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The Role of Human Capital in Economic Growth

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In endogenous growth theories, with the endogeneity of technology and its inclusion into the model, the new technologies produced by individuals equipped with knowledge, skills, and experience by using this technology were regarded as the human capital investments of countries. Later, the effects of human capital on economic growth became a significant topic in the empirical literature. In this study, initially the basic approaches to human capital were theoretically investigated. Then, the relationships between human capital and economic growth were analyzed with cointegration and causality tests by using the data of Turkey for the period 1961-2011. Our findings revealed a dual causality relationship between human capital and economic growth variables.

Keywords: human capital, economic growth, cointegration with structural break

Introduction

Economic growth in its simplest form is defined in the economics literature as the increase in goods and services produced in a country. It is also defined as a continuous increase in gross domestic product per capita. Such growth is an indicator of the development level desired by every country in an internationaly competitive environment. Labor is a production factor used to improve economic growth through the production of goods and services. Investments in labor improve the productivity of human capital. The knowledge, skills, experience, and similar assets of individuals significantly affect production factors through labor and accelerate economic growth (Koç, 2013). In this way, every supplementary asset to labor speeds up economic growth.

The theory of human capital regards the individual not only as a component of the production function but also as a dynamic input in the realization of economic progress (Özşahin & Karaçor, 2013). Such dynamism attributed to the individual represents the knowledge and technology factors in economic growth models. There are several studies in the literature which investigate the relationships between human capital and economic growth from various aspects. Considering the basis of economic growth models, it was observed that Smith and Ricardo-like economists were the pioneers of classical growth theories. They investigated the growth processes of countries and provided significant contributions to the relevant literature.

In a neo-classical growth model, Solow (1956) considered technology as an external factor and did not explain the emergence of technology in his model. Later, technology was included in economic models as an

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endogenous factor and the significance of human capital using information was proposed (Taban & Kar, 2006). In internal growth models, Romer (1986; 1990), Lucas (1988), and later economists investigated economic growth through physical and human capital accumulation. Besides labor and capital, human capital had a significant place in endogenous growth models and additionally the effects of human capital on economic growth were pointed out in previous studies in the literature (Telatar & Terzi, 2010).

The present study was conducted to assess the relationships between human capital and economic growth by means of human capital index data. Initially, the concept of human capital was defined and the relations with economic growth were pointed out. Then, theoretical and empirical studies were provided about the subject. In the practical section, the human capital index data of Turkey covering the period between 1961-2011 were used to analyze the relationships between human capital and economic growth with cointegration and causality tests. Finally, the results were discussed with the findings of earlier researchers.

The Concept of Human Capital

Businesses use three types of capital: physical capital (factory, stocks etc.), financial capital (investments), and intellectual capital. The very last one, intellectual capital, is defined as "nonfinancial fixed assets-intangible assets". Human capital is a component of intellectual capital. It represents the investments made on humans and encompasses human-related factors like knowledge, skills, experience, sufficiency, business quality, employee relations, emotional intelligence, entrepreneurialism, flexibility, employee loyalty, employee satisfaction, education, and creativity. In businesses, investment on humans is the most difficult investment to control.

The equivalent of human capital in the economy is labor, which is among the production factors and operates in order to earn. The individual should produce a good or a service to earn this wage. The knowledge, experience, and similar qualifications used in producing this good or service constitute the individual's gears and such gears were termed as human capital until the end of the 1950s (Bal, 2011). However, the focus herein is not only the physical power of the individual but also the knowledge, experience, analytical thinking ability, and similar intangible values. Later, human capital was defined not only as the power spent in the production of a good or service, but also as the qualifications of the individual.

Romer (1990) regarded human capital as the source of economic efficiency. The OECD (Organisation for Economic Co-operation and Developmen) defines human capital as the contributions of knowledge and skills made by an individual to a country's economy and thus as the improvement in social and economic development made by an individual (Eser & Gökmen, 2009). Human capital can then briefly be defined as the contributions of individuals and every kind of knowledge and experience gained by an individual.

Since human capital is accepted as the qualifications acquired by individuals, in other words, the dynamic of the economy, these qualifications can be summarized as all kinds of knowledge and experiences which improve production (Karataş & Çankaya, 2010). Human capital material is directly proportional to the country's economy. However, it may be misleading to link the efficiency of human capital only to the increase in a country's population. In fact, the quantitative traits of the population come into prominence in developing countries, while knowledge, skills, experience, and education-like qualitative traits come into prominence in developed countries. When we consider the situation today, it is easy to see that not the countries with a large population, but those with educated, healthy, and long-living individuals are more developed (Yumuşak, 2008). Such traits indicate that a large population alone is not sufficient for the efficiency of human capital.

Throughout the world in the mid-20th century, especially after the Second World War, an educated labor force became a significant issue with countries' conversion into knowledgeable societies and countries assigned as much significance to human capital as they did to physical and financial capital (Doğan & Şanli, 2003). Although Malthus's thesis "Increase in population reduces the income per capita" established a presence in neo-classical theory, later this thesis was abandoned since high-tech developments increased the income per capita despite the increasing population (Deliktaş, 2001). Kremer (1993) regarded the technological process as an increasing function of the population and adapted the principle of "the higher the population, the higher the number of people there will be to invent new technologies and the higher the knowledge gain will be" (Kremer, 1993, p. 712). Such an opinion was approved by others with the contributions made by technology to a country's economy.

Lucas (1988) pointed out the observable effects of both human capital and physical-financial capital on economic models. The author also pointed out that individuals should spend time on various activities to improve their performance and individual skills, a recommendation that is commonly mentioned in human capital theory (Lucas, 1988). Despite different definitions of human capital, the generally accepted definition encompasses every kind of individual-oriented knowledge and experience.

Human Capital and Economic Growth Relations

The outcomes of empirical studies and technological innovations have resulted in directing tremendous energy to human capital. In all countries with successful permanent growth, education, and training have allowed countries to overcome the changes in production methods and to improve human capital (Becker, 1993). Thus, every kind of investment made on human capital can also be viewed as a contribution to a country's economy.

While explaining economic growth, neo-classical theorists accepted technology and human capital as exogenous factors (Kar & Ağır, 2006). Later on, neo-classical theory supported the hypothesis of "technological developments eliminated the problems which resulted from population increase and the population even positively affected economic development" (Güneş, 2005). Inclusion of human capital into economic growth models was started by Romer (1986). Contrary to the neo-classical growth model, Romer (1986) included technology into the endogenous growth model and thus endogenized technology. Romer (1990) then endogenized technology and included human capital into the model. Lucas (1988) developed a dynamic to define the technology variable and defined this dynamic as human capital in the model. Romer (1990) regarded technology as the outcome of individual abilities to obtain new products with new ideas and then included human capital accordingly. Additionally, Lucas (1988) included human capital into the model as the qualification levels of individuals (Ulucak, 2015).

Endogenous growth models instead focus on the quality of the population and accept the primary determinants of economic growth as either a direct increase in human capital or indirect activities of human capital like R&D activities. Economic success provides significant contributions to investments, primarily to human capital, and also increases economic efficiency and productivity (Tsen, 2006). Positive economic developments ensure more qualified human capital. As one can see, although the direction of interaction between economic growth and human capital differs most of the time, their attraction to each other is always the same. While the positive attributes of human capital, namely, the implementation of knowledge and technology, affect economic growth, positive developments in the economy affect the quality of human capital (Genç, Değer, & Berber, 2009).

The investments made on human capital are highly significant in terms of economic competition among countries. In fact, the components which make some countries more prominent than others include any kind of supplements to inparticular, labor, which is a production factor. Countries with a qualified labor force integrate this force with advanced technology and thus experience the advantage of always being one step ahead in competition. In this way, increasing efficiencies in human capital provide significant contributions to a country's economy (Çakmak & Gümüş, 2005).

Previous studies and experiences revealed that economic growth could not be achieved by only improving physical conditions. Additionally, the knowledge and skills acquired by the working and producing individual should also be accepted as a tool for economic progress. Likewise, Becker, Murpy, and Tamura (1990) in a study titled "Human Capital, Fertility and Economic Growth", indicated higher returns of human capital and education in developed countries than in developing countries. Based upon the aforementioned information, one can see that the size of a population alone is not sufficiently effective on economic growth and the bottom line is the knowledge, skills, and experience-like attributes of the population.

