theta_{54} & \theta_{55} \end{pmatrix} \begin{pmatrix} x_{1,t-1} \\ x_{2,t-1} \\ x_{3,t-1} \\ x_{4,t-1} \\ x_{5,t-1} \end{pmatrix} + \begin{pmatrix} \varepsilon_{1,t} \\ \varepsilon_{2,t} \\ \varepsilon_{3,t} \\ \varepsilon_{4,t} \\ \varepsilon_{5,t} \end{pmatrix} \quad (2)$$

In the above VAR(1) model, $x_{i,t}$ for $i = 1,2,3,4,5$ represent the logarithmic returns of the bond yields. The diagonal elements θ_{ii} in matrix Θ measure the effect of lagged returns of the respective bond, while the off-diagonal elements $\theta_{i,j}$ represent the connections in terms of bond yield returns also known as return spillovers. The random errors $\varepsilon_{i,t}$ are the innovations of each return at time t with corresponding $(5x5)$ conditional variance-covariance matrix H_t. The vector c shows constants. Engle and Kroner (1995) showed that conditional variance matrix H_t can be modeled by a linear function of the past squared errors and cross products of errors and past values of the elements of variance-covariance matrix H_t, thus H_t can be represented as:

$$\boldsymbol{H_t = C^T C + A^T \varepsilon_{t-1}^T \varepsilon_{t-1} A + B^T H_{t-1} B} \quad (3)$$

where C is a $(\mathbf{5x5})$ lower triangular matrix (to induce the positive semi-definiteness of $\boldsymbol{H_t}$) containing the constant terms. A is a $(\mathbf{5x5})$ matrix of the coefficient corresponding to the lagged squared errors. The elements of matrix A measure the impacts of 'innovations' or shocks on the conditional variances. The $(\mathbf{5x5})$ matrix B signifies the effects of past values of conditional variance-covariance matrix onto the current one. The matrices A and B capture the ARCH and GARCH effects of the volatility process. The diagonal coefficients $\boldsymbol{\alpha_{i,i}}$ (for $\boldsymbol{i = 1,2,3,4,5}$) of matrix A shows the dependence of current conditional variances $\boldsymbol{h_{i,i}}$ on their lagged squared errors, whereas the effects of the past conditional variances of $\boldsymbol{h_{i,i}}$ are indicated through significance of the parameters $\boldsymbol{\beta_{i,i}}$. The effects of cross-shocks and cross-volatilities are measured with off-diagonal elements $\boldsymbol{\alpha i,j}$ and $\boldsymbol{\beta_{i,j}}$ of the matrices A and B.

The estimation of the BEKK(1,1) model can be utilized via the maximizing the conditional log likelihood function $\boldsymbol{L(\Phi)}$ which has the following expression:

$$\boldsymbol{L(\Phi) = -Tlog(2\pi) - 0.5 \sum_{t-1}^{N} log|H_t(\Phi)| - 0.5 \sum_{t-1}^{N} \varepsilon_t(\Phi)^T H_t^{-1} \varepsilon_t(\Phi)} \quad (4)$$

where, $\boldsymbol{N}$ is the number of observations and $\boldsymbol{\Phi}$ denotes the parameter set to be estimated.

4. Data

Bond yield data for Turkey and for the four developed economies, namely Germany, Japan, United States and the United Kingdom are retrieved from Bloomberg database. The sample period spans from February 10, 2006 to September 12, 2014 containing 448 weekly observations of the yields on the 5-year maturity government bonds. The logarithmic returns of the bond yields are calculated as the growth rate of bond yields, $X_t = ln(R_t) - ln(R_{t-1})$, where R_t bond rate at time t.

Descriptive statistics of the log-returns are presented in Table 1. From these statistics, we notice that Turkish bond returns show lower unconditional risk as measured by the standard deviation of daily bond yield returns than the developed markets. The kurtosis and skewness statistics indicate that non-normality is a common phenomenon for bond

market return distributions. Jarque-Bera statistics also recommend that bond market returns do not obey the normal law. We conclude that all return series are stationary as suggested by ADF test statistics.

Table 1. *Descriptive statistics of the logarithmic returns*

	Germany	Japan	Turkey	UK	USA
Mean	-0.0062	-0.0042	-0.0008	-0.0020	-0.0022
Maximum	0.6090	0.3331	0.2349	0.3446	0.3313
Minimum	-0.5897	-0.2092	-0.1682	-0.2281	-0.2669
Std.	0.1077	0.0721	0.0373	0.0656	0.0710
Skewness	0.5660	0.6149	0.3760	0.7665	0.4143
Kurtosis	9.8270	5.0314	8.1314	6.9145	5.0463
Jarque-Bera	893.9400	105.2700	502.0800	329.9000	90.9800
ADF	-23.2110	-21.0440	-20.8080	-22.1820	-22.7930

Table 2 reports the pairwise unconditional correlation coefficients between the international bond markets. Overall, we observe high degree of co-movements between the UK, the USA, and Germany with correlation values range from 0.62 to 0.72. Japan has weaker degree of relationships with other markets as suggested by correlation coefficients lower than 0.5. Moreover, relationship between Turkish and Japanese markets is statistically insignificant. Overall, we find that developed markets seem to be more integrated and correlations between the Turkish and developed bond market returns are positive and statistically significant (except with Japan), but they are weak with coefficients lower than 0.5.

Table 2. *Unconditional correlations between bond markets*

	Turkey	Japan	Germany	UK	USA
Turkey	1				
Japan	0.0127	1			
Germany	0.1458**	0.2587**	1		
UK	0.1158**	0.3027**	0.7252**	1	
USA	0.1898**	0.3479**	0.6245**	0.6407**	1

Note: ** denotes 5% significance level.

From the point of Turkish investors, low correlation coefficients enrich potential portfolio diversification benefits by investing in international bond markets. Reversely, Turkish bond markets might be attractive for the international investors in terms of diversifying their portfolio risks. However, as Graham and Kviaho (2012) point out using simple correlation coefficients for analysing the co-movements between the financial markets and make portfolio allocation decisions could be deceptive due to temporal instability of such correlation coefficients. Therefore, we must turn to more advanced techniques to expose the integration dynamics of the international bond markets.

5. Empirical results

In order to see the time-varying evolutions of conditional correlations between Turkish and international bond returns and spot the direction of spillovers, we applied a VAR(1)-BEKK(1,1). We present the estimated coefficients of the matrices Θ, A and B in Table 3.

Table 3. *Estimated coefficients for the VAR(1)-BEKK(1,1) model*

Panel A	Turkey	Germany	Japan	US	UK
	(i =1)	*(i = 2)*	*(i = 3)*	*(i = 4)*	*(i = 5)*
$\boldsymbol{\theta_{i,1}}$	0.032	0.008	0.036	0.098	0.04
$\boldsymbol{\theta_{i,2}}$	-0.044	-0.166	-0.101	-0.107	-0.07
$\boldsymbol{\theta_{i,3}}$	-0.047	0.105*	-0.124	0.045	0.067
$\boldsymbol{\theta_{i,4}}$	0.035	0.017	0.199*	-0.079	0.088
$\boldsymbol{\theta_{i,5}}$	0.117*	0.081	0.167	0.116	-0.058
Panel B	Turkey	Germany	Japan	US	UK
	(i = 1)	*(i = 2)*	*(i = 3)*	*(i = 4)*	*(i = 5)*
$\boldsymbol{a_{i,1}}$	0.148**	0.016	-0.124*	0.09**	-0.026
$\boldsymbol{a_{i,2}}$	-0.023	0.575*	-0.126*	0.217*	-0.525*
$\boldsymbol{a_{i,3}}$	-0.329*	-0.025	-0.272*	0.255*	0.098
$\boldsymbol{a_{i,4}}$	-0.059	0.132*	-0.162*	-0.008	-0.14**
$\boldsymbol{a_{i,5}}$	-0.099	0.05	-0.164*	0.311*	-0.146**
$\boldsymbol{\beta_{i,1}}$	0.874*	0.017	-0.107*	0.004	-0.023
$\boldsymbol{\beta_{i,2}}$	0.002	0.945*	-0.016	0.098*	-0.202*
$\boldsymbol{\beta_{i,3}}$	0.338*	0.049	0.89*	0.014	-0.135*
$\boldsymbol{\beta_{i,4}}$	0.093	0.047*	-0.043	0.99*	-0.098*
$\boldsymbol{\beta_{i,5}}$	0.035	0.084*	-0.031	0.042*	0.83*

Notes: i = 1; 2; 3; 4; 5 stands for Turkey, Germany, Japan, US, and UK respectively. θ, α and β represent return, shock and volatility effects. Significant coefficients at 1% and 5% levels are marked with * and **.

In order to examine the relationship in terms of bond yield returns; we inspect the elements of matrix $\boldsymbol{\Theta}$ of the Eq.1 captured by the coefficients $\boldsymbol{\theta_{i,j}}$ in the panel A of Table 3. We notice that diagonal elements $\boldsymbol{\theta_{1,1}}$, $\boldsymbol{\theta_{4,4}}$ and $\boldsymbol{\theta_{5,5}}$ are statistically insignificant meaning that bond yield returns of Turkey, USA and the UK do not depend on their lagged values. On the other hand, German and Japanese bond yields have dependence on their past returns as indicated with significant parameters $\boldsymbol{\theta_{2,2}}$ and $\boldsymbol{\theta_{3,3}}$.

When we look at the off-diagonal elements of the matrix $\boldsymbol{\Theta}$; we observe following patterns for the cross-market linkages among bond yield returns. First of all, the significant $\boldsymbol{\theta_{1,5} = 0.117}$ parameter suggests that Turkish bond yield returns respond positively to the changes in the UK bond returns. While we observe a uni-directional return spillover from US market to Japanese market with parameter $\boldsymbol{\theta_{3,4} = 0.199}$, Japanese bond market has bidirectional relationship with German and the UK markets as exposed with statistically significant coefficients of $\boldsymbol{\theta_{2,3} = 0.105}$, $\boldsymbol{\theta_{3,2} = -0.101}$, $\boldsymbol{\theta_{3,5} = 0.167}$ and $\boldsymbol{\theta_{5,3} = 0.067}$. The estimation results of the mean equation reveal that Japanese bond market is sensitive to changes originated from other developed markets.

To see the cross-market shock and volatility transmissions, we look into estimated parameters of BEKK model given as $\boldsymbol{\alpha_{i,j}}$ and $\boldsymbol{\beta_{i,j}}$ in the panel B of Table 3. As stated earlier, the diagonal elements of matrix A measure the own past shock or ARCH effects, while the diagonal elements of matrix B measure own past volatility or GARCH effects. As presented in Table 3, the statistically significant diagonal parameters $\boldsymbol{\alpha_{11}}$, $\boldsymbol{\alpha_{22}}$, $\boldsymbol{\alpha_{33}}$ and $\boldsymbol{\alpha_{55}}$ are implying the existence of ARCH effect in the bond returns of Turkey, Germany, Japan and the UK. Furthermore, the diagonal coefficients $\boldsymbol{\beta_{11}}$ through $\boldsymbol{\beta_{55}}$ are all statistically significant showing a strong presence of GARCH effects. Thus, conditional variances of all bond returns are driven by a strong GARCH(1,1) process.

We inspect the off-diagonal elements of matrix A and B to understand the cross-market linkages in terms of shock spillover and volatility spillover among international bond markets. Firstly, we document a two-way negative shock transmission between Turkey and Japan at 1% significance level. News on Turkish bond market has also moderate impact on the conditional volatility of the US bond returns at 5% level. There also exists a bidirectional shock spillover between Japanese and US bond markets. While, the shocks on Japanese bond returns have positive effect over the US bond returns, Japanese bond return volatility respond negatively to the news from the US market.