Literature Review

The research on human capital was started by Lucas (1998) and Romer (1986) with the inclusion of human capital into their models and the research continues today. Schultz (1961) differentiated human capital from the traditional perception of capital and accepted it as knowledge investment made on humans and indicated that a labor force which is not enriched with knowledge would not provide any contributions to economic growth in modern economies.

Benhabib and Spiegel (1994) investigated the role of human capital in economic growth and reported the positive impacts of physical and human capital on economic growth. Sacerdoti, Brunschwig, and Tang (1998), in a study carried out in Western Africa, investigated the effects of human capital on economic growth and indicated that physical capital was more effective on economic growth than human capital. The studies indicated that the reason why human capital was not very effective was due to the lack of qualified and trained individuals who were able to use advanced technology in human capital.

Evans, Green, and Murinde (2002), in a study to investigate the effects of human capital and financial developments on economic growth, used the 21-year data of 82 countries. The researchers indicated that financial development was as effective as human capital in economic growth. Güneş (2005) analyzed the relationships between population increase and economic growth with cointegration and a vector error correction model. He indicated that population increase had a short-term impact on economic growth and the thesis of "population increase negatively affects the economic growth" was not valid for Turkey.

In a study pointing out the significance of human capital in an endogenous growth model, Taban and Kar (2006) used the causality test on annual data for Turkey covering the period within 1969-2001 and reported a positive and reciprocal relationship between human capital and economic growth. Kar and Ağır (2006) applied cointegration and causality tests on data within 1926-1994 to assess the relationships between human capital and economic growth. The researchers used the share of health and education expenses in income to indicate human capital and found a causality relationship between the variables.

Sarkar (2007), in his study, used the data of 92 countries covering the period of 1970-1987. He obtained similar results with Benhabib and Spiegel (1994) and indicated that human capital was effective and had positive effects both on the prevention of income injustice and on economic growth. Ljungberg and Nilsson

(2009) carried out a study on the Swedish economy with data covering the period within 1870-2000 and investigated the relationship between human capital and economic growth with the Granger causality test. The researchers reported that human capital was a significant factor in the growth of the Swedish economy, but the effects of human capital with improved educational levels after the 1970s had relatively lower impacts on economic growth than expected.

Bucci and Torre (2009), in their study, analyzed the relationship between the change in population and income per capita and concluded that human capital had ambiguous effects on income per capita during the process of knowledge and skill formation. However, the population had both direct and indirect impacts on economic growth.

Altıntaş and Çetintaş (2010) used data in Turkey for the period of 1970-2007 and investigated the relationships among human capital, fixed capital, export and economic growth with cointegration and error correction methods and tested the long and short-term causality relationships between the variables. The researchers reported long-term significant positive relationships among human capital, fixed capital, and export and concluded that human capital resulted in economic growth in Turkey.

Şimşek and Kadılar (2010) tested the causality relationships among human capital accumulation, export and economic growth with cointegration and error correction methods. The researchers used real annual gross domestic product, real export and enrollment to higher education data for the 1960-2004 period in Turkey and concluded that on increase in export and human capital supported long-term growth and on increase in gross domestic product nurtured on increase in human capital.

Empirical Study and Results

In this study, the long-term relationships between human capital and the gross domestic product (GDP) of Turkey were analyzed for the period of 1961-2011. The human capital index created based on years of education and returns of education was used to represent human capital (HC); real GDP values were used to represent the GDP variable. The data for both variables were taken from the PWT (Penn World Tables) database.

For sound and reliable outcomes, the unit root content of the variables used in estimations should be analyzed. Structural breaks in tested series should also be taken into consideration because there may be breakpoint unit roots in data series and the resultant outcomes may be misleading when they are not taken into consideration. Therefore, tests were conducted in this study to identify structural breaks. To overcome such a problem, Lee and Strazicich (2003) expanded the minimum Lagrande multipliers (LM) unit root test introduced by Schmidt and Phillips (1992) to the literature. In the LM test, the null hypothesis can be formed by taking structural breaks into consideration. Two structural breaks (at level and trend) are also identified as endogenous. In this way, the number and dates of structural breaks and the presence of unit roots in series can be analyzed reliably. The results for the unit root test on HC and GDP variables are provided in Table 1.

The unit root tests revealed that both variables included a unit root. In this case, the stable state of the linear combination of these two variables should be identified through cointegration analysis. Cointegration analysis tests the stable nature of the linear combination of unstable series including a unit root. It is also used to assess long-term relations between series, to assess whether or not there is a long-term balance between series and to assess the synchronized operation of series. There are various approaches in the literature to test this relationship. Most of these approaches are based on the assumption that the nature of the cointegration

vector is constant throughout the investigated period. However, micro economic variables in the long-run are evidently affected and vary due to factors like economic crises, technology shocks, political changes, variations in individual decision, and preferences. As was indicated by Perron (1989), such changes, also called structural breaks, should definitely be taken into consideration in analyses for reliable outcomes. Therefore, in this study, the cointegration test developed by Hatemi-J (2008) was used to take possible structural breaks into consideration and to get better and more reliable results. The cointegration test introduced the literature by Gregory and Hansen (1996) and allowance for one endogenous break among the investigated series was expanded to two endogenous breaks by Hatemi-J (2008). The method operates over model 1 by considering two structural breaks for the GDP and HC variables in long-term relations between the series as follows:

$$GDP_t = \gamma_0 + \gamma_1 D_{1t} + \gamma_2 D_{2t} + \beta_1 HC_t + \beta_1 HC_t D_{1t} + \beta_1 HC_t D_{2t} + \varepsilon_t \quad (1)$$

where GDP_t is a dependent variable vector and HC_t is an independent variable vector. In this model, the dummy variables were defined as follows if t > [nτ1] then D_{1t} = 1, otherwise 0; if t > [nτ2] then D_{2t} = 1, otherwise 0. The terms τ1 and τ2 have a value within 0-1 and represent the unknown parameters indicating structural break times. Hatemi-J (2008) formed the null and alternative hypothesis of the cointegration test as follows:

H_0: There is no cointegration between the variables.

H_1: There is cointegration between the variables.

Table 1

Results of Lee Strazicich Unit Root Test With Structural Breaks

Variable	Model	λ value	Number of lags	Break dates	Test statistics	Critical values		
						1%	5%	10%
HC	Level		2	1978 1982	-3.1649	-4.54	-3.84	-3.50
	Level and trend	λ_1: 0.4 λ_2: 0.6	2	1979 1992	-5.4850	-6.45	-5.67	-5.31
GDP	Level		1	2002 2007	-1.8451	-4.54	-3.84	-3.50
	Level and trend	λ_1: 0.4 λ_2: 0.8	1	1984 1999	-6.5070	-6.42	-5.65	-5.32

Hatemi-J (2008) used three different test statistics, namely, *ADF*, Z_a, and Z_t, to test the null hypothesis. *ADF* tests the significance of the ε_{t-1} parameter value through the regression of the first difference of the error term of model 1 (ε_{t-1}) with $\Delta\varepsilon_{t-1} \ldots \Delta\varepsilon_{t-k}$ values. Z_a and Z_t are based on the deviation-adjusted first-order auto correlation coefficient ($\hat{\rho}^*$) calculations and are defined as follows:

$$\hat{\rho}^* = \frac{\sum_{t=1}^{n-1}\left(\hat{\varepsilon}_t\hat{\varepsilon}_{t+1} - \sum_j^B \omega(\frac{j}{B})\hat{\vartheta}(j)\right)}{\sum_{t=1}^{n-1}\hat{\varepsilon}_t^2} \quad (2)$$

where $\omega(.)$ is the kernel weight function including standard conditions for spectral intensity estimators. The symbol B yields the band width meeting the conditions of $B \to \infty$ and $B/n^5 = O(1)$, and $\hat{\vartheta}(j)$ yields the autocovariance function. Then, the autocovariance function is defined by

$$\hat{\vartheta}(j) = \frac{1}{n}\sum_{t=j+1}^{T}(\hat{\varepsilon}_{t-j}\hat{\rho}\hat{\varepsilon}_{t-j-1})(\hat{\varepsilon}_t\hat{\rho}\hat{\varepsilon}_{t-1}) \quad (3)$$

where the Z_a and Z_t test statistics were calculated as defined below

$$Z_a = n(\hat{\rho}^* - 1)$$

$$Z_t = \frac{(\hat{\rho}^* - 1)}{(\hat{\vartheta}(0) + 2\sum_{j=1}^{B} \omega(j/B)\hat{\vartheta}(j))/\sum_1^{n-1} \hat{\varepsilon}_t^2}$$

In accordance with the defined test statistics, the Hatemi-J (2008) cointegration test results calculated for model 1 are provided in Table 2.

Table 2

Hatemi-J (2008) Cointegration Test Results

Test statistics	Break years	Calculated value	Critical values		
			1%	5%	10%
ADF^*	1981-1990	-6.0070	-6.503	-6.015	-5.653
Z_t^*	1980-1995	-7.6586	-6.503	-6.015	-5.653
Z_a^*	1980-1995	-121.1133	-90.794	-76.003	-52.232

(The Gauss codes written by Hatemi-J were used)

The calculated test statistics are given on the left side of the critical values on the table. Therefore, the null hypothesis indicating "there is no cointegration between the variables" was rejected and it was decided that there is a long-term cointegration between the variables, in other words, variables in the long-run exhibited synchronous action.

Causality analysis between the variables is another critical issue. The causality test recommended by Hacker and Hatemi-J (2006) is both a newer method and uses the bootstrap technique allowing calculation of critical values in accordance with the data set used in the study. Therefore, the method was regarded as a more reliable method. Since Hacker and Hatemi-J (2006) causality test produces proper critical values for the data set through the bootstrap technique, it can yield more efficient outcomes for analysis with low observations (Hacker & Hatemi-J, 2006). Again, since this method is developed based on Toda and Yamamoto's (1995) MWALD (Modified Wald test) test, it is not sensitive against the integration level of the series. Toda and Yamamoto (1995) recommended the modified MWALD test assuming the normal distribution of the error term and asymptotic chi-square distribution of the test statistics to test the null hypothesis of "no-Granger causality".

$$MVALD = \left(C\widehat{\beta}\right)\left[C\left(\left(Z'Z\right)^{-1} \oplus S_U\right)C'\right]^{-1}\left(C\widehat{\beta}\right)$$

where $\oplus$ indicates the Kronecker multiplier, C indicates the $p \times n\left(1 + n\left(p + d\right)\right)$ matrix, S_U indicates the variance covariance matrix of the error term of the model, and $\widehat{\beta}$ indicates the column stacking processor. The null hypothesis of the test indicates "no-Granger causality" as expressed below

$$H_0 : C\beta = 0$$

Hacker and Hatemi-J (2006) approach calculates the critical values for this hypothesis by using the bootstrap technique. The critical values calculated with this method and test statistics are provided in Table 3.

The results provided in Table 3 indicate that the null hypothesis for both cases is rejected. In this case, the causality analysis results indicate that the changes in GDP were the reason for the changes in HC and vice versa. Therefore, there was a dual causality relationship between the variables.

The estimation of long-term cointegration parameters in which human capital was taken as an explanatory variable, and the calculation of their effects on the dependent variable are other critical issues. When the OLS

(Ordinary Least Squares) estimator is used without the performance of relevant corrections, the estimations will then be deviant and inconsistent because of autocorrelation and endogeneity problems (Montalvo, 1995). The FMOLS (Fully Modified Ordinary Least Squares) estimator of Phillips and Hansen (1990), the CCR (Canonical Cointegration Regression) estimator of Park (1992), and the DOLS (Dynamic Ordinary Least Squares) estimator of Stock and Watson (1993) take these corrections into consideration; therefore they are commonly used as cointegration estimators. In this study, the long-term cointegration parameters were separately estimated by using these estimators. The estimation results calculated by using the logarithmic values of the variables are provided in Table 4. In this way, coefficients were able to be interpreted as having flexibility.

Table 3

Causality Test Results

Hypothesis	Test statistics	Bootstrap critical value 1%	Bootstrap critical value 5%	Bootstrap critical value 10%
GDP ≠> HC	7.791	7.353	4.096	2.824
HC ≠> GDP	7.524	7.294	4.059	2.808

(The Gauss codes written by Hacker and Hatemi-J were used)

Table 4

Long-Term Cointegration Parameters

	OLS	FMOLS	DOLS	CCR
LHC	2.907097	3.216245	3.418860	3.215854
	(0.3135)	(0.1179)	(0.0546)	(0.1170)
	[0.0000]	[0.0000]	[0.0000]	[0.0000]
Sabit	11.17190	10.92499	10.52832	10.92434
	(0.2357)	(0.0703)	(0.0571)	(0.0666)
	[0.0000]	[0.0000]	[0.0000]	[0.0000]
R^2	0.995411	0.979751	0.996425	0.979727

Notes. The values in parentheses indicate standard errors; the values in brackets indicate probability values.

The first column in Table 4 presents the results obtained with the OLS estimator. The autocorrelation problem in OLS estimation was solved by including the AR(1) process into the model. However, if there is an endogeneity problem, then the results are deviant and inconsistent. The other estimators do not have such problems. Therefore, the results obtained with FMOLS, DOLS, and CCR are more reliable. After all, OLS estimations were different from the other estimations and had higher standard errors. The FMOLS and CCR estimators yielded almost identical results. The results obtained from all the estimators had the uppermost significance levels. The least standard error was observed in the DOLS estimator. According to the DOLS result, a 1% increase in human capital yielded about a 3.2% increase in GDP.

Conclusion

In this study, the significance of human capital in endogenous growth theories was pointed out and the effects of labor enriched with knowledge and skills on economic growth were obtained. In modern economies, developed countries have established their place in international competition not with the quantitative wealth of their human capital but with highly qualified and educated individuals. Therefore, the relationship between economic growth and human capital has been the topic of several studies. In the present study, the relationship

between economic growth and human capital was empirically analyzed and a long-term cointegration relationship was observed between these two variables. The findings of the present study revealed that these variables acted synchronously in the long-run and there was a balanced relationship between them. Another outcome of this study was the presence of a dual causality relationship between the variables. Such an outcome can be interpreted as follows: an increase in human capital was responsible for increased incomes in Turkey and vice versa. According to long-term cointegration parameters in which HC was used as the explanatory variable, a 1% increase in human capital yielded about a 3.2% increase in GDP. Accordingly, the cost fractions spent to increase the human capital level in the long-run result in more than a 3-fold increase in GDP. Such a case revealed that politicians searching solutions for growth and development should never hesitate to take steps to improve human capital levels.

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Social Accounting Matrix on the Base of the Mexican System of National Accounting*

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Links between institutional sectors and economic activities with National Accounting System of Mexico are studied used accounting multipliers. Key sectors had changed to strategic or leading as oil and gas extraction and dairy product manufacturing, i.e., Mexico went from a producer of goods to a service provider country, losing value added in their production chains. The mixed income is leading/independent economic activity for woman whose income is between 1 and 5 minimum wages. This is really important in the domestic economy through its impact on solidarity activities: providing care and support and providing food. Moreover, non-financial corporations and households of 10 or more minimum wages for income investing in strategic sectors such as retail trade and wholesale and manufacturing products derived from oil and coal. This is evidence of two Mexicos: the traditional and industrialized.

Keywords: social accounting matrix, national accounting, linkages, accounting multipliers, input-output tableau

Introduction

Many works have been written on the application of social accounting matrix (SAM), accounting linkages and multipliers but none shows the low impact of public policies that encourage certain industries giving preferential treatment in taxes, water, electricity, etc., arguing that generate new high paying jobs and technological development of the region. Bolio, Remes, Lajous, Manyika, Roseé, and Ramirez (2014) explained that in Mexico the growth and prosperity are output of a two-speed economy (Mckinsey Global Institute, 2014). In a modern Mexico, a high-speed and technologically forward multinationals factories that compete in global markets and universities that graduate more engineers that Germany and traditional Mexico, a land of sub-scale, low-speed, technologically backward, unproductive enterprises and many of which operate in informal economy. For eight decades Mexico has been unable to grow and develop economically to substantially improve the living standards of its population. The free trade in North America has come to break the production chains. This is evident in the study of direct, cross, and cyclical multipliers. The important oil

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industry impacts poorly homes, also the automotive industry with Original Equipment manufactures (OEMs) and indirect jobs linked to it have no impact on economic development. This is evident in the study of direct, cross, and cyclical multipliers.