Moreover, we found evidence of unidirectional negative shock transmission from German and the UK markets to Japan. The significant $\boldsymbol{\alpha_{24}}$, $\boldsymbol{\alpha_{42}}$ and $\boldsymbol{\alpha_{25}}$, $\boldsymbol{\alpha_{52}}$ and $\boldsymbol{\alpha_{45}}$, $\boldsymbol{\alpha_{54}}$ indicate strong bidirectional shock spillover between Germany and US; between Germany and UK; and between US and UK at 1% significant level. There are strong bidirectional volatility spillovers between Turkish and Japanese market as shown with parameter $\boldsymbol{\beta_{13} = 0.338}$ and $\boldsymbol{\beta_{31} = -0.107}$. The past volatility shocks in Japanese bond market have also negative effects on the future volatility in the UK bond market. The bidirectional volatility transmission mechanisms are also present between Germany and US; Germany and UK; US and UK.

Our empirical finding for this part advocate that; Japan is the main return and shock spillover receiver, and future volatility of the UK bond market heavily depend on past volatility shock from other markets, specifically UK is the main volatility receiver. It is also interesting that there is a strong bidirectional shock and volatility linkages between Turkish and Japanese bond markets which can be attributed to the carry-trade phenomenon.

6. Conclusion

For this study, we implemented VAR-BEKK model, for empirical purposes, to investigate the co-movements among the international bond markets at returns, shock and volatility level. Our empirical results for this chapter have some implications from the point of macroeconomic perspective. First, the higher degree of co-movement indicates greater shock transmission exist in world bond market with possible adverse consequences of the monetary policy stability. Central banks of the developed markets have more difficult tasks of implementing and controlling monetary policy (as their aim is to control interest rates and maintain price stability).

Moreover, higher degree of bond market integration has important implications for the fiscal policy maintenance. As suggested by Claeys et al. (2010), with the increasing globalization, capital mobility and trade flows among countries have proliferated in last decade driving both domestic and foreign agents to seek out diversification benefits across borders. As a consequence, budget deficits of one economy are not solely financed by domestic resources. Fiscal policies of governments heavily depend on international capital markets. Reversely, fiscal decisions of one government have impact on all other capital markets in an integrated economic environment.

In conclusion, the results documented in this chapter are in line with some of the earlier literature (Driessen et al., 2003; Barr and Priestley, 2004; Engsted and Tanggaard, 2004, 2007) suggest that most of the movements in international government bond markets is a product of global risk factors rather than country specific factors. A further study will be needed to uncover the precise reasons and risk factors behind the bond rate co-movements in the international markets.

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Causal relationship between internet use and economic development for selected Central Asian economies

Fuat SEKMEN
Kyrgyzstan-Turkey Manas University, Bishkek, Kyrgzstan
Sakarya University, Sakarya, Turkey
sekmen@sakarya.edu.tr
Hasmet GOKIRMAK
Istanbul Sabahattin Zaim University, Istanbul, Turkey
gokirmak@gmail.com

Abstract. *The aim of this study is to examine the effects of information and communications technology (ICT) on economic development of several Central Asian countries. Dumitrescu and Hurlin (DH) panel causality test has been used for the relationship between ICT and economic development. The DH test results indicate that a unidirectional causality exists from GDP per capital to Inter-net use. These results suggest that an increase in GDP per capita can stimulate internet use. In addition, the cross-sectional dependence is examined using LM test of Breusch and Pagan and CD-LM and CD test of Pesaran. The results suggest that the null-hypothesis, no cross-sectional dependence exists among countries, is rejected for all the tests, suggesting an economic shock in a one country may have spillover effects on other countries.*

Keywords: internet use; economic development; panel causality test; cross-section dependence.

JEL Classification: B22, C12, C33, F62.

1. Introduction

Information and communications technology (ICT) includes the infrastructure, networking components, applications, and systems components that enable modern computing. ICT makes it possible for people and organizations to interact with other people, businesses, government agencies and nonprofit organizations in a digital environment. ICT has internet-based and mobile (wireless networks) components. ICT has enabled people and businesses to do transactions and interactions in many new ways. ICT brings about business growth and economic development. Many have argued that ICT has brought about the fourth industrial revolution.

Hoffman (2000) describes internet as the most important innovation since the development of the printing press. The internet gives instant access to an endless supply of knowledge and entertainment. The benefits of internet include knowledge sharing, and easy access to information and learning new things; opportunities for connectivity, communication and sharing; map and direct users to places; remote access to banking services (sending money and paying bills, etc.); a great shopping experience without leaving you home; opportunities to sell any product to customers anywhere in the world; collaborative work, work from home and access to a global work force; and access to an endless supply of entertainment (videos, movies, music, and games). The internet of things, controlled remotely, helps you connect your residence, businesses, and many helps many service providers save energy, money and time. Cloud computing and cloud storage devices can connect to remote data storage and more powerful computers to perform complex tasks. According to Riddle (1999), the internet is a rich resource of information for the market for competitors, suppliers, and customers. Internet use can encourage e-trade and reduce costs and increase competitiveness.

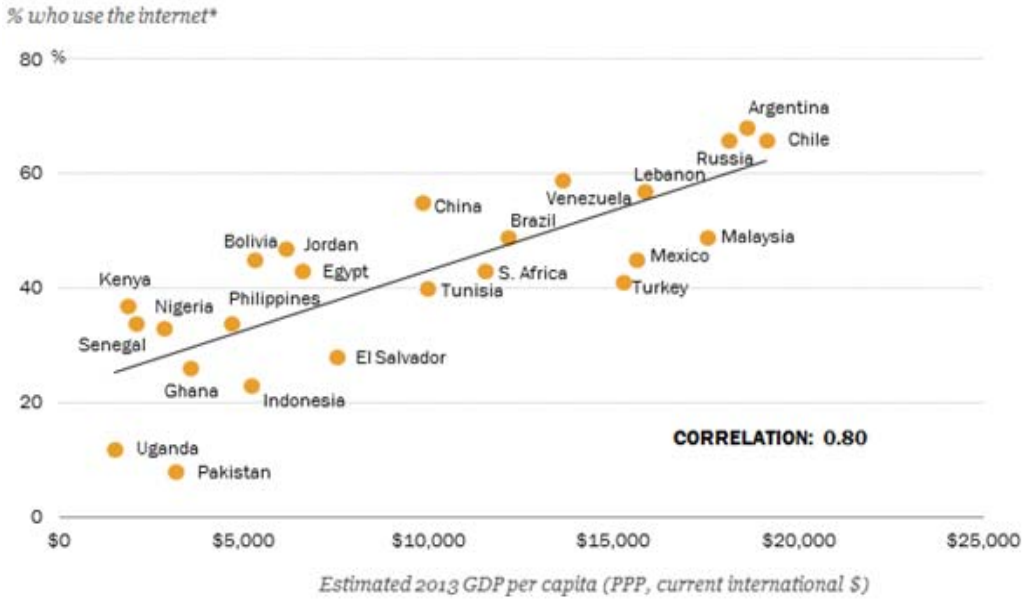
The aim of this study is to examine the effects of ICT, represented by internet use, on economic development, represented by per capita GDP, for six Central Asian developing economies for the 1990-2016 periods. Despite the fact that several studies have analyzed the factors that affect internet uses in order to determine the future of e-commerce and international globalization, the number of contributions focusing on the reciprocal relationship between internet use and economic growth is surprisingly scarce.

In this study, the causal relationship between GDP per capita and internet use has been analyzed. Four kinds of hypotheses can be derived from this analysis. The first hypothesis is that the causal relationship can be directed from internet use toward increased GDP per capita because ICT is considered an indispensable asset in the fight against world poverty. According to Kamssu, Siekpe and Ellzy (2004), ICT provides developing nations with unprecedented opportunities to meet vital development goals, such as poverty reduction, basic healthcare, and education far more effectively than before. This hypothesis implies that there is a positive relationship between internet use and GDP per capita. In the study by Penard and Poussing (2010), the Internet is taken into account as a convenient and an efficient means of decreasing the cost of investing in social capital.

The second hypothesis is that increase in GDP per capita can stimulate internet use, meaning that a causal relationship can be described from GDP per capita to internet use. This hypothesis postulates that increase in GDP contributes to internet use. It is a fact that there is a technology inequality between rich and poor countries. Developed countries have well-established telecommunications systems and telephone infrastructure, enabling them to have widespread internet service available for connection. However, many less developed and developing countries do not have proper telephone infrastructure, which requires high cost investments.

Figure 1 shows technology usage versus GDP per capita for several developing countries. Figure 1 suggests that there is a positive correlation between GDP per capita and internet use.

Figure 1. *Internet use vs. GDP per capita*



Source: http://www.pewglobal.org/2014/02/13/emerging-nations-embrace-Internet-mobile-technology/

The third hypothesis is that bidirectional causality corresponds to the feedback hypothesis, which indicates that internet use and GDP per capita affect each other simultaneously. The validity of this hypothesis would show that the policies that help increase internet use may also increase economic growth and, which in turn encourage Internet use.

Finally, the neutrality hypothesis indicates that changes in economic growth do not affect internet use or vice versa. If this study concludes that there is a non-existence of a causal relationship between Internet use and economic growth, this hypothesis will be validated.

2. Economic model and methodology

In the Granger causality analysis, a variable y_t is said to Granger-cause another variable x_t, if x_t can be predicted with greater accuracy by using past values of y_t. The Granger causality test is based on a simple Wald test, which allows us to test the significance of lagged values of the second variable.

Even though the Granger causality test is a well-known econometric technique, it has some shortcomings; for example, the Granger causality test is not the proper test to apply for different frequencies. However, Geweke (1982) introduced a Wald test to analyze the existence of Granger causality in the frequency domain; using this test to make it possible to study the variations of a time series as a function of frequency as opposed to the time domain, where variance is examined as a function of time.

Breitung and Candelon (2006) advanced Geweke's Granger causality test. To study the large sample properties of the test, they analyzed the power against a sequence of local alternatives. The finite sample properties were investigated by means of Monte Carlo simulations. Their methodology was applied to investigate the predictive content of the yield spread for future output growth. Croux and Reusens (2013) investigated the predictive power for the future domestic economic activity included in the domestic stock prices, using a Granger causality analysis in the frequency domain.

This study uses Dumitrescu-Hurlin's (2012) panel causality test (hereafter DH). The DH is an elaborated version of the Granger causality test and it tests the null hypothesis of non-causality for the panel between the variables against the alternative one, which assumes that causality exists between the variables for at least one-cross section unit.

The DH causality test for the case of two stationary variables y_t and x_t can be illustrated as follows.

$$y_{i,t} = \alpha_i + \sum_{k=1}^{K} \beta_{ik} y_{i,t-k} + \sum_{k=1}^{K} \gamma_{ik} x_{i,t-k} + \varepsilon_{i,t} \qquad (1)$$

where $x_{i,t}$ and $y_{i,t}$ are two stationary variables for individual i in period t. Here, coefficients are allowed to differ across individuals, but are assumed to be time-invariant. On the other hand, the lag order k is assumed to be identical for all cross-section units and the panel must be balanced.

The null-hypothesis is defined as follows:

$$H_0 : \gamma_{i1} = ... = \gamma_{ik} = 0 \qquad \forall i = 1, ..., N$$

The null-hypothesis is that there is no causality for all individuals in the panel.

The alternative hypothesis assumes that causality exists between the variables for at least one cross-section unit.

The alternative hypothesis can be defined as follows:

$$H_0 : \gamma_{i1} = ... = \gamma_{ik} = 0 \qquad \forall i = 1, ..., N_1$$

$$\gamma_{i1} \neq 0 \text{ or } \gamma_{ik} \neq 0 \qquad \forall i = N_1 + 1, ..., N$$

where $N_1 \varepsilon [0, N-1]$ is unknown. If $N_1 = 0$, there is causality for all cross-section units in the panel. N_1 is strictly smaller than N, otherwise there is no causality for all cross-section units.

It is a fact that the world economy has been experiencing a rapid globalization and increasing economic and financial integration, thus panel data methodologies should take into account the cross-sectional dependence, otherwise the results will be unrealistic. Therefore, this study examines whether there is a cross-sectional dependence among the countries examined by using LM test of Breusch and Pagan (1980), and CD-LM and CD test of Pesaran [10].

The basic Pesaran test statistics can be showed as follows.

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{p}_{ij} \right) \qquad (2)$$

where CD cross-dependency in the panel, T is the time dimension of the panel, N is the cross-sectional dimension in the panel, and $\hat{p}_{ij}$ is correlations coefficients, which are calculated from residuals. The distribution of the Pesaran (2004) test is N (0, 1).

3. Data and empirical results

This study used annual data obtained from the World Bank for Kyrgyzstan, Kazakhstan, Turkmenistan, Uzbekistan, Azerbaijan, and Tajikistan from 2000 to 2016 to test the causality between Gross Domestic Product (GDP) per capita and percentage of individuals using internet. The logarithmic form of GDP per capita and percentage of individuals using internet are used in this study.

At the first step, the variables examined were tested whether they are stationary or not using Levin, Lin, Chu, and Im, Pesaran and Shin panel unit root tests, which allowed us to test the null of the unit root for the whole panel against the alternative hypothesis, which claims that there is at least one stationary series in the panel. The tests results are illustrated in the Table 1.

Table 1. *Unit root test results*

Series	Levin, Lin and Chu	Im, Pesaran and Shin	
		Level	First difference
Lint	-2.24346 (0.0124)**	-0.41506 (0.3390)	-5.59572 (0.0000)*
GDP	-2.17355 (0.0149)**	0.11307 (0.5450)	-1.55735 (0.05)**

Note: Numbers in the parenthesis show the *p*-values.
*Significant at the 1% level. ** Significant at the 5% level.

The test results, presented in the Table 1, exhibit that both variables are stationary at level $I(0)$ when the Levin, Lin and Chu unit root test is allowed, thus it does not need to take differences of the series to test the Granger causality. Yet, when the Im, Pesaran and Shin method is considered, both variables are not stationary at level, but they become stationary after taking first differences of the variables.

This study uses Dumitrescu and Hurlin's (DH) Panel causality to observe the relationship between two series. The DH test in different lag lengths is presented in the Table 2.

Table 2. *Results of DH causality test*

	K=1		K=2	
Null hypothesis	W-Stat.	Zbar-Stat	W-Stat.	Zbar-Stat
LINT. does not homogenously cause LGDP	0.12773	-1.31987	1.41645	-0.82005
LGDP does not homogenously cause LINT.	3.48985	2.81862*	5.74818	2.25553**

Note: K shows the lag lengths.
*Significant at the 1% level. **Significant at the 5% level.

The DH test results given in the Table 2 indicate that a unidirectional causality exists from LGDP to LINT, which is the percentage of individuals using the internet. This conclusion confirms our second hypothesis, which we have already written. So the increase in GDP stimulated the use of the internet.

The cross-sectional dependence is examined and the empirical results are given in the Table 3. According to the results, the null-hypothesis that no cross-sectional dependence exists among countries is rejected for all tests. This conclusion means that if a shock occurs in one sample country, it may in turn have a spillover effect on other countries. It is a fact that internet has not only dispersed quickly from cities in a country but also has had increasingly significant effects on neighbouring countries.

Table 3. *Cross-sectional dependence*

Statistics	*P-value*	
Cross-sectional dependence		
BP_{LM}	185.3752*	0.0000
$Pesaran_{LM}$	30.01*	0.0000
$Pesaran_{CD}$	4.4679*	0.0000

Note: *indicates significance at 1 % level.
BP_{LM} – Breusch-Pagan LM test.
$Pesaran_{LM}$ – Pesaran scaled LM test.
$Pesaran_{CD}$ – Pesaran cross-sectional dependence.

4. Concluding remarks

In this study, the relationship between internet use and economic development is examined using the Dumitrescu and Hurlin (DH) panel causality test for some selected Asian Countries. The DH test results indicate that a unidirectional causality exists from GDP per capital to internet use. These findings confirm the second hypothesis presented, which postulates that increase in GDP per capita can stimulate internet use because less developed and developing countries do not have proper telephone infrastructure, which require high levels of investments.

In addition, the cross-sectional dependence is examined using LM test of Breusch and Pagan and CD-LM and CD test of Pesaran. The results suggest that the null-hypothesis, no cross-sectional dependence exists among countries, is rejected for all the tests. This conclusion means that if a shock occurs in a one sample country, it may have spillover effects on other countries.

Future studies may examine geographic inequality in internet use and economic development for a country or a group of countries.

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Financial sector development and the poor in developing countries: revisiting the access to finance channel

Atul MEHTA
SRM Institute of Science & Technology, Chennai, India
fl1atulm@iimidr.ac.in
Joysankar BHATTACHARYA
Indian Institute of Management Indore, Indore, India
joysankar@iimidr.ac.in

Abstract. *With the help of thorough literature survey, the present study proposes that formal financial services by commercial banks in the developing countries are primarily suitable for the non-poor population and hence acts as a medium-direct channel of financial development to affect the poor whereas the semi-formal financial services by microfinance institutions specifically target the poor in developing countries and thus act as a direct channel. The paper also documents the divergent outcomes of lending through MFIs on the poor in rural areas and explains the coexistence of formal/semi-formal and informal financial markets. The paper further suggests that the future research in the area of finance-poor nexus may focus on providing comparative empirical evidence with respect to the effect of formal, semi-formal and informal finance on the poor in developing countries including the South Asian region. The result of such comparative studies would be of interest to all the key stakeholders in the development finance arena.*

Keywords: financial sector; South Asia; poverty; inequality; bank credit; microcredit; economic growth.

JEL Classification: G21, O16, O18, O53.

1. Introduction

The relationship between financial sector developments (FSD) and the poor in developing countries has received much attention from academics, practitioners, and policymakers in recent times. The existing two key channels of FSD which affect income inequality and poverty levels are economic growth (the indirect channel) and the access to finance channel (the direct one). However, the poor people's access to formal financial services offered by banks in developing countries is very limited forcing them to use informal sources of finance which are expensive as well as risky. Information asymmetry and high fixed costs of borrowing act as the key barriers to poor people's access to formal finance (Stiglitz, 1999). Also, financial institutions evaluate prospective clients on their entrepreneurship and lend those who have highest chances of successful repayment (Agenor, 2004) and thus primarily benefit the better-off. During the last four decades, microfinance institutions (MFIs) have emerged as a credible answer to the small financial needs of the poor by providing them access to a range of financial services such as microsavings, microcredit, micro-insurance, payment facility, etc. often to very low-income groups or households, who otherwise remain excluded by formal financial institutions (Kurmanalieva et al., 2003). MFIs use innovative ways of providing financial services to the poor who usually face significant constraints in obtaining credit from traditional banks (Besley and Coate, 1995). Microfinance has been widely recognized as an effective tool for alleviating poverty (Barr, 2005; Hudon, 2009) by governments, non-governmental organizations (NGOs), banking community, national and international donor organizations, etc. Across developing countries, microfinance has gained much of the attention of policymakers and the sector too has witnessed tremendous growth.

One of the key objectives behind launching the microfinance programme across developing countries was to mitigate the imperfections in the credit market and safeguard the interests of poor borrowers who are charged usurious interest rates by the moneylenders (Meyer, 2002). However, theory suggests that the informal sector's market structure and the formal/semi-formal sector's repayment schedule play a key role in describing the response of expansion in formal credit on the interest rates in informal sector (Hoff and Stiglitz, 1993, 1997). MFIs fix a very frequent and tightly structured repayment schedule for its poor borrowers. As a result, the borrowers find it difficult to invest the borrowed money into projects that have long gestation period as the repayment begins long before the return on investment is realized. The tight repayment schedule forces them to borrow from informal lenders to make the repayment of microloans on time and to invest some part of it in addition to the loan obtained from MFIs.

Among the developing countries, the South Asian region assumes great importance as the region is experiencing an overall high economic growth since 2003 and a whole lot of efforts are being put in the financial sector in order to make finance work for the poor. Although growth in South Asia slowed to 6.5 percent in 2017, it is expected to accelerate to 6.9 percent in 2018. However, an underdeveloped financial sector appears as the major challenge to the growth story in the region. While 46% of adults in the region have a bank account, the regional variation is significant with 83% of adults in Sri Lanka having a bank account, whereas less than 15% adults with a bank account in Afghanistan and Pakistan.

Thus, the region today is known for its high growth rates accompanied by high poverty levels. It remains home to about 1.6 billion people of which about one-third are poor living for less than USD 2 per day.

The failure of the financial sector in South Asia to include the low-income households led to the emergence of Cooperative Credit Societies Act in 1904. However, certain controls limited the ability of cooperative societies to serve the purpose and the cooperative movement failed miserably in the region which resulted in bank nationalisation in the 1970s and the emergence of microfinance sector in Bangladesh. The objective of all the three initiatives – the Cooperative Credit Societies Act, the bank nationalisation, and the launch of microfinance was to provide access to formal financial services to the low-income households or the poor in the region. Despite the fact that majority of low income households in South Asian countries reside in rural areas, the banks have a reasonably strong presence only in urban areas limiting the access to formal financial services by the rural poor. Even the strong presence of bank branches in rural areas has not been able to provide easy access to formal financial services to the poor in countries such as India and Sri Lanka.

Following the impressive growth of microfinance in Bangladesh, other countries in the region also joined the rally and developed the microfinance sector. Since then, the microfinance sector in South Asia has experienced exceptional growth and today has about 75 million active borrowers and 24.32 billion USD of gross loan portfolio (MIX market database). About 54 percent of the global active borrowers of microfinance are from South Asia region. However, owing to the tremendous demand for microfinance in the region (approx. 50 percent of the global demand), the outreach is estimated at less than 10 percent of the total demand, including less than 3% in Pakistan and 2% in Afghanistan. In India alone, more than 300 million potential clients still lack access to financial services.

With the help of thorough literature review, this paper proposes that the formal financial services by the commercial banks, which are considered to have a direct effect on the poor in developing countries, are predominantly availed by the non-poor and urban households and hence their benefits accrue primarily to the non-poor households. Thus, formal credit by banks is a medium-direct channel to affect the poor. On the other hand, the semi-formal financial services, i.e., microfinance, by MFIs provide dedicated financial services specifically targeting the poor and thus act as a direct channel of financial sector development to affect the poor. The paper also documents that while MFIs core objective is to reach out to the poor and the underserved population, their failure in doing so for various reasons results in the existence of informal moneylenders who not only lend their own savings to the poor at exorbitant interest rates but also borrow from formal sources for further lending to the poor. The paper concludes that the future studies with respect to the effect of financial sector development on the poor need to assess the effect of each channel of FSD separately and provide a comparative evidence for the same especially for the South Asian region which is characterized as having a diverse financial sector accompanied with high poverty levels. The result of such comparative studies would be of interest to all the key stakeholders in the development finance arena and would help them take more informed decisions.

2. Review of literature

2.1. Financial sector development, economic growth, and the poor: Theory and evidence

The theory with respect to the emergence of the link between finance and economic growth can be traced back in 1934 when Schumpeter suggested that finance has the potential to boost growth in an economy (supply led hypothesis) followed by Goldsmith (1969), Greenwood and Jovanovic (1990), and McKinnon (1973) who also suggested that finance is the prerequisite for growth. However, Robinson (1952) proposed the demand led hypothesis and argued that enterprises play a leading role and finance merely follows. The empirical studies testing the link between finance and growth have mostly favoured the supply-led hypothesis (Arestis and Demetriades, 1997; Beck et al., 2000; Bordo and Rousseau, 2012; Demetriades and James, 2011; King and Levine, 1993; Rousseau and Watchel, 1998, 2011). However, a few of the recent works that doubt the potential contribution of finance in economic growth argue that finance may impede growth (Arcand et al., 2012; Kneer, 2013).

Extending the finance-growth link, researchers have also attempted to examine the indirect link between financial development and the poor through economic growth. The theory in this respect suggests that finance benefits the poor when it facilitates economic growth which in turn increases the income and consumption levels of the poor. Such an indirect effect of financial development on the poor is observed when the growth proportionately benefits the poor along with the non-poor population. The various channels through which the beneficial effects of growth are passed on to the poor include creation of more jobs, reduction in wage differentials between skilled and unskilled workers at a certain phase of development which benefits the poor (Galor and Tsiddon, 1996), increased tax revenues which results in higher social spending which benefits poor and also allows them to invest in human capital (Perotti, 1993), and increased capital accumulation that facilitates availability of more funds for investment for the poor (Aghion and Bolton, 1997). A few recent cross-country and country level studies have also pointed out that FSD positively affects the poor by bringing structural changes in the economy which increases employment opportunities (affects labour market) and reduces poverty and inequality (Ayyagari et al., 2013; Beck et al., 2010; Gine and Townsend, 2004; Pagano and Pica, 2012).