This paper shows these two Mexicos by building a social accounting matrix similar to that proposed by Thorbecke and Jung (1996), in terms of branches of economic activity and applying the theory of Leontief multipliers (Thorbecke, 2000). In section 2 provides a brief review of the SAMs for Mexico published in recent years ago. In section 3 the methodology used for this analysis is established. In section 4 the results of the major multipliers are presented in the direct-indirect-cyclic sequence. In section 5 the analysis is done and the results are discussed. Finally, sections 6 and 7 give the conclusions and references.

State of the Art

The latest SAMs, this proposal by Núñez (2015) focused on analyzing taxes on the extraction of hydrocarbons using a general equilibrium model. In Mexico oil derivatives are very expensive because of these taxes. Other works of Núñez (2008) evaluated social policies to alleviate poverty disaggregating household income by deciles. Multisectoral model is used incorporating input-output tableau (IOT) in 2000. This tableau is obtained from the 1980 data using the biproportional matrix transformation or Row-Column Adjustment of Successive-approaches (RAS) method. Pineda (2011) worked on a social accounting matrix (SAM, 2003) based on the system of national accounting of Mexico (SNCM, 2014), but it does not transform to Thorbecke (2000) form, i.e., from balance equations system to factors, agents, and accounts matrix arrangement. In that work financial and social policies were evaluated, the results evidence weak linkage between financial sector and real economy (structure weak of financial system). Intermediaries and financial markets do not contribute to the economy strongly. Núñez (2008) proposed a SAM-MX00 for Mexico on the base of the first three accounts (good & services, production, and generation of income), capital, and good & services with outside accounts of the SNCM, year 2000. Institutional sectors took account the gross operating surplus for enterprises and wage and contributions for household. Gross mixed income was not considered. The capital account was in terms of saving/investment (it is an inequality). The other accounts were not used (primary allocated, secondary distribution and use income, and financial). The SAM-MX00 was disaggregated into 43 accounts: 10 household deciles, 18 productive activities, three public goods, and other 12 accounts: companies, government with three kinds of taxes, two kinds of transfers, a savings/investment accounts, productive factors labor and capital, private consumption, and rest of word. This structure does not consider, for example, traditional factories (tortilla, bakeries), traditional and high-speed factories (tequila, breweries, bakeries, and chocolate), and technological forward factories (auto parts, OEMs, and steelmakers).

Kim Kijong (2008) studied the multiplier effects of a hypothetical new sector to change the social accounting matrix. The new sector is assigned a composite of factors by gender and skills. Furthermore, if these individuals are in the government program “Expanded public works programme”. Employment and income distribution are misleading, i.e., underestimate the impact of the proposed target level of employment.

Minzer and Solís (2014) mixed equations account balance of goods and services account to the economic activities of IOT, factors of investment and trade with the rest of the world analyzed certain tax reform measures such as the increase in value added tax in some branches of economic activity and its impact on tax collection and poverty.

Other authors as Blancas (2006) and Laguna (2010) analyzed the inter-relationships and supply chains in Mexico. And Sobarzo (2009) discussed some proposals for tax reform. The proposal is financed through tax the new social security system. The social accounting matrix calibrates a general equilibrium model in the context of coexistence of formality and informality in the labor market.

The structure of the System of National Accounts of Mexico (SCNM) is made up of balance equations linking macroeconomic with microeconomic aspects. The SAMs to Mexico mentioned herein take into account some industry groups only, all of them broken down in terms of population deciles rather than the distribution of income-expenditure in terms of minimum wages.

The proposed social accounting matrix (SAM-MX11) is founded on complete economic structure of the system of national accounting of Mexico, year 2011 (System of National Accounting of Mexico, 2011) (SNAM-2011), MFTIS (Mexican Foreign Trade Inquiry System, 2011), and ENIGH (National Survey on Household Income and Spending, 2012). The square matrix size is 288 and showed in Table 1, it is Defourny and Thorbecke type (Defourny & Thorbecke, 1984; Thorbecke & Jung, 1996). The SNAM-2011 comprises balance equations and accumulation and current accounts. National accounting: goods and services (G&S), production (P), generation of income (GI), allocation of income (PAI), distribution of income (DI), use of income (UI), capital (C), gross fixed capital formation (GFCF), financial (F), goods and services with the outside (G&S outside). The latter account is divided: current transferences (TC) and capital transferences (TK). SNAM has institutional units: non-financial corporations (NF), financial corporations (F), government units, including social security funds (G), non-profit institutions serving households (NPIsSH), households (H), and the rest of the world (RW). Households are formed by customers and producers. The GI, PAI, DI, UI, C, and GFCF accounts were disaggregated on institutional sectors. Household sector is broken down into income-expenditure deciles or minimum salaries level (mw).

The input-output tableau (IOT-MX11) is included into SAM-MX11. The IOT-MX11 is built by economic activities added into sectors, subsectors, and branches. IOT-MX11 uses the North America industrial classification system (NAICS) code of 2007. The tableau size is 165.

The production account presents economic activities by branches. The goods and services account shows economics activities and institutional sectors.

Links between institutional sectors and economic activities with SNAM-2011 were studied by using accounting multipliers. IOT-MX11 was obtained by using the RAS method to OIT-MX 2008. Table 2 presents disaggregated IOT-MX11. Each of the aij entrances is Tij matrix of different sizes, T13 is the matrix which allocates the value added generated by the production activities into income accruing to the various factors of productions. T33 shows the intermediate input requirement, T32 reflects the expenditure pattern of the institutional sectors on the commodities which they consume. T21 shows the scanning of the factorial income distribution into institutional sectors. T22 gives the inter-institutional transfers.

The current transferences entrances were disaggregated to economic activities branches and NAFTA countries and the rest of the world. To do this, it was necessary to make the correspondence between the tariff code (Mexico Foreign Trade Inquiry System, 2015) and NAICS code (United States Census Bureau, 2014), because export and import of goods and services are not present for countries in SNAM.

Table 1

Social Accounting Matrix (SAM) on the Base of the System of National Accounting of Mexico (SNAM)

Schematic social accounting matrix on based defourny and thorbecke (1984)			Expenditure													
			Endogenous							Exogenous						
				Factors			Enterprises				Rest of world		Capital accounts			
			Productive activities	L	k	Households	Nfs	Fs	Npissh	Government	Current t.	K. T.	Capital	Gfkf	Financial	Totals
Incomes	productive activities		T33 **A11**	0	0 **A12**	T32h		T32e		X34	X35		X36			Y3
	Endogenous Factors	L	T13	0	0	0		0		X14	X15		X16			Y1
		K														
	Households		0 **A21**	T21lh	T21kh **A22**	T22hh		T22eh		X24h	X25h		X26h			Y2h
	Enterprises	Nfs	0	T21le	T21ke	T22he		T22ee		X24e	X25e		X26e			Y2e
		Fs														
		Npissh														
	Government		T43	L41l	L41k	L42h		L42e		T44	T45		T46			Y4
	Exogenous Rest of world	Curren t t.	T53	L51l	L51k	L52h		L52e		T54	T55		T56			Y5
		K. T.														
	Capital accounts	Capital														
		Gfkf	T63	L61l	L61k	L62h		L62e		T64	T65		T66			Y6
		Financial														
Totals			Y3	Y1l	Y1k	Y2h		Y2e		Y4	Y5		Y6			

T, transference; K.T., capital transferences; nFS, non-financial companies; FS, financial companies; NPIsSH, non-profit institutions serving household; GFKF, gross fix capital formation; L, work; K, capital.