The two conflicting theories in this regard are the Kuznets's inverted-U hypothesis postulated by Kuznets (1955/1963) and the "trickle down" theory. While the former suggests that as economy grows, income inequality increases at the early stage of development and reduces at a later stage of industrialization; the latter suggests that growth reduces inequality through creation of jobs and other economic opportunities for the poor people (Todaro, 1997). Despite conflicting theories, several researches have reached to a consensus that higher rates of economic growth result in rapid poverty/inequality reduction over a longer period of time (Datt and Ravallion, 1992; Dollar and Kraay, 2002; Dollar et al., 2016; Klasen, 2004; Kraay, 2006; Loayza and Raddatz, 2010; Ravallion and Chen, 2007).

Thus, a robust amount of evidence is available that supports the poverty reducing role of economic growth. This also suggests that if the supply led hypothesis of finance-growth nexus is believed to be true, it may be concluded that financial development reduces poverty and inequality indirectly through its positive contribution to the economic growth.

2.2. Access to formal finance and the poor: Theory and evidence

Theory with respect to access to finance and the poor suggests that well-functioning financial sector benefits the poor directly by providing access to formal financial services to the poor who lack resources to fund themselves or collateral to obtain a bank loan because of information asymmetries (Banerjee and Newman, 1993; Galor and Zeira, 1993). Poor benefit from access to finance by investing the borrowed funds into profitable small-business opportunities and human capital formation such as education for their children (Levine, 2008). Financial development also helps poor to make use of saved and borrowed money in times of sudden economic crisis (Rosenzweig and Wolpin, 1993). A large number of empirical studies using different samples and methodologies support the view that access to finance benefit the poor (Akhter and Daly, 2009; Ang, 2010; Beck et al., 2007; Burgess and Pande, 2005; Honohan, 2004; Jalilian and Kirkpatrick, 2005; Odhiambo, 2009).

Greenwood and Jovanovic (1990) found evidence for the existence of a financial Kuznet's curve which suggests that as financial sector develops, inequality increases in the early stages of financial development and reduces at a later stage. The same theory was later confirmed by Clarke, Xu and Zou (2006) and Jalilian and Kirkpatrick (2005) while analyzing the relationship between financial development and income inequality. Contradicting the beneficial effect of financial development on the poor in short or long-run, Rajan and Zingales (2003) claimed that financial development increases inequality. Akhter and Daly (2009) and Jeanneney and Kpodar (2011) suggest that excessive financial development results in financial instability which negatively affects the poor. Another view suspects the ability of developed financial sector to benefit the poor and argues that the rich and those with political influence largely benefit (Haber, 2005). A study conducted by Mehta and Bhattacharya (2017a) suggests that FSD in India has been pro-urban in nature benefitting the urban population more than their rural counterparts and resulting in declining rural-urban consumption ratio. However, another study by Mehta and Bhattacharya (2017b) suggests that within rural India, bank credit and microcredit have been beneficial for the poor resulting in reduced poverty ratio across states.

Economic theory suggests that the key reason behind the reluctance of banks in serving the rural poor is information asymmetry. The lenders have least information about the repayment capacity of the borrowers in rural areas (Chowdhury, 2010). In order to cover the risk of any likely default, they charge high interest rates from the rural clients (Akerlof, 1970). In such case, good quality borrowers are not willing to take up loan on such high interest rates and find out other sources of obtaining credit and the lender ends up with lending to the poor quality borrowers who are likely to default. The lenders are also not able to track the use of the borrowed funds or the actual return earned by the borrower out of the invested money. Moreover, the transaction costs of serving the rural poor, who need small loans and transact frequently, are quite high. All these issues together have resulted in the failure of formal financial institutions in rural areas and the exclusion of the poor

from these markets. Despite banks and cooperative societies having a wide network of branches, their performance in terms of reaching out to the poorest and serving their needs remain very low (Imai et al., 2010). Another argument says that profitability or financial sustainability of the banks is not the only issue to be considered while banking the poor. The bigger challenge remains the suitability of the standard consumer financial services to the needs of the poor. Thus, whether the direct access to finance provided by financial institutions reaches and affects the poor is still an open question.

As per CGAP Donor brief by Pearce (2003), 60-80 percent of the population in developing countries lives in rural areas with a wide dispersion. There exists a huge gap in the availability of physical, institutional, and IT-related infrastructures with very low levels of wages and education. Agriculture, which is mostly dependent on monsoon, is the main occupation and the incidence of income diversification is very low for small poor farmers. For the same reasons, formal financial institutions perceive rural areas as more costly and risky compared to their urban counterparts and tend to focus on financing the urban clients. Banks have also been found collecting savings from the rural areas and lending the same either to the large urban clients or investing in government bonds and treasury bills. Also, formal financial institutions in rural areas, sometimes lend based on social criteria instead of economic criteria. The borrowers' creditworthiness in such cases is avoided which eventually increases the NPAs of the banks in the event of non-payment of the borrowed funds.

As per the Global Financial Inclusion (Global Findex) database – 2014, on the demand side, the poor state of availing banking services by the households in developing countries may be estimated by the fact that only 54 percent of the total households and 43 percent of the poorest 20 percent households – the poorest income quintile – own a bank account with the unbanked living predominantly in rural areas. On the supply side, the number of bank branches per 1 lakh adults in low and middle income countries is as low as 8.6 compared to 21.2 in the high income countries in 2015.

2.3. Access to semi-formal finance and the poor: Theory and evidence

Like non-poor population, poor people do need and use a variety of financial services such as deposits, credit, insurance, etc. to invest in business opportunities or to meet sudden large expenditure or to fight economic shocks. The failure of commercial banks in providing access to mainstream financial services to the poor attracted the interest of policymakers in the potential role of financial products and services dedicated to poverty alleviation in developing countries. During the 1970s, the way to develop access to credit dedicated to the underserved through microcredit was lead by few pioneers such as the Badan Kredit Desa village banks, the Bank Dagang Bali in Indonesia, and Grameen Bank in Bangladesh. MFIs emerged with innovative lending models which included features that distinguish the MFI lending from traditional bank lending such as group lending with self-monitoring, progressive lending and provision of small loans with repayment in small instalments. Such features were suitable for the low-income clients, involved high recovery rate and helped MFIs overcome the problem of adverse selection, moral hazard and strategic default being faced by the traditional banks. Poor with entrepreneurial skills were provided loans to invest in profitable business opportunities, acquire and accumulate assets,

enhance income and welfare outcomes. However, a lending model which was based solely on credit soon invited criticism with respect to the financial sustainability and outreach of MFIs in 1980s. This resulted in the discovery of the saving potential of the poor and the extension of microcredit to microfinance comprising savings, credit, insurance, and other financial products suitable for the poor. This led to a significant improvement in the financial markets of many developing countries in terms of market determination of interest rates, increased investment efficiency, increased banking competition, and availability of wide range of financial products which proved to be the foundation of strong growth of microfinance institutions across developing countries.

Microfinance institutions, during the last four decades, have emerged as the pioneers in providing financial services to the poor in developing countries. They provide micro loans to the poor which are easy to repay and instead of asking for collateral, they divide the risk of lending by group guarantee. The loan size of the borrowing group is increased on the basis of the repayment record of the previous loan. The potential clients are reached out by the MFI representatives allowing the lender to know more about the borrower and their family, their job, living conditions etc. (Roodman and Qureshi, 2006). This also helps build mutual trust, speed transactions and enforce compliance.

Microfinance, today, involves provision of financial services such as credit, saving, deposit, insurance and repayment services to the poor who do not have access to conventional formal financial services because of their inability to offer collateral (Ledgerwood, 1998; Littlefield et al., 2003; Robinson, 2001). The model has proved that serving the poor is profitable as well as sustainable. In countries such as Indonesia and Bolivia, the portfolio quality as well as the stability of MFIs is found to be better than that of commercial banks in turbulent times. As per the Microfinance Information eXchange (MIX) database, the global microfinance sector has recorded a double-digit growth with a portfolio of USD 87 billion and 111 million clients in 2014, and an estimated growth of 10% in outstanding portfolio and 15.8% in borrowers in 2015. The microfinance institutions in South Asia, the pioneer of the microfinance movement in world, are serving 72.6 million borrowers and 35.21 million depositors in the region. The average debt per borrower amounts to USD 2762.2 and the average deposits amount to USD 1922.7 in the region.

Theory suggests that microfinance has the potential to correct the market failures resulting from market imperfections, asymmetric information, and the high fixed costs involved in small-scale lending (Green et al., 2006). Access to microcredit empowers poor economically and socially, lifting them out of poverty (Yunus, 2007). It enables the households to diversify their income, acquire productive assets, better education and health standards, smoothen consumption, and fight economic shocks and fluctuations (Abou-Ali et al., 2010; Banerjee et al., 2015; Karlan and Zinman, 2010; Littlefield et al., 2003; Roodman and Morduch, 2014). However, few recent evidence document the impact of microfinance being divergent between positive, no impact and even negative impact (Angelucci et al., 2013; Ganle et al., 2015; Van Rooyen et al., 2012). The impact of microfinance is dependent on context and factors such as population density, attitudes to

debt, group-cohesion, enterprise development, financial literacy, financial service providers and others (Armendariz and Morduch, 2005).

2.4. Informal finance and the poor: Theory and evidence

Rural financial markets in developing countries are characterized by the existence of both formal and informal finance on account of weak legal enforcements and low income levels or lack of collaterals (Germidis et al., 1991; Nissanke and Aryeetey, 1998). While banks enjoy superiority in savings mobilization, informal moneylenders are better at gaining superior information about poor borrowers. Since banks have very less information about the behaviour of the poor borrowers as well as the usage of the borrowed funds by them, they require them to provide collateral for obtaining loans failing which the poor borrowers resort to informal moneylenders. Poor borrowers are, thus, found to be borrowing either from formal financial institutions or from private moneylenders or both (Banerjee and Duflo, 2007; Das-Gupta and Nayar, 1989). In the event of insufficient loan amount being lent by the formal institutions, the poor turn to private moneylenders for borrowing some additional amount which makes it possible for them to invest in productive assets. The co-existence of formal and informal lenders may either be in the form of substitutes or complements to each other. In case of substitutes or horizontal integration, formal financial institutions and informal moneylenders compete with each other in the rural financial markets and the borrowers first try to obtain credit from the formal ones first which offers credit at comparatively low rate of interest. Any unmet demand from the formal institution as a result of credit rationing or some other reason is then met by the informal sources. In this way, they are able to borrow from both the sources (Bell, 1990; Bell et al., 1997; Jain, 1999). Whereas in case of complements or vertical integration, the informal lenders borrow from formal sources and re-lent it to the poor. Thus, poor only borrow from the informal sources (Bose, 1998; Hoff and Stiglitz, 1997).

Any change in the formal financial sector would not only affect the availability of credit in the informal market but would also have an effect on the interest rates and would thus affect the poor based on the structure of informal credit market whether it is monopoly, monopolistic competition, or perfect competition (Bose, 1998; Floro and Ray, 1997). Also, local moneylenders have very limited availability of funds for lending as compared to banks and they seek access to funds from banks in order to be able to meet the credit demand of the local population (Conning and Udry, 2007). Moneylenders use two sources for re-lending to the poor; one is their own savings and other is the government-subsidized funds (Bhaduri, 1987; Onchan, 1992; Siamwalla et al., 1990). Availability of formal credit at subsidized interest rates induces entry of new moneylenders in the informal market which reduces the market for each moneylender. A reduced market increases the marginal cost of lending for each player resulting in higher interest rates being charged by them. This negatively affects the poor borrowers. Increased entry of moneylenders in the market may provide increased options of borrowing to the poor, in the event of default, and may also adversely affect their incentives to repay. This may require moneylenders to spend more and put in more efforts on enforcement in order to ensure timely repayment. This raises the cost of lending to an additional borrower and hence with an increase in cost the interest rates for the poor borrowers may rise.

Thus, the development of formal financial sector in a region may result in an expansion of lending through informal sources when the relationship between formal and informal lenders in the region is complementary. Informal lenders, in such a case, have greater access to funds from formal sources which they re-lent to the poor at high interest rates. One of the initiatives taken by the government in less developed countries to address the problem of high interest rates being charged by the moneylenders to the rural poor is 'cheap credit policy' under which credit at subsidized interest rates is provided to the agricultural sector by formal financial intermediaries. However, despite such policies, informal moneylenders do dominate the rural financial markets with the interest rates remaining relatively unaffected (Basu, 1994; Bell, 1990; Hoff and Stiglitz, 1990; Siamwalla et al., 1990).

3. The poverty alleviation toolbox

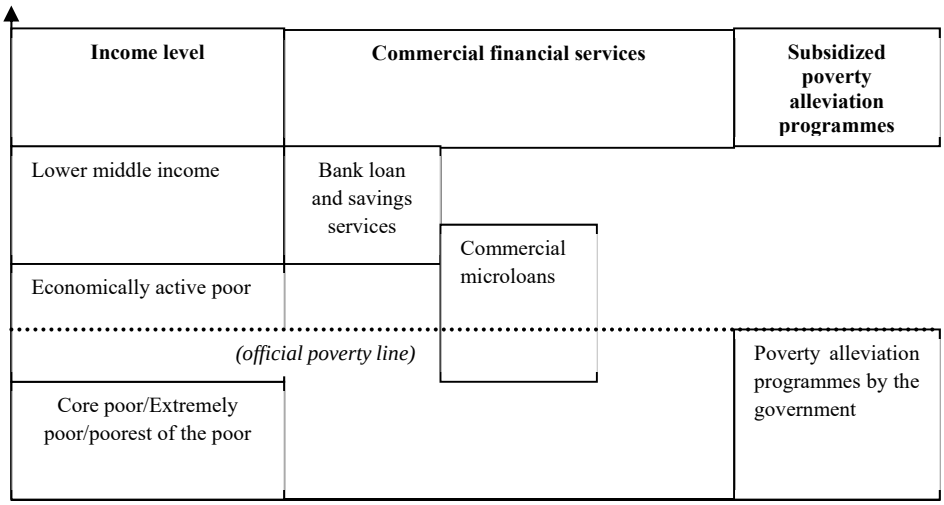
Robinson (2001) in his work "The microfinance revolution – sustainable finance for the poor" has developed a poverty alleviation toolbox for the financial institutions to lend to the poor profitably. There is a huge demand for microfinance services among the poor and such demand can be served profitably and on a large scale. The author proposes that standard financial services offered by commercial banks are suitable for non-poor who belong to the lower-middle income and above category. He further argues that lower-income people who lack access to formal financial services may be divided into extremely poor and economically active poor group (Figure 1). The extremely poor group include individuals who do not have sufficient resources to meet their basic consumption needs or household needs. This also includes individuals who cannot work because of age or other health concerns. Because such individuals have food and shelter as their urgent needs to satisfy, they require tools distinct from financial services (such as employment opportunities) to come out of poverty.

Such individuals, in the absence of appropriate economic opportunities, when provided credit, are unable to make efficient use of it resulting in defaults in making payment of principal as well as interest amount. Thus, neither borrower nor the lender is going to benefit out of such a deal. Moreover, this may also result in extremely poor individual falling in the poverty trap even badly and reduced capacity of the lending institution. Such a fraction may be helped by government by developing policies that promote self-employment, create employment opportunities, or provide skill training and enabling them to make proper use of the financial services.

On the other hand, the economically active poor include microenterprises, marginal farmers, low-income individuals, and poor households. Such individuals are working (self-employed or otherwise), own some property, and are capable of working. They too are unable to satisfy their basic household needs because of fluctuating income due to informal or seasonal employment. This group is the target group of microfinance institutions. Therefore microfinance acts as a complement and not a substitute to the welfare programmes launched by government for employment generation for the extremely poor. The coordination between commercial banks, microfinance institutions, and welfare

programmes to alleviate poverty is shown in Figure 1 below. The individuals belonging to extremely poor and economically active poor group are below the poverty line.

Figure 1. *Poverty alleviation toolbox*



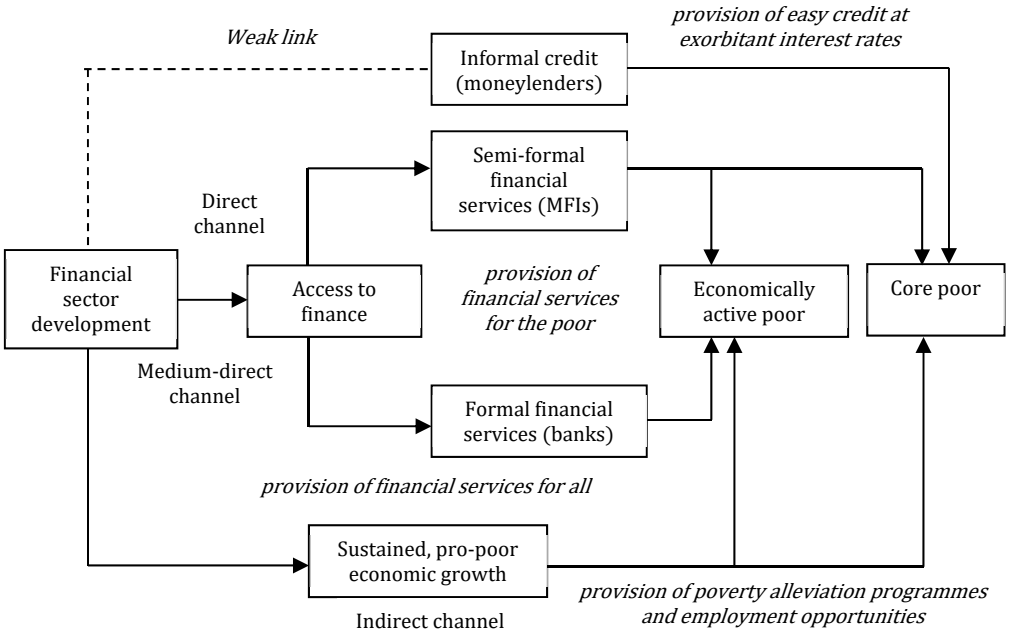
The basic difference between economically active poor and higher income individuals is their socio-economic and commercial characteristics as well as the volume of their commercial transactions. The customers of microfinance do not consider cost of loan as important as the service, speed, and agility. They need the documentation process of loan to be simple and disbursement of loan to be timely. In terms of savings, an attractive rate of interest is less important whereas unrestricted access to savings account with least requirements is more important an issue.

4. Channels of FSD and the poor

Our discussion so far concludes that the financial markets in developing countries including the South Asian region comprise three key segments: formal markets (banks and financial institutions); semi-formal market (microfinance institutions and cooperatives) and informal market (moneylenders, employers, friends and relatives). The basic function of financial institutions is mobilization and allocation of funds between households, individuals, and firms. However, the difference in the three categories of markets lies in their characteristics. In the formal market, financial institutions mobilize savings and lend to those who need financial resources and who are capable of making the repayment. Borrowing involves a certain transaction cost and interest rates are determined by market forces. The semi-formal financial markets mostly serve to the financial needs of the poor households. They are characterized by high interest rates with frequent and tightly scheduled repayment schedule. Informal markets, on the other hand, are more popular among the poor across developing countries because of their ability to reach out to the poor in a better way. They are characterized by very low transaction cost with high interest rates. Such a market exists because poor find it easier to borrow from them without much formality.

The literature review with respect to the link between financial development and the poor in developing countries so far suggests that the access to finance channel mostly considers the economy wide measure of financial sector development, i.e., credit by commercial banks. The literature also suggests that commercial banks do not adopt a targeted approach for the poor nor do their products and services suit the needs of the poor. Lending to the poor is also detrimental to the financial sustainability of the formal financial institutions. On the other hand, microfinance institutions were created with the sole objective of providing access to financial services dedicated to the poor suiting their needs. Thus, a comparison between the two institutions, i.e., commercial banks and microfinance institutions, in terms of their lending model and target client suggests that access to financial services provided by commercial banks acts as a medium-direct channel to affect the poor whereas access to financial services provided by MFIs acts as a direct channel. Financial sector development, thus, affects the poor through three channels: indirect, medium-direct, and direct (Figure 2). Indirect link flows through its impact on economic growth (when the growth is pro-poor). The impact is medium direct when banks provide access to full range of formal financial services primarily to the lower-middle income and above group (non-poor) which provides employment opportunities to all including poor and thus helps everyone enhance their income levels. Financial services have direct impact on inequality and poverty when the microfinance services are provided directly into the hands of poor by microfinance institutions and thus enable them to enhance their income and consumption levels. Lending by informal market agents such as moneylenders, friends and relatives to the poor may also be considered as a weak link of FSD since the informal lenders to borrow from formal financial institutions to lend it further to the poor at higher interest rates. However, such markets are not regulated by the government.

Figure 2. *Channels of financial sector development and the poor*



5. Conclusion

This paper examines the literature that establishes relationship between financial sector development and the poor in developing countries. The existing literature highlights two key channels of FSD that affect the poor: one is indirect – which flows through economic growth and another is direct: access to finance channel. The present study doubts the potential role of traditional commercial banks in enhancing access to formal financial services to the poor. Moreover, a lending model that is meant to serve the poor is neither financially sustainable for the commercial banks nor the financial products and services offered by them are suitable for the poor. Also, commercial banks are found to be serving predominantly in urban areas leaving the rural areas underserved where more than 75 percent of the poor live. The paper further argues that microfinance institutions provide dedicated small-scale financial services to the poor and are found to have positive effects on the poor in terms of access as well as use of unconventional financial products and services. However, the tight repayment schedule and lending in small amounts has resulted in the existence of informal credit market along with formal and semi-formal financial markets in rural areas across developing countries.

Our paper suggests that mainstream formal financial services offered by traditional commercial banks act as a medium-direct channel of FSD to affect the poor whereas the unconventional semi-formal financial services offered by MFIs act as a direct channel of FSD and serve and benefit the poor in an improved manner. We, thus, suggest that future research on the finance-poor nexus need to assess the impact of each channel of FSD separately and provide comparative empirical evidence with respect to the effect of financial services offered by commercial banks and MFIs across regions and countries. Such evidence is all the more relevant for the South Asian region where not only the financial sector is growing leaps and bounds but poverty and inequality is also a major source of concern. The existing studies in the region have attempted to analyse the link between access to finance and the poor using economy wide measures of FSD such as money supply, private credit, and market capitalization. While such evidence provide important information on the effect of financial sector as a whole, the effect of different segment of the financial markets, which have different lending models, remain unexplored. From policy perspective, such evidence is expected to give more meaningful insights to the policymakers and national and international funding institutions allowing them to make better informed decision with respect to channelizing funds to developing economies.