Table 2

IOT Compounds. Matrix 165x165

SECTOR	A12 - SAM aggregated = OIT	NAICS code	Number of accounts
11	Agriculture, hunting, forestry and fishing	1111-1114, 1119, 1121, 1122-1125, 1129, 1131-1133, 1141, 1142, 1151-1153.	19
21	Mining and quarrying	2111, 2121-2123, 2131.	5
22	Electricity, gas, and water supply	2211, 2221, 2222.	3
23	Construction	23: 2361, 2362, 2371-2373, 2379, 2381-2383, 2389.	1
31-33	Manufacturing	3111-3119, 3121, 3122, 3131-3133, 3141, 3149, 3151, 3152, 3159, 3161, 3162, 3169, 3211, 3212, 3219, 3221, 3222, 3231, 3241, 3251-3256, 3259, 3261, 3262, 3271-3274, 3279, 3311-3315, 3321-3329, 3331-3336, 3339, 3341-3346, 3351-3353, 3359, 3361-3369, 3371, 3372, 3379, 3391, 3399.	86
43-46	Commerce	43-46: 4311.	1
48	Transport and communications	4862, 4869, and the rest of the sector 48: 4811, 4812, 4821, 4832, 4841, 4851-4855, 4859, 4871, 4872, 4879, 4881-4885, 4889.	3
49	Mail and storage	49: 4911, 4921, 4931.	1
51	Mass media information	51: 5111, 5112, 5121, 5122, 5151, 5152, 5171, 5172, 5174, 5179, 5182, 5191.	1
52	Financial services and of insurances	5211, 5221-5225, 5231, 5332, 5239, 5241, 5242.	11
53	Real-estate and rental of personal property and intangible services	53: 5311-5313, 5321-5324, 5331.	1
54	Professional, scientific, and technical services	54: 5411-5419, 5511.	1
55	Management of companies and enterprises	55: 5511.	1
56	Waste management and remediation services	5621, and the rest of the sector 56: 5611-5617, 5619.	2
61	Educational services	61: 6111-6117.	1
62	Health and social care	6214, 6216, the rest of the sub-sector 621: 6211-6213, 6215, 6219; 6221-6223, 6231-6233, 6239, 6241-6244.	14
71	Cultural and sporting services, recreation, and other recreational services	71: 7111-7115, 7121, 7131, 7132, 7139.	1
72	Temporary accommodation services and preparation of foods and beverages	72: 7211-7213, 7221-7224.	1
81	Other services except government activities	8141 and the rest of the sector 81: 8111-8114, 8121-8124, 8129, 8131, 8132.	2
93	Activities of the government and activities of international organizations and offshore	9311-9318, 9321.	9
	Total		165

The intermediate consumption and production account entrances were open to economic activities branches. The first is IOT 2011 and the second is gross production value (basic prices). The goods & services with outside account entrances: remunerations, rental of property, and current transfers received/paid were broken down by NAFTA country redistribution like flows of Outward/Inward Direct Investment (Foreign Direct Investment, 2016).

Consumption of fixed capital (CFC), taxes less subsidies on products and adjustment by rounding are distributed as gross values added.

Capital transferences received/paid and current transferences paid are not known. Adjustments due to changes to pension rights received/paid from/to the rest of the world (Use of income account) were adjusted few years ago. These changes were consequence of the Pension Reform in 1996.

Lending or financing and current external balance have same value but the sign changed.

The net factor income from/to the rest of the world (NFIRW), is disaggregated from the cell net added value so should be adjusted in the successive cells.

The original structure of the accounting matrix proposal is extensively explained in the paper predecessor (Ledesma-Carrión, Hernández-Hernández, & Muciño-Porras, 2015). This SAM is in terms of the balance equations for all accounts which integrate the SCNM. The matrix here studied in terms of Thorbecke (2000) is obtained simply by rearranging and/or adding accounts.

Methodology

Accounting multipliers and linkages use Leontief theory (Thorbecke, 2000; Pineda, 2011; Núñez, 2008; Kim, 2008; Minzer & Solís, 2014). Because revised data appear up to 2011, the SAM and OIT were calculated for 2011. Links and relations between economic sectors and branches involve the input-output tableau, the distribution by countries and industry of goods and services of imports and exports in the balance of trade (BT) and balance of payments (BP) and the relationship between institutional sectors and branches of economic activity make a system of accounting balance equations.

Data between economic and institutional sectors through SNAM were used to redistribution cell T_{32}.

Households were open by minimum salaries levels of income and mixed income was disaggregated by sex for the first five deciles (in terms of mw) of income and not paid work is by (i) providing food, (ii) providing cleaning and maintenance of housing, (iii) providing cleaning and care of clothing and shoes, (iv) providing shopping and household management, (v) providing care and support, and (vi) providing help to other households and volunteer work. The redistributions used National Income and Expenditure Survey of Households (ENIGH [Encuesta Nacional de Ingreso y Gasto de los Hogares], 2012). The ENIGH is biannual.

The SNAM-MX11 does not provide for the production of narcotics (cannabis) in gross domestic product (GDP) and intermediate consumption (IOT-MX11) and their impact on the ENIGH. Because of this, the lower deciles are underestimated. Many families work for drug trafficking as distributers and/or producers. The families work a portion of the land for poppy and cannabis and one for beans, corn, sorghum, and other legal crops. Some of the medium and upper deciles are money lauder through their companies. The rich do not respond to interviewers, they are also underestimated.

The discrepancies between current transfers received by households (it is reported by ENIGH) and total transferences reported by BP (it is calculated with financial system data) reveal the lack of response of households.

Also, the BP does not record earnings of Mexican producers abroad, for example, Televisa, CEMEX, Bimbo, Vitro Group, etc.

The lack of registration of iron production and that was exchanged for chemicals to produce drugs, production, internal distribution, export and transfer of drugs, do not appear in BP and BT, in addition, trafficking in persons and smuggling of weapons appear not quantified in BP and BT.

Accounting multipliers direct Ma_1, cross Ma_2, and cyclical Ma_3 are defined as

$$\mathrm{Ma}_1 = \begin{pmatrix} (\mathrm{I} - \mathrm{A}_{11})^{-1} & 0 \\ 0 & (\mathrm{I} - \mathrm{A}_{22})^{-1} \end{pmatrix} \quad (1)$$

$$\mathrm{Ma}_2 = \begin{pmatrix} \mathrm{I} & (\mathrm{I} - \mathrm{A}_{11})^{-1}\mathrm{A}_{12} \\ (\mathrm{I} - \mathrm{A}_{22})^{-1}\mathrm{A}_{21} & \mathrm{I} \end{pmatrix} \quad (2)$$

$$\mathrm{Ma}_3 = \begin{pmatrix} (\mathrm{I} - (\mathrm{I} - \mathrm{A}_{11})^{-1}\mathrm{A}_{12}(\mathrm{I} - \mathrm{A}_{22})^{-1}\mathrm{A}_{21})^{-1} & 0 \\ 0 & (\mathrm{I} - (\mathrm{I} - \mathrm{A}_{22})^{-1}\mathrm{A}_{21}(\mathrm{I} - \mathrm{A}_{11})^{-1}\mathrm{A}_{12})^{-1} \end{pmatrix} \quad (3)$$

Direct multipliers are those which measure the interrelationship between productive activities and institutional sectors, equation (1). No mix of productive and institutional sectors. This interrelationship is a dimensionless proportionality constant.

From equation (2), the cross multipliers measure the interaction between sectors, that is, given the direct impact of an economic activity is affected by the subsequent interaction with any institutional sector and vice versa.

Cyclical multipliers are closing the cycle, equation (3): economic activity-institutional sector-economic activity. That is, given the cross-impact of economic activity and institutional sector, how it is affected by the subsequent interaction with any economic activity. The other cycle would be: institutional sector-economic activity-institutional sector.

Results

The fixed-price multiplier analysis is showed in the Tables 3-6 for key, strategic, leading, and independent activities respectively.

From Table 3, the GI impact has two items: the gross operating surplus (GOS) and wage and salaries, of non-financial companies and household for deciles 1-6 (current transferences), for the deciles 7-10 the impact is in PIA, DI, and UI accounts: remunerations, current transferences, rental of properties, and saving. The government supports housing credit through financial institutions: publics, Housing Fund for Institute for Social Security and Services for State Workers (FOVISSSTE) and Institute of National Housing Fund for Workers (INFONAVIT)) and privates. Also, the government supports programs for entrepreneurs and self-employment. The population with income between deciles 2 and 9 is benefited with these programs. The “Crusade against hunger” program is aimed at people in the income decile 1.

The wholesale trade & retail trade and the real estate and rental and leasing are more impactful than oil and gas extraction and petroleum and coal products manufacturing production respect to the gross value of production (GVP). Mexico has become a trade and service country and does not remain as producer of goods. The strength of the domestic economy was slaughtered to maintain stable macroeconomic variable by free trade agreements (FTAs). The sectors 48 and 8, transport and other services except public administration, and subsector 561, administrative and support services were benefited during this change. The sectors of electric power generation, transmission and distribution, basic chemical manufacturing, bakeries and tortilla manufacturing, animal slaughtering and processing, oilseed and grain farming, and dairy product manufacturing become traditional. The information sector growth is due to technological development.