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Impact of unbalanced economic growth to dynamic trade specialization

Putri AYU
Universitas Gadjah Mada, Indonesia
Putri.ayu@mail.ugm.ac.id
Maizul RAHMIZAL
Universitas Gadjah Mada, Indonesia
Maizul.rahmizal@mail.ugm.ac.id
IRWANDI
Universitas Gadjah Mada, Indonesia
Irwandi.91@mail.ugm.ac.id

Abstract. *This paper aims to analyze the influence of Unbalanced Economic Growth on Dynamic Trade Specialization. We analyze the effects of unbalanced economic growth to the dynamic trade specialization with the econometric model. The countries of Argentina, Brazil, Paraguay and Uruguay are the units of analysis in this research. The results obtained the country Argentina and Brazil possesses positive relations and significantly affect dynamic trade specialization, but not for the country Paraguay and Uruguay. In addition, the world unbalanced economic growth has a relationship that does not significantly affect the Dynamic trade specialization of all countries selected in this research.*

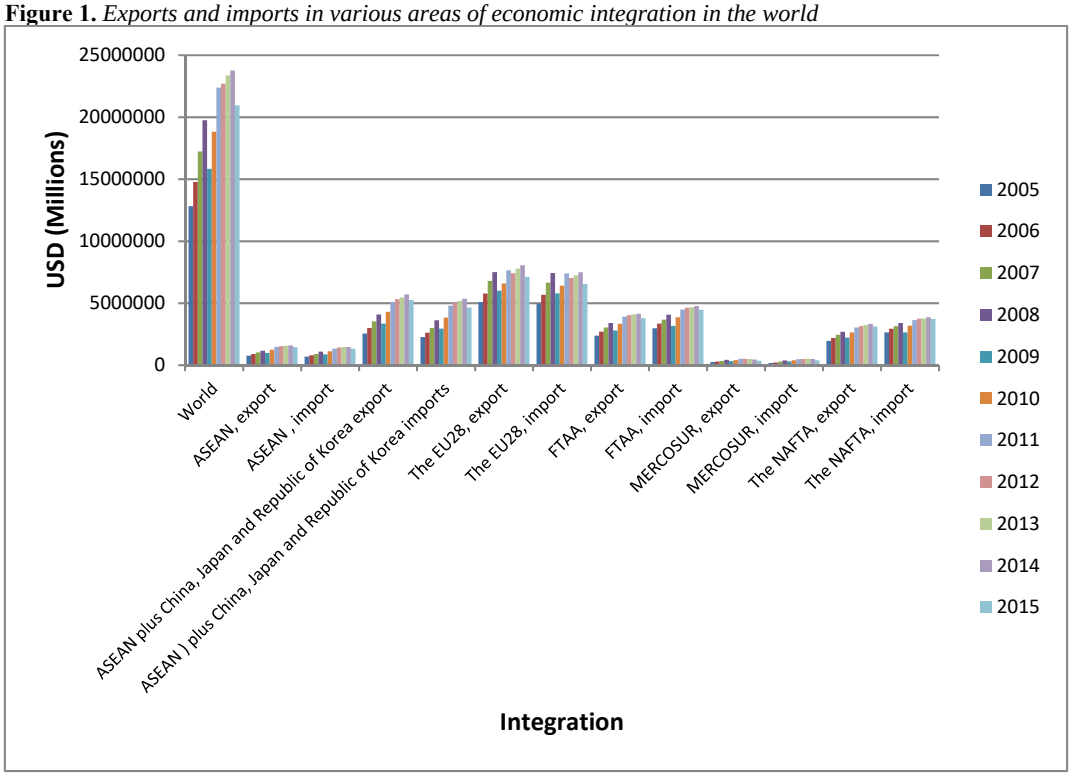
Keywords: unbalanced economic growth, dynamic trade specialization, RSCA, GDP.

JEL Classification: F10, F13, F19.

A. Introduction

A searcher who consider a country's comparative advantage in the dynamic sense rather than static one where the big attention aimed at the change in the side of the supply or production. World prices and the common changes in technical efficiency which is reflected in the GDP share is the variables that affect the dynamics of comparative advantage (Redding, 2002). In addition, the dynamics comparative advantage influenced by the role of trade, the frictional input in international trade and investment flows substantially to geography, institutions, transports and information cost (Grossman and Helpman, 1991). Widodo and Shaleh (2010) also examine the impact of unbalanced economic growth upon dynamic trade specialization.

Figure 1. *Exports and imports in various areas of economic integration in the world*



Source: UNCTAD stat (2017), author's calculation.

Figure 1 shows openness of trade in various integration that occurred in the world, visible exports and imports *Común Mercado del Sur* - Mercosur (Southern Common Market) is smaller than the other integration like ASEAN, ASEAN+3, EU28, and the NAFTA. In average years 2005-2015 the distribution of exports and imports of Mercosur to the world is just 2.04% and 1.932%.

In line with the integration process in the world market, the critical issue is on a country's specialization and dynamic change in comparative advantage, this paper aims to examine the impact of unbalanced economic growth upon dynamic trade specialization. Argentina, Brazil, Paraguay, and Uruguay are chosen for case studies. In session 2, explains

about the framework of the theory and empirical studies related to this research. The session 3 discusses methodology and data used, the session 4 shows results and analysis, and last is the conclusion that will be discussed in the session 5.

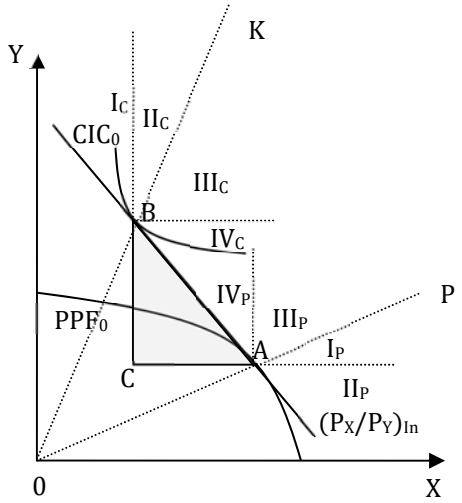
B. Theoretical framework and empirical studies

Theoretical framework

In the Bowen (1998) a small country, a country have PPF (production possibility frontier) and a community indifference curve (CIC). With the economic growth, The PPF shifts outward, allowing the country 0 choose different production combinations of X and Y. The various new possible equilibrium in production are located within the region fixed by the mini-axes drawn through the original production equilibrium at point A. The economic growth is product-neutral, when productions of the export good and the import competing good have increased in the same rate or if the new equilibrium in production lies on the straight in OP. If the new equilibrium lies in region $I_{p,}$ it is *pro-trade-biased* (reflecting the relatively greater availability of export good). In region II_p is *ultra-protrade-biased*, in region III_p is *anti trade biased* (reflecting the relatively greater availability of import good), and in region IV_p is *ultra anti trade biased* (Widodo and Shaleh, 2010).

In addition, the consumption equilibrium impacts due to the economic growth (Widodo and Shaleh, 2010). The balance of the consumption is at the point of origin B. The straight line OB is a new equilibrium point, so consumption of both goods X and Y will increase proportionally and the consumption trade effect will be *neutral* (consumer have not changed their relative consumption pattern with growth). If the new consumption equilibrium in region II_c , it is call *Pro trade consumption effect* (reflecting the relatively greater availability of export good), *ultra protrade consumption effect* in region I_c, *anti protrade consumption effect* in region III_c, and *ultra anti protrade consumption effect* in region $IV_{c.}$

Figure 2. *Equilibriums in production and consumption*



Source: Widodo and Shaleh (2010).

Mankiw (2010) said that the changes in technology (i.e. factor neutral, labor saving or capital saving) or the courses of factors of production (i.e factor neutral growth, relatively higher growth in capital or relatively higher growth in labor) can affect economic growth. Todaro and Smith (2011), suggest that balanced and unbalanced growth is the type of economic growth. In Widodo and Shaleh (2010), the shift out of PPF can proportionally or not. A country becomes more or less specialized specialized after the economic growth depend upon the kids of growth (balance or unbalanced).

Empirical studies

Widodo and Shaleh (2010) analyze the impact of unbalanced economic growth upon countries' dynamic trade specialization in ASEAN. He found that the state of Indonesia and Malaysia are significant and positively affect the dynamic trade specialization. Meanwhile the country Korea and Singapore are not significant. Unbalance economic growth world did not significantly affect the dynamic trade specialization. This shows that the unbalanced in the world will not be able to affect the international trade in a country.

Redding (2002) analyzed the dynamics of specialization using disaggregated data on 20 manufacturing industries in seven OECD countries the 1970-1990. His results show how statistical models of distribution dynamics may be used to shed light on a variety of issues relating to specialization dynamics, bringing empirical work the closer to the focus on dynamic comparative advantage evident in range research on trade and growth. He finds substantial mobility in patterns of specialization. Then, over longer time horizons, country-specific changes in factor endowments become more important. But there is no evidence of an increase in countries' overall degree of specialization.

C. Methodology and data

Revealed symmetric comparative advantage

Measurement tools in comparative advantage according to Laursen (1998) is Revealed Symmetric Comparative Advantage (RSCA). The RSCA index starting from the Revealed Comparative Advantage (RCA connectors) or Balassa index (Balassa 1965).

The RCA and RSCA indexes are formulated as follows:

$$RCA_{ij} = (x_{ij} / x_{in}) / (x_{rj} / x_{m}) \quad (1)$$

$$RSCA_{ij} = (RCA_{ij} - 1) / (RCA_{ij} + 1) \quad (2)$$

RCA_{ij} represents revealed the comparative advantage of country *i* for the group of products (SITC) *j* ; and x_{ij} is total exports of country *i* in group of products (SITC) *j*. Subscript *r* represents all countries except country *i*, and subscript *n* stands for all groups of products (SITC) without group of product *j*. To avoid double counting, the country and group of products under consideration is excluded from the measurement so that the bilateral exchange is more exactly represented (Vollrath, 1991; Wörz, 2005; Widodo and Shaleh, 2010).

The RCA index range has a value ranges from zero to infinity $0 \leq RCAij \leq \infty$. Country *i* has a comparative advantage in the group of products *j* if RCA_{ij} greater than one means. On the other hand, a comparative disadvantage in product *j* if RCAij less than one implies that country *i* has. The Revealed Symmetric Comparative Advantage (RSCA) is the index created by Laursen (1998). The index will using when the RCA_{ij} turns out to have values that cannot be compared on both sides of one. The $RSCA_{ij}$ index ranges from negative one to one or $-1 \leq RSCA_{ij} \leq 1$. $RSCA_{ij}$ greater than zero implies that country *i* has a comparative advantage in product *j*. In contrast, $RSCA_{ij}$ less than zero implies that country *i* has a comparative disadvantage in product *j*.

The dynamics of specialization

Econometric Model

An econometric model (3) is commonly used to examine the dynamics of comparative advantage (Laursen, 1998; Wörz, 2005; and Widodo, 2009):

$$_{ij,} = _{i,\ 0\text{-}T} + _{i,0\text{-}T}\ _{ij,0} + _{ij} \qquad (3)$$

where:
$RSCA_{ij,T}$ and $RSCA_{ij,0}$ = the RSCA indexes of country *i* in product *j* for years *T* and 0, respectively.
$_{ij}$ denotes white noise error term.
The coefficient $\beta_{i,0\text{-}T}$ = the existing comparative advantage or specialization patterns have been reinforced or not during the years of observation.

If $\beta_{i,0\text{-}T}$ is not significantly different from one $\beta = 1$, there is no change in the overall degree of specialization. $\beta > 1$ indicates increased specialization of the respective country. Finally, $0 < \beta < 1$ indicates de-specialization; that is, a country has gained a comparative advantage in industries where it did not specialize and has lost competitiveness in those industries where it was initially heavily specialized (Wörz 2005). In the event of $\beta \leq 0$, no reliable conclusion can be drawn on purely statistical grounds; the specialization pattern is either random, or it has been reversed. This equation is conducted for regional or country analysis.

Unbalanced economic growth

The output growth of a specific sectors for period 0-T in country i can be calculated (Widodo and Shaleh, 2010):

$$g_{is,0-T} = (GDP_{is,T} - GDP_{is,0}) / GDP_{is,0} \qquad (4)$$

where:
$GDP_{is,T}$ and $GDP_{is,0}$ are the country i's growth rate of sector s in years T and 0, respectively. The output growth of a specific sector might differ from that other sector. So, the dispersion of output growth of sectors shows the unbalanced economic growth in a country (Widodo and Shaleh, 2010).

To indicate the dispersion of output growth sectors (unbalanced economic growth) Widodo and Shaleh (2010) use the coefficient of variation (CV). Formulation of the Coefficient of variation of the sector output growth for period 0-T as follows:

$$CVG_{0-T} = \frac{\sqrt{(\sum_{s=1}^{n}(g_{is,0-T} - \bar{g}_{i,0-T})^2)/n}}{\bar{g}_{i,0-T}} \quad (5)$$

where:
$\bar{g}_{i,0-T}$ is the country i's average growth rate for the period 0-T. If all sector have the same growth of output (balanced economic growth), the coefficient of variation will equal zero.

Based on model Widodo and Shaleh (2010), estimation regression model to investigate the impact of unbalanced economic growth on the dynamic trade specialization as follows:

$$DS_{0-T} = \mu_0 + \mu_1 CVGD_{0-T} + \mu_1 CVGW_{0-T} + \varepsilon_T \quad (6).$$

$DS_{0\text{-}T}$ = Degree of dynamic specialization ($\hat{\beta}_{0\text{-}T}$) in period 0-T obtained from the estimation of equation (3);
$CVGD_{0\text{-}T}$ = Coefficients of variation of domestic economic growth for the period 0-T;
$CVGW_{0\text{-}T}$ = Coefficients of variation of world economic growth;
μ_0 = constant;
μ_1, μ_2 = coefficient;
ε_T = white noise error term.

If a country (i) and world have a balanced economic growth ($CVGD_{0\text{-}T} = 0$ and $CVGW_{0\text{-}T} = 0$), the degree of dynamic trade-specialization will be constant and equal to μ_0. When a country (i) and world have an unbalanced economic growth ($CVGD_{0\text{-}T} \neq 0$ and $CVGW_{0\text{-}T} \neq 0$), the impact of unbalanced economic growth depends on the estimated coefficients μ_1 and μ_2. The unbalanced economic growth of domestic and the world contribute to decreasing specialization (de-specialization) occurs when μ_1 and μ_2 are negative, and the unbalanced economic growth of domestic and the world contribute to increasing specialization occurs when μ_1 and μ_2 are positive.

The analysis used is the analysis of OLS in form of multiple analysis with the classical assumption must be fulfilled.

Data

Data on export by the 3-digit Standard International Trade Classification (SITC) Revision 3 is data used in this research. the data come from the United Nations Commodity Trade Statistics Database (UN-COMTRADE) that using as indicator to calculate RSCA and data on Gross Domestic Products (value added) by economic activities (sector) taken from the United Nations Statistics Division (UNSD) for period 2000-2015. GDP is divided into seven following sectors: 1) Agriculture, hunting, forestry and fishing, 2) Mining, manufacturing and utilities, 3) Manufacturing, 4) Construction, 5) Wholesale, retail trade, restaurants, and hotels, 6) Transport, storage and communication, 7) other activities.

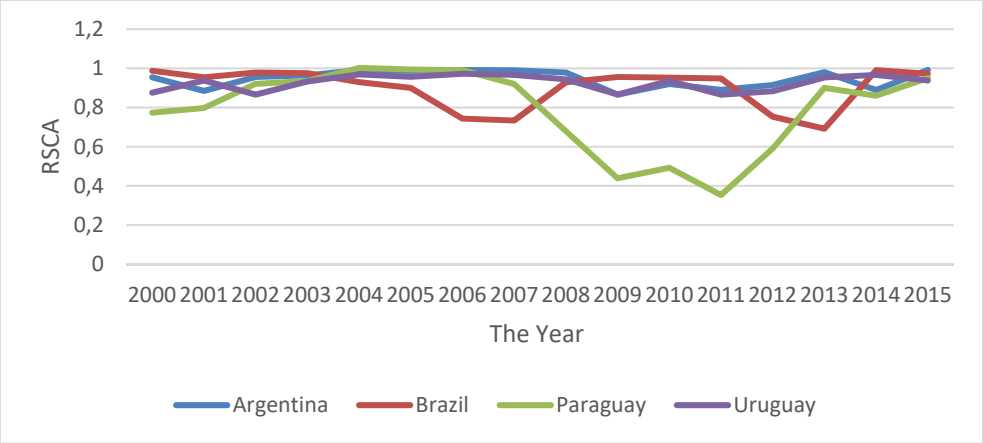
D. Result and analysis

In the picture 4. Show the value of coefficient Dynamic Specialization (DS) for country Argentina, Brazil, Paraguay and Uruguay. This value obtained by similarities (3) in this research. DS is the value of ($\hat{\beta}_{0\,T}$) the period 2000-2015. Gained the ($\hat{\beta}_{0\text{-}T}$) obtained with

simple regression with using SITC Rev 3,3 digits with 237 commodities. It is apparent that all countries have the value ($\hat{\beta}$) smaller than 1 and larger than 0 ($0 < \beta < 1$) indicates de-specialization; that is, a country has gained a comparative advantage in industries where it did not specialize and has lost competitiveness in an industry where it was initially heavily specialized. This implies that all countries show de-specialization process over time. The countries may have the trade-off between specialization in their existing products (with high comparative advantage but facial level low in technology) and specialization in the other products with many potentiality for comparative advantage in the future as the result of high productivity growth.

The global financial crisis that occurred in 2008-2009 was the worst in 80 years. The supreme mortgage crisis in United State eventually manifested into a world-wide financial crisis. No single country is free from the effects, including the countries in Mercosur. This crisis not only affects the financial sector but also real sector. This crisis makes Paraguay more smitten than 3 countries. This shows a more dramatically in the coefficient dynamic specialization on 2008-2014. The decrease means that Paraguay has de-specialized enormously her comparative advantage during that period.

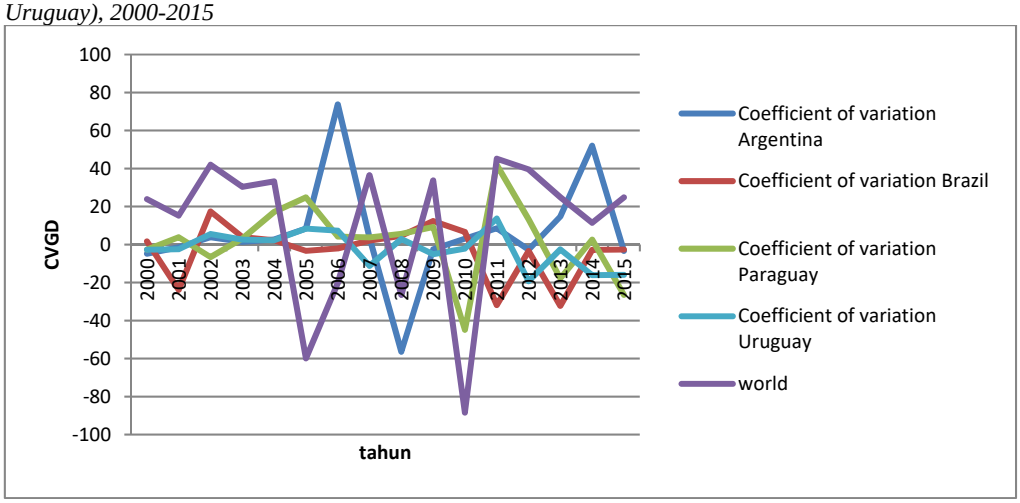
Figure 3. *Trends in Dynamic Specialization (DS), 2000-2015*



Source: UN_COMTRADE (2017), the author's calculation.

Figure 4 shows the unbalanced value of domestic economic growth (CVGD) obtained from the value of the coefficient of variation of Value-added GDP of each country in 7 sectors. The results show that neither Argentina, Brazil, Paraguay nor Uruguay from 2000-2015 has values that are not equal to 0. This means that based on Widodo and Shaleh (2010) and Todaro and Smith (2011), it shows unbalanced economic growth. In addition to domestic Unbalanced Economic growth, the world's economic growth also, unbalanced. Where the coefficient value of world variation is not equal to zero.

Figure 4. *Domestic Unbalanced Economic Growth (CVGD) in Mercosur (Argentina, Brazil, Paraguay, and Uruguay), 2000-2015*



Source: UNSD (2017), the author's calculation.

Based on Bowen (1998) economic growth in a country does not balanced can be caused by the change of the k input (capital) or l (labor) or changes in the technology used in each sector. According to Todaro and Smith (2011) "structural change" from agricultural sector basis toward manufacturing and services cause unbalanced economic growth is because of non-homothetic preference. The consequences of the law Engel, where aggregate consumption of agricultural commodities increases less that proportionally with the growth of per capita income because The relative change in the contribution of each sector to total output Extensive industrialization in Mercosur has also been the main reason for unbalanced economic growth. The innovation (Romer, 1990), the role of technology (Edwards, 1992) and accumulation of human capital (Lucas, 1993) are causing of unbalance economic growth.

Table 1. *Estimation results*

Coefficient	Argentina	Brazil	Paraguay	Uruguay
Unbalanced domestic economic growth (cvdg)	0.0001936*** (0.0005262)	0.0006814** (0.0003032)	-0.0012179 (0.0029154)	-0.0005557 (0.0011969)
Unbalanced world economic growth (cvdw)	-0.0000187 (0.0000209)	1.6100E-06 (0.0000359)	0.0000262 (0.0000853)	-0.0000111 (0.0000165)
Constant	0.9423431** (0.0132893)	0.9145472** (0.0256002)	0.7945173** (0.0587888)	0.9235985** (0.0115728)

Notes: *, **, *** mean statistically significant at the level of significance 1%, 5%, and 10% respectively. Figures in parenthesis () represent standard error

In Table 1 shows the results of the estimation of the econometric model (6) for country Argentina, Brazil, Paraguay, and Uruguay. The value of Constant (μ_0) shows the coefficient dynamic specialization when the domestic economic growth and world economic growth are balanced. Visible all countries have a value smaller than one, this implies that Argentina, Brazil, Paraguay, and Uruguay will have de-specialization if the domestic economic growth and the world economic growth are the simultaneously balanced type. When conditions are balanced, Paraguay would have faster de specialization than Brazil,

Argentina, and Uruguay. Seen from the value of the constant is much smaller than the 3 other countries (0.7945173 < 0.9145472 < 0.9423431 < 0.9235985).

The value of the coefficient μ_1 is the value of domestic Unbalanced Economic Growth (CVGD). It is apparent that the coefficient μ_1 countries Argentina and Brazil worth positive and significant impact on the alpha 1 % to Argentina and 5 % for Brazil. This shows that for the case of countries Argentina and Brazil, their domestic unbalanced sectoral-growth has caused the increase in specialization. The higher unbalanced domestic economic growth, the higher specialized is the exports. This results in line with the research Widodo and Shaleh (2010) who find that Korea, Malaysia, and Indonesia have positive relations between the unbalanced economic growth of trade specialization.

Different countries with Paraguay and Uruguay which is also the one area of economic integration (Mercosur). Domestic unbalanced economic growth in Paraguay and Uruguay have a negative impact and not significant for trade specialization. The higher unbalanced is the domestic economic growth, the less specialized is exports. This results in line with the research Widodo (2010) who find that Singapore has a positive relation between the unbalanced economic growth of trade specialization. According to Edwards (1992) in Widodo and Shaleh (2010) suggest that the incentive for research and in turn long-run growth will reduce because of trade. So that this is possible causes unbalanced economic growth related negative trade specialization.

The coefficient $\mu_{2,}$ shows the effects of unbalanced economic growth globally. The result shows that the World unbalanced economic growth and all countries, both in the equation Argentina, Brazil, Paraguay and Uruguay did not significantly affect the countries dynamic specialization. This implies that the countries' dynamic specialization is a domestic issue rather than an international competition one.

Widodo and Shaleh (2010) stated that this can happen because the countries are considered as small countries in the world competition and they behave as 'price taker of'. Hence, the world economic growth is as a given thing and the countries only adjust their trade specialization based on domestic supports such as technologies, infrastructures, human resources, capital, labor, etc.

D. Conclusion

This paper aims to analyze how the impact from unbalanced economic sectoral-growth on dynamic trade specialization. Now the results obtained the country Argentina and Brazil possesses positive relations and significantly affect the dynamic trade specialization, but not for the case of the country Paraguay and Uruguay. In addition, the world unbalanced economic growth has a relationship that did not significantly affect the Dynamic trade specialization all countries selected in this research.

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Base erosion and profit shifting in multinational corporations

Vedang Ratan VATSA
MBA-Department of IME, IIT Kanpur, India
vatsvedang@gmail.com

Abstract. *The subject of shifting of income by various MNCs or 'Base Erosion and Profit Sharing' (BEPS) motivated by tax reasons has been a matter of attention, globally, in the recent years. In this paper, I provided a literature review of what is known about the issue of BEPS in general and went forward in discussing the empirical approaches that identify shifting of income supported by some data sources and thus summarized the discussion using the same. One of the major observations from this review is that the intensity of BEPS in the recent studies, is smaller than what can be found in the studies done earlier. This manuscript talks about the ways to offer an approach to conceptualize the magnitude of BEPS. It finishes up by featuring the significance of existing economic, financial and legal frictions as limitations on BEPS and by examining the ways by which future research may demonstrate these constraints efficiently.*

Keywords: BEPS, profit sharing, base erosion in MNCs, taxation, multinational firms.