Table 3

Key Institutional and Economic Sectors

Variable code	Standardized forward linkages	Standardized backward linkages	Name
43-46	5.875	1.100	Wholesale trade & Retail trade
3241	3.980	1.053	Petroleum and coal products manufacturing
REST 561	3.649	1.267	THE REST OF THE SUB-SECTOR 561: administrative and support services
REST 48	3.578	1.411	THE REST OF THE SECTOR 48: transportation
L w&s S10	3.162	1.119	Wage and salaries + effective employer contribution for pension + effective employer contribution for nonpension + imputed contribution by employers for pension + imputed contribution by employers for nonpension. Household with 10 minimum salaries
51	2.722	1.147	Information
2211	2.620	1.154	Electric power generation, transmission and distribution
54	2.605	1.040	Professional, scientific, and technical services
3116	2.141	1.348	Animal slaughtering and processing
72	1.826	1.151	Accommodation and food services
L w&s S9	1.783	1.119	Wage and salaries + effective employer contribution for pension + effective employer contribution for nonpension + imputed contribution by employers for pension + imputed contribution by employers for nonpension. Household with 9 minimum salaries
3118	1.744	1.237	Bakeries and tortilla manufacturing
REST 81	1.692	1.139	THE REST OF THE SECTOR 81: other services (except public administration)
H DI S10	1.672	1.208	Household with 10 minimum salaries. Distribution of income
3121	1.671	1.234	Beverage manufacturing
3361	1.590	1.107	Motor vehicle manufacturing
L w&s S8	1.549	1.119	Wage and salaries + effective employer contribution for pension + effective employer contribution for nonpension + imputed contribution by employers for pension + imputed contribution by employers for nonpension. Household with 8 minimum salaries
K NPIsSH	1.486	1.151	Gross operating suplus + consumption of fix capital. Non-profit institutions serving household
5221	1.485	1.027	Depository credit intermediation
L w&s S7	1.382	1.119	Wage and salaries + effective employer contribution for pension + effective employer contribution for nonpension + imputed contribution by employers for pension + imputed contribution by employers for nonpension. Household with 7 minimum salaries

From Table 4, the rental of properties of nFS is the economic activity which is more strategic. It is following for FS and NFIRW. The GVP of petroleum and coal products manufacturing, plastics product manufacturing and resin, synthetic rubber and synthetic thread, and filaments manufacturing are strategic. The current transferences of nFS and the rental of properties of FS are strategic activities whereas households are key activities. The intermediate consumption of manufacturing of petroleum and coal, basic chemical, motor vehicle parts and resin, synthetic rubber, synthetic thread, and filaments are averagely strategic.

From Table 5, the more intensive leading economic activities are the manufacturing of pharmaceutical and medicine, dairy products, animal food, sugar and confectionery products, other food, iron and steel mills and ferroalloy, other crop farming and cattle ranching, and farming in production and intermediate consumption.

The wages and salaries of household decile 2 of income and financial companies and the effective employer contribution for non-pension of non-financial companies are linked to construction sector like leading activity.

Table 4

Strategic Institutional and Economic Sectors

Variable code	Standardized forward linkages	Standardized backward linkages	Name
K nFS	15.267	0.223	Gross operating suplus + consumption of fix capital. Non-financial companies
H API S10	5.967	0.887	Household with 10 minimum salaries. Primary allocation of income
53	5.868	0.931	Real estate and rental and leasing
H UI S10	5.169	0.967	Household with 10 minimum salaries. Use of income
H API S9	3.264	0.887	Household with 9 minimum salaries. Primary allocation of income
3251	3.206	0.858	Basic Chemical Manufacturing
H UI S9	2.843	0.967	Household with 9 minimum salaries. Use of income
H API S8	2.806	0.887	Household with 8 minimum salaries. Primary allocation of income
2111	2.757	0.937	Oil and gas extraction
H API S7	2.478	0.887	Household with 7 minimum salaries. Primary allocation of income
H UI S8	2.448	0.967	Household with 8 minimum salaries. Use of income
H UI S7	2.166	0.967	Household with 7 minimum salaries. Use of income
H API S6	2.022	0.887	Household with 6 minimum salaries. Primary allocation of income
3363	1.892	0.910	Motor vehicle parts manufacturing
E FS PAI	1.836	0.767	Enterprises. Financial companies. Primary allocation of income
H UI S6	1.774	0.967	Household with 6 minimum salaries. Use of income
1111	1.712	0.730	Oilseed and grain farming
H API S5	1.656	0.887	Household with 5 minimum salaries. Primary allocation of income
E FS UI	1.590	0.571	Enterprises. Financial companies. Use of income
H UI S5	1.459	0.967	Household with 5 minimum salaries. Use of income

Table 5

Leading Institutional and Economic Sectors

Variable code	Standardized forward linkages	Standardized backward linkages	Name
H DI S9	0.997	1.208	Household with 9 minimum salaries. Distribution of income
3113	0.965	1.282	Sugar and confectionery product manufacturing
L w&s S5	0.963	1.119	Wage and salaries + effective employer contribution for pension + effective employer contribution for nonpension + imputed contribution by employers for pension + imputed contribution by employers for nonpension. Household with 5 minimum salaries
1123	0.946	1.335	Poultry and egg production
3314	0.908	1.116	Nonferrous metal (except Aluminum) production and processing
2221	0.888	1.121	Water collection, treatment and supply of water
H DI S8	0.882	1.208	Household with 8 minimum salaries. Distribution of income
3256	0.861	1.120	Soap, cleaning compound, and toilet preparation manufacturing
61	0.856	1.443	Educational services
5241	0.846	1.082	Insurance carriers
3152	0.834	1.033	Cut and sew apparel manufacturing
H DI S7	0.800	1.208	Household with 7 minimum salaries. Distribution of income
5224	0.784	1.241	Securities and commodity contracts intermediation and brokerage
3231	0.781	1.073	Printing and related support activities
3211	0.769	1.194	Sawmills and wood preservation

Table 5 continued

Variable code	Standardized forward linkages	Standardized backward linkages	Name
L w&s S4	0.729	1.119	Wage and salaries + effective employer contribution for pension + effective employer contribution for nonpension + imputed contribution by employers for pension + imputed contribution by employers for nonpension. Household with 4 minimum salaries
3272	0.701	1.042	Glass and glass product manufacturing
5242	0.701	1.083	Agencies, brokerages, and other insurance related activities
L GMI S9	0.690	1.128	Gross mix income. Household with 9 minimum salaries
71	0.690	1.117	Arts, entertainment, and recreation

Secondly, financial sector has leading activities through of management of companies and enterprises, securities and commodity contracts intermediation and brokerage, non-depository credit intermediation, and insurance carriers.

Thirdly, the mixed income for sex and kind of activity impact likes leading economic branch: providing care and support for woman for deciles 3, 2, 4, 1, and 5, in this order. It follows the provided food for woman for deciles 5-1. The NPIsSH are led by imputed contribution by employers for non-pension.

From Table 6, the GVP of grain and oilseed milling, educational services, plastic product manufacturing, and insurance carriers are the strongest independent activities.

Table 6

Independent Institutional and Economic Sectors

Variable code	Standardized forward linkages	Standardized backward linkages	Name
H API S3	0.918	0.887	Household with 3 minimum salaries. Primary allocation of income
3253	0.915	0.870	Pesticide, fertilizer, and other agricultural chemical manufacturing
3344	0.908	0.627	Semiconductor and other electronic component manufacturing
3399	0.870	0.786	Other miscellaneous manufacturing
H UI S3	0.824	0.967	Household with 3 minimum salaries. Use of income
1113	0.797	1.000	Fruit and tree nut farming
3132	0.794	0.806	Fabric mills
2123	0.746	0.950	Nonmetallic mineral mining and quarrying
3359	0.740	0.673	Other electrical equipment and component manufacturing
3259	0.724	0.651	Other chemical product and preparation manufacturing
3329	0.701	0.681	Other fabricated metal product manufacturing
3328	0.686	0.951	Coating, engraving, heat treating, and allied activities
1133	0.682	0.978	Logging
3255	0.665	0.997	Paint, coating, and adhesive manufacturing
H API S2	0.653	0.887	Household with 2 minimum salaries. Primary allocation of income
E FS DI	0.644	0.811	Enterprises. Financial companies. Distribution of income
3342	0.624	0.647	Communications equipment manufacturing
3336	0.616	0.669	Engine, turbine, and power transmission equipment manufacturing
3341	0.613	0.611	Computer and peripheral equipment manufacturing
3122	0.597	0.954	Tobacco manufacturing

The import and export subsidies into GI account are government independent activities. The rental of property of non-financial companies is an intensive independent activity. Primary activities do not appear as independent

except other animal production. Many secondly and thirdly are independent as water collection, treatment, and supply of water; steel product manufacturing from purchased steel; paint, coating, and adhesive manufacturing; iron and steel mills and ferroalloy manufacturing, general public administration, regulating and promoting economic development, administrative activities of social welfare institutions, among other activities.

The first 10 economic activities with direct multipliers more intensives and OEMs activities are showed in Table 7: 2122 Metal ore mining, Rest 48 Transportation except pipeline, 5224 Securities and commodity contracts intermediation and brokerage, 5232 Securities and commodity exchanges, 2221 Water collection, treatment and supply of water, 55 Management of companies and enterprises, 3241 Petroleum and coal products manufacturing, 9318 National security activities, 3113 Sugar and confectionery product manufacturing, 3118 Bakeries and tortilla manufacturing, 3361 Motor vehicle manufacturing, 3363 Motor vehicle parts manufacturing and 3362 Motor vehicle body and trailer manufacturing, 3161 Leather and hide tanning and finishing, 3162 Footwear manufacturing.

From Tables 7-9, taking the activity more direct multiplier value, metal ore mining, this affects to petroleum and coal products manufacturing by a factor of 0.12820. This same activity has a maximum cross multiplier factor 0.09061 with capital of non-financial corporations, 0.00786 with property income of households with 10+ mw and 0.00327 with the wages and salaries of these same households. For gross mixed income of household with 10+ mw the factor is 0.00599.

In the case of cyclical multipliers of that same economic activity the factor is 0.00155 for the petroleum and coal products manufacturing, 0.00199 for transportation except pipeline, and 0.00444 for real estate and rental and leasing.

Other activity that represents modern Mexico is motor vehicle manufacturing. This has direct multipliers of 0.50802 and 0.26277 for motor vehicle parts manufacturing and wholesale trade & retail trade respectively. Cross multipliers are 0.06078, 0.00783, and 0.00345 with capita of non-financial companies, rental of property for household with income of 10+ mw and gross mixed income of same households, and cyclical multipliers: 0.00432, 0.00193, and 0.00150 for real estate and rental and leasing, transportation except pipeline and petroleum, and coal products manufacturing respectively.

Economic activities representative of modern and traditional Mexico are bakeries and tortilla manufacturing. The maximum direct impacts are 0.33837 (1111, oilseed and grain farming), 0.20812 (43-46, wholesale trade & retail trade), 0.18531 (3112, grain and oilseed milling), 0.07422 (3251, basic chemical manufacturing), and 0.05384 (3241, petroleum and coal products manufacturing).

Table 7

Direct Multipliers

Row code	2122	Row code	REST 48	Row code	5224	Row code	5232	Row code	2221
2122	2.81522	REST 48	2.23917	5224	2.20312	5232	2.15328	2221	2.13249
3241	0.12820	3241	0.46336	55	0.20338	51	0.37448	3251	0.29299
2211	0.12491	2111	0.20490	54	0.14080	54	0.15131	43-46	0.11251
REST 561	0.10129	43-46	0.10891	REST 561	0.13048	5221	0.10358	2111	0.07843
43-46	0.08611	3363	0.07065	51	0.09606	55	0.07683	3241	0.06265
3259	0.06605	54	0.06033	53	0.08736	REST 561	0.07334	54	0.04706
2111	0.06184	REST 561	0.05624	REST 48	0.08195	43-46	0.05559	REST 48	0.02988
53	0.05510	53	0.03477	2211	0.05744	53	0.04664	3399	0.02748
54	0.05305	3251	0.02472	43-46	0.04260	2211	0.03625	REST 561	0.02089

Table 7 continued

Row code	2122	Row code	REST 48	Row code	5224	Row code	5232	Row code	2221
3251	0.03626	3336	0.02412	3241	0.03543	REST 81	0.03622	2211	0.02000
REST 48	0.01975	REST 81	0.02304	3221	0.02961	3221	0.03473	3273	0.01715
REST 81	0.01899	55	0.02208	REST 81	0.02786	3344	0.03423	3259	0.01672
51	0.01736	51	0.02156	3231	0.02629	3231	0.02975	REST 81	0.01621
5241	0.01560	2211	0.01689	5221	0.02514	3241	0.01818	53	0.01349
3339	0.01319	5221	0.01305	5241	0.02396	REST 48	0.01347	55	0.01279
55	0.01260	5241	0.01289	2111	0.01782	5241	0.01197	51	0.01254
5221	0.01250	72	0.01247	72	0.01607	72	0.01160	3329	0.00742
2221	0.01084	3262	0.00881	3251	0.01417	3251	0.01078	2123	0.00705
Row code	55	Row code	3241	Row code	9318	Row code	3113	Row code	3118
55	2.12420	3241	2.11919	9318	2.11087	3113	2.10616	3118	2.10600
54	0.11245	2111	0.92665	3241	0.13989	1119	0.49673	1111	0.33837
REST 561	0.06915	3251	0.05325	2111	0.06906	43-46	0.15598	43-46	0.20812
53	0.03600	43-46	0.04731	43-46	0.06137	3241	0.07637	3112	0.18531
3241	0.02553	55	0.02637	3251	0.04860	REST 561	0.06967	3251	0.07422
51	0.02411	REST 48	0.02212	72	0.04253	3112	0.05688	3241	0.05384
5221	0.01836	3327	0.01314	2211	0.04239	3251	0.05576	REST 561	0.04011
2111	0.01150	REST 561	0.00978	51	0.03806	2111	0.04282	3261	0.03903
43-46	0.00883	54	0.00825	REST 48	0.02067	3261	0.04157	REST 48	0.03674
72	0.00776	5221	0.00582	54	0.01986	2211	0.03922	2111	0.03630
5224	0.00736	2211	0.00546	REST 561	0.01978	54	0.03633	53	0.03183
2211	0.00697	53	0.00380	3329	0.01636	3119	0.03478	2211	0.02859
REST 48	0.00678	51	0.00367	3328	0.01553	3253	0.03168	3113	0.02484
3231	0.00332	5224	0.00217	REST 81	0.01399	REST 48	0.03130	3119	0.01965
REST 81	0.00319	72	0.00212	3359	0.00893	53	0.02940	3253	0.01869
3221	0.00313	3329	0.00173	2221	0.00852	3222	0.02828	54	0.01847
5241	0.00299	3312	0.00164	3363	0.00775	1113	0.02684	3222	0.01695
3251	0.00254	3324	0.00150	53	0.00669	3115	0.02402	3115	0.01526
Row code	3361	Row code	3362	Row code	3363	Row code	3161	Row code	3162
3361	1.88403	3362	1.72453	3363	1.79472	3161	1.55610	3162	1.80840
3363	0.50802	3311	0.30809	43-46	0.12197	3116	0.40348	3161	0.26009
43-46	0.26277	43-46	0.17409	3311	0.06858	43-46	0.18958	43-46	0.18872
3261	0.07505	3363	0.08211	3344	0.06290	REST 561	0.10090	3116	0.08535
REST 48	0.06192	REST 561	0.05585	3359	0.06041	1121	0.06697	REST 561	0.06910
3312	0.06191	3313	0.04665	3261	0.05803	1123	0.06331	3262	0.05634
3262	0.05102	3312	0.04442	REST 561	0.05761	3251	0.04916	3252	0.04546
REST 561	0.04613	REST 48	0.04408	3312	0.04263	2211	0.03607	2211	0.03531
3311	0.04069	2211	0.03862	3329	0.03791	3371	0.03446	3251	0.03384
3336	0.03775	3255	0.03792	3314	0.03663	3111	0.03313	3241	0.02801
3359	0.02656	3241	0.03589	REST 48	0.03405	REST 48	0.03182	53	0.02626
2211	0.02628	2122	0.03288	3353	0.03364	3241	0.03098	REST 48	0.02438
3241	0.02539	54	0.03171	3251	0.03056	1122	0.02848	54	0.02290
3252	0.02533	3251	0.02705	3252	0.02954	1111	0.02710	3222	0.02267
3362	0.02503	3332	0.02262	2211	0.02929	2111	0.02202	3132	0.02220
53	0.02424	53	0.02115	54	0.02543	53	0.02102	2111	0.01805
3251	0.02359	3211	0.02107	53	0.02482	1129	0.01876	3255	0.01674
3328	0.02220	2111	0.02027	3313	0.02298	54	0.01703	1121	0.01419