JEL Classification: F01.

I. Introduction

The topic of taxation of MNCs or international taxation in general has as of late picked up a high amount of political prominence and attention. G20 leaders after having a meet at the city of Los Cabos, Mexico in the year 2012 furnished the statement “We reiterate the need to prevent base erosion and profit shifting and we will follow with attention the ongoing work of the OECD (Organization for Economic Cooperation and Development) in this area” (http://www.telegraph.co.uk/finance/g20-summit/9343250/). The issues encompassing BEPS were portrayed in one of the major OECD report in February 2013. Eventually, a plan of action on BEPS was created in July 2013, which comprised of 15 particular steps that are expected to encourage collaboration among the government bodies concerning the tax assessment of MNCs. The general point to cover is to ‘better align rights to tax with economic activity’.

While investigating these propositions, one of the important considerations is the level of BEPS activities by the MNCs. This manuscript gives an overview of the observations of income shifting within MNCs.

The study centers around the predominant approach based on the economic aspects of shifting of income, which goes back to Hines and Rice (1994). Different methodologies within the subject of economics are additionally reviewed, including strategies proposed by Dharmapala and Riedel (2013) and Dyreng and Markle (2013).

One of the major subjects that comes up is that a move from country level datasets to the firm-level microdata has enormously contributed to the validity of the measures of BEPS. In the recent literatures, the observed amount of BEPS is comparatively lesser that that found in the previous studies. An estimate, in light of the study of a meta regression by Heckemeyer and Overesch (2013), of elasticity of the income reported w.r.t. the rate of tax differential over nations is recorded to be 0.8. This involves a 10% increment in the difference of the rate of tax involving a subsidiary and its parent (for instance, in light of the fact that the rate of tax in company’s nation went down from 35% to 25%) would make the reported income before tax to increase by 8% (for instance, from $1,000,000 to $1,080,000).

The manuscript also reviews particular issues identifying with BEPS that have been the subject of various policy debates. Eventually, the manuscript looks to offer a system to investigate the size and estimation of BEPS and the implications involved. Specifically, while the evaluated size of BEPS is lesser than what was found in the earlier studies, it is, however, unclear whether it is to be seen as being 'huge' or 'little' for policy purposes. The findings additionally recommend the significance of present economic constraints as checks on BEPS.

II. Background

The purpose of development of MLI was to quickly implement the measures related to the tax treaty, that were introduced under Actions 2, 6, 7 and 14 (hybrid mismatches, treaty abuse, permanent establishments and mutual agreement procedures respectively) of the BEPS project. In order to maximize the participation, MLI provides with flexibility to judge the parts of MLI to be adopted, rejected or to be modified, to the potential signatories.

To be specific, MLI allows the following jurisdictions:

- Choice w.r.t. the tax treaties that the MLI modifies (CTAs: Covered Tax Agreements).
- Alternatives to fulfil the minimum standards under the Actions 6 and 14 (treaty abuse and mutual agreement procedures respectively) of the BEPS project.
- Potential of opting out from certain provisions w.r.t. CTAs whether completely or partially.
- Ability to exert any optional provisions.

With signing of the same, each signatory deposited a record to the OECD that listed their CTAs along with their reservations w.r.t the provisions of MLI. After the completion of the ratification process (including the modification requests that may be asked), the signatories may decide their positions on MLI.

It can be observed that the taxpayers may need to work more closely and lay attention to the options that the countries made under the MLI. They need to calculate and consider the impact of MLI on their operations and thus, work on the policies to address the impact.

III. Observations and methodologies: Literature review

The study by Hines and Rice (1994) is based on the observation that the income before tax of any company is the total of 'true' and 'shifted' incomes. The shifted income here, may either be positive or negative. True income includes that capital and the labor estimations and it is intended to reflect the overall work efficiency of the company. Shifted income, on the other hand, depends upon the tax structure of the country in which the company is based and can be set as per the value of the company. It is dependent upon the tax incentives of the country and determines the amount to be moved in or out of the company.

The approach according to Hines and Rice may be represented as:

$$\log\pi_i = \beta_0 + \beta_1\tau_i + \beta_2 \log K_i + \beta_3 \log L_i + X_i\gamma + \varepsilon_i. \quad (1)$$

where:

π_i – profits earned by the MNC 'i'.

The specification is taken to be log-linear in nature. It does not include loss-making companies in the sample.

K_i – Company i's capital inputs.

L_i – Company i's labor inputs.
β_0 – Constant.
β_1 – Extent of income shifts by any MNC 'i'.
X_i – Vector of additional affiliate-level controls.
τ_i – Tax incentive to shift profits into or out of affiliate 'i'.
ε_i – Error term.

With the use of Panel data (using different observations of the same company over different time values), we may use the previous equation as:

$$\log \pi\, it = \beta_1 \tau_{it} + \beta_2 \log K_{it} + \beta_3 \log L_{it} + \mathbf{X}it\, \boldsymbol{\gamma} + \mu_i + \delta_t + \varepsilon_{it} \quad (2)$$

where:
π_{it} – profits earned by the MNC 'i' in the year 't'.
μ_i – Affiliate fixed effect.
δ_t – Year fixed effect.
τ_{it} – Tax incentive for the purpose of profit shifting w.r.t. company 'i' in the year 't'.
K_i – Company i's capital inputs.
L_i – Company i's labor inputs.
ε_i – Error term.
β_0 – Constant.
β_1 – extent of income shifts by any MNC 'i'.

The difference in tax values between a company 'i' and/or its parent or any sister company are due to the tax reforms or differences in the location/country of the company which is why it is not directly related to the company's choice but there is a possibility that the difference in corporate tax rate in a country, which will change the value of τ_{it} may be related to the changes in the economic environment or the policies being implemented in the country that may affect the profits of company 'i'.

Apart from the discussed approach used in the literature of BEPS, the other approaches include the usage of data from Compustat, on the working of US companies to analyze BEPS worldwide. Compustat was not able to offer information about each company, the aim was to verify if the US based multinational corporations shifted their profits from US to any of their foreign based subsidiaries or any such company for that matter. This includes finding a relation between the ratio of foreign income (without tax) to the measure of foreign sales, involving the foreign tax rate (which can be taken as an incentive to shift the income abroad).

There are, however, a few empirical issues that may rise of this approach. The income being shifted and the operations that increases the measure of foreign tax rate (FTR) are completely internal choices of the companies. It may not be possible to use difference in the tax rates as a source of external variation of the same, w.r.t. the calculations in the above equation (2) with company data. In case a company has a high orientation to work on the

tax planning mechanisms, it may operate in countries with lower tax which will lead to a lower value of FTR and transfer high income amount out from the country which may lead to a high value of Foreign Sales (FRoS). In this case, the high value of FRoS may be linked to low FTR values but not to the orientation of tax planning of the company, which may in turn, drive both the variables indirectly. To summarize, the BEPS estimate may thus be subjected to an upward bias.

In a study, even with the presence of this bias, Kemsley and Lang (1998) did not find any proof of shifting of income from USA from 1984-92.

In an extension of which, Klassen and Laplante (2012) worked on the analysis of panel data of the US companies with data of foreign income from 1988 to 2009. They tried to answer these by making use of variables from different years and taking an average of 5 year periods for the calculation of FTR.

Another development of this approach is found in the literature from Dyreng and Markle (2013). They included the fact that the allocation of sales of US based MNCs, between US based customers and non-US customers in the calculation of income shifting cannot be manipulated with the fixed location of the customers/clients and they went on arguing that there is a possibility of calculating the amount and direction of income shifting by making an analysis of the differences between the US based MNC's sales and considering the location of its sales and its earnings, based on this estimate. It relies on the fact that the location of the sales of any MNC cannot be manipulated and may not be linked with any income-shifting strategy.

A new approach was proposed by Dharmapala and Riedel (2013) to measure BEPS which considered the differential of tax rate between a country j and any other country where the MNC operate. According to it, the tax rate differential may encounter a change due to any external factor. Coefficient β_1 is used to sense the profits of a company to such a change. The companies or affiliates that face a higher tax rate tend to act like a control group to take decisions of profit sharing or indirectly the operation of the internal capital flow which may increase the reported income of any affiliate of a company due to increase in the income of the parent company (Dharmapala and Riedel, 2013).

In both the above equations, β_1 represents the percent change in the income before tax w.r.t. 1 percent change in τ.

Further in the BEPS literature, Huizinga and Laeven (2008) used commercial databases, the most famous of which includes Amadeus and Orbis.

According to Bureau Van Dijk, 'Amadeus contains comprehensive information on around 21 million companies across Europe'.

Huizinga and Laeven (2008) made use of cross sectional company level data from Amadeus for around 1999 European companies in order to offer a regression similar to that

in the first equation by taking into account the measurement of τ that includes the effect of tax rates for all the affiliates of a MNC. Thus, they estimated the elasticity of BEPS in those European companies, which came out to be 1.31. This means that a 10 percent increase in the incentive of tax by shifting of income to an affiliate 'i' of a company is related to 13.1 percent change in the income of that affiliate.

Comparing the elasticity of 2.25 estimated by Hines and Rice (1994), the number is smaller in the estimations done by Huizinga and Laeven (2008), which suggests that by controlling the country and industry specific unobserved factors may show an affect in the values of income before tax. Since then, the usage of panel data has been more prevalent in the literature.

Dischinger (2010) estimated the value of elasticity of European companies to be equal to 0.7 from 1995 to 2005, using the Amadeus database.

Lohse and Riedel (2013) used the panel data from 1999 to 2009 in the Amadeus database and estimated the value of elasticity = 0.4.

The table below shows the BEPS estimate values of different studies:

Study	Data source	Time period	Value of elasticity	10% dec. in the tax rate of a country is related to the inc. in income from $100,000 to:
Hines and Rice, 1994	BEA	Cross sectional data - 1982	2.25	$122,500
Huizinga and Laeven, 2008	Amadeus	Cross sectional data - 1999	1.31	$113,100
Dischinger, 2010	Amadeus	Panel data from 1995 to 2005	0.7	$107,000
Heckemeyer and Overesch, 2013	Many sources	Many sources	0.8	$108,000
Lohse and Riedel, 2013	Amadeus	Panel data from 1999 to 2009	0.4	$104,000

IV. Directions for future research

It emerges out from the study that the estimated value of BEPS is lower in the recent studies than that in the earlier studies. One of the activities related to the tac planning of MNCs focusses on the heterogeneity in apparent tax sophistication.

According to Desai, Foley and Hines (2003), in the year 1999, 59% of the USA based companies with operations in foreign countries, has affiliates in countries considered as a tax haven.

According to Dharmapala and Riedel (2013), in the Amadeus sample of study, 58% of affiliates had at least one affiliate in any non-European tax haven country and a large fraction do not have affiliates in any tax haven countries.

Mills, Erickson and Maydew (1998) used a data of 365 US companies and found that the expenditures related to tax planning tend to decrease as per the size of the firm. It raises the question that why don't more companies invest in the activities of tax planning when the expenditures on tax planning is found to generate higher rate of return. The question can be raised on the existing economic frictions and its connection as constraints on BEPS. Future research may try to model these frictions and may study its implications for the overall efficient structuring of the tax regime and propose reforms accordingly.

Conclusion

The issue of BEPS attracts opportunities for understanding the cause for it and the ways in which it may be reformed. On the other hand, it has turned out to be considerably more essential to comprehend the discoveries of the empirical literature on base erosion and profit sharing. This manuscript surveys the empirical literature on the study of income sharing motivated by tax reasons, in various MNCs. The emphasis is laid upon the extent of BEPS that has been calculated in the studies. In the recent studies, the magnitude, however, has been found to be lesser than the calculated in the earlier studies. This manuscript brings to light the importance of existing economic frictions and its connection as constraints on BEPS. It also put forward the future research that may try to model these frictions and may study its implications for the overall efficient structuring of the tax regime and thus, propose reforms accordingly.

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