Table 8

Cross Multipliers

Row code	2122	Row code	REST 48	Row code	5224	Row code	5232	Row code	2221
2122	1.00000	REST 48	1.00000	5224	1.00000	5232	1.00000	2221	1.00000
K nFS	0.09061	K nFS	0.13264	K nFS	0.11249	K nFS	0.15336	K nFS	0.09416
H API S10	0.00786	H API S10	0.03994	H API S10	0.01838	K NPIsSH	0.01406	H API S10	0.02963
E FS PAI	0.00703	L w&s S10	0.02959	H UI S10	0.01193	H API S10	0.01300	L w&s S10	0.02377
L GMI S10	0.00599	H UI S10	0.02558	L w&s S10	0.01011	E FS PAI	0.01043	H UI S10	0.01898
K FS	0.00544	H API S9	0.02109	H API S9	0.00971	H UI S10	0.00865	H API S9	0.01565
H UI S10	0.00526	H API S8	0.01789	H API S8	0.00823	L GMI S10	0.00858	H API S8	0.01327
E FS UI	0.00453	L w&s S9	0.01562	E FS PAI	0.00798	K FS	0.00808	L w&s S9	0.01255
H API S9	0.00415	H API S7	0.01560	H API S7	0.00718	H API S9	0.00687	H API S7	0.01158
H API S8	0.00352	H UI S9	0.01351	L GMI S10	0.00664	E FS UI	0.00672	L w&s S8	0.01065
L w&s S10	0.00327	L w&s S8	0.01325	H UI S9	0.00630	H API S8	0.00583	H UI S9	0.01002
L GMI S9	0.00316	H API S6	0.01242	K FS	0.00618	H API S7	0.00508	L w&s S7	0.00929
H API S7	0.00307	L w&s S7	0.01156	H API S6	0.00572	H UI S9	0.00457	H API S6	0.00922
H UI S9	0.00278	H UI S8	0.01146	K NPIsSH	0.00554	L GMI S9	0.00453	H UI S8	0.00850
L GMI S8	0.00268	H UI S7	0.00999	H UI S8	0.00534	H API S6	0.00405	H UI S7	0.00742
H API S6	0.00244	H API S5	0.00987	L w&s S9	0.00534	H UI S8	0.00387	L w&s S6	0.00739
H UI S8	0.00235	K NPIsSH	0.00987	E FS UI	0.00514	L GMI S8	0.00384	H API S5	0.00732
L GMI S7	0.00234	L w&s S6	0.00920	H UI S7	0.00466	H UI S7	0.00338	E FS PAI	0.00693
Row code	55	Row code	3241	Row code	9318	Row code	3113	Row code	3118
55	1.00000	3241	1.00000	9318	1.00000	3113	1.00000	3118	1.00000
K nFS	0.20802	K nFS	0.02114	L w&s S10	0.10822	K nFS	0.06776	K nFS	0.10905
H API S10	0.03138	H API S10	0.00450	H API S10	0.10012	H API S10	0.01678	H API S10	0.02048
H UI S10	0.02039	H UI S10	0.00290	H UI S10	0.06310	L w&s S10	0.01160	H UI S10	0.01323
K NPIsSH	0.02030	L w&s S10	0.00267	L w&s S9	0.05715	H UI S10	0.01078	L w&s S10	0.01146
H API S9	0.01657	H API S9	0.00237	H API S9	0.05287	H API S9	0.00886	H API S9	0.01082
E FS PAI	0.01406	K NPIsSH	0.00221	L w&s S8	0.04848	H API S8	0.00751	K NPIsSH	0.00962
H API S8	0.01405	H API S8	0.00201	H API S8	0.04485	H API S7	0.00655	H API S8	0.00917
L w&s S10	0.01360	H API S7	0.00176	L w&s S7	0.04228	L w&s S9	0.00613	H API S7	0.00800
H API S7	0.01226	H UI S9	0.00153	H API S7	0.03912	H UI S9	0.00569	E FS PAI	0.00744
L GMI S10	0.01155	E FS PAI	0.00142	L w&s S6	0.03367	H API S6	0.00522	H UI S9	0.00699
K FS	0.01089	L w&s S9	0.00141	H UI S9	0.03332	L w&s S8	0.00520	H API S6	0.00637
H UI S9	0.01077	H API S6	0.00140	H API S6	0.03115	H UI S8	0.00483	L GMI S10	0.00613
H API S6	0.00976	H UI S8	0.00130	H UI S8	0.02827	E FS PAI	0.00473	L w&s S9	0.00605
H UI S8	0.00913	L w&s S8	0.00120	L w&s S5	0.02675	L w&s S7	0.00453	H UI S8	0.00593
E FS UI	0.00907	L GMI S10	0.00116	H API S5	0.02474	K NPIsSH	0.00439	K FS	0.00577
H UI S7	0.00796	H UI S7	0.00113	H UI S7	0.02465	H UI S7	0.00421	H UI S7	0.00517
H API S5	0.00775	H API S5	0.00111	H DI S10	0.02172	H API S5	0.00415	L w&s S8	0.00513
Row code	3361	Row code	3362	Row code	3363	Row code	3161	Row code	3162
3361	1.00000	3362	1.00000	3363	1.00000	3161	1.00000	3162	1.00000
K nFS	0.06078	K nFS	0.04820	K nFS	0.03167	K nFS	0.03822	K nFS	0.06144
H API S10	0.00783	H API S10	0.01851	H API S10	0.00962	H API S10	0.01083	H API S10	0.02741
H UI S10	0.00512	L w&s S10	0.01466	L w&s S10	0.00729	L w&s S10	0.00760	L w&s S10	0.02305
K NPIsSH	0.00489	H UI S10	0.01181	H UI S10	0.00616	H UI S10	0.00694	H UI S10	0.01747
E FS PAI	0.00418	H API S9	0.00977	H API S9	0.00508	H API S9	0.00572	H API S9	0.01448
H API S9	0.00414	H API S8	0.00829	H API S8	0.00431	H API S8	0.00485	H API S8	0.01228
H API S8	0.00351	L w&s S9	0.00774	L w&s S9	0.00385	H API S7	0.00423	L w&s S9	0.01217

Table 8 continued

Row code	2122	Row code	REST 48	Row code	5224	Row code	5232	Row code	2221
L GMI S10	0.00345	H API S7	0.00723	H API S7	0.00376	L w&s S9	0.00401	H API S7	0.01071
K FS	0.00324	L w&s S8	0.00657	L w&s S8	0.00327	K NPIsSH	0.00382	L w&s S8	0.01032
H API S7	0.00306	H UI S9	0.00624	H UI S9	0.00325	H UI S9	0.00366	H UI S9	0.00922
L w&s S10	0.00287	H API S6	0.00576	H API S6	0.00299	L w&s S8	0.00340	L w&s S7	0.00900
H UI S9	0.00270	L w&s S7	0.00573	L w&s S7	0.00285	H API S6	0.00337	H API S6	0.00853
E FS UI	0.00270	H UI S8	0.00529	H UI S8	0.00276	H UI S8	0.00311	H UI S8	0.00782
H API S6	0.00244	H UI S7	0.00461	H UI S7	0.00241	L w&s S7	0.00297	L w&s S6	0.00717
H UI S8	0.00229	H API S5	0.00457	H API S5	0.00238	H UI S7	0.00271	H UI S7	0.00682
H UI S7	0.00200	L w&s S6	0.00456	L w&s S6	0.00227	H API S5	0.00268	H API S5	0.00677
H API S5	0.00194	K NPIsSH	0.00411	E FS PAI	0.00223	E FS PAI	0.00258	H DI S10	0.00595

Table 9

Cyclical Multipliers

Row code	2122	Row code	REST 48	Row code	5224	Row code	5232	Row code	2221
53	0.00444	53	0.02161	53	0.01008	53	0.00731	53	0.01604
REST 48	0.00199	3241	0.00752	REST 48	0.00451	REST 48	0.00327	REST 48	0.00717
3241	0.00155	3116	0.00719	3241	0.00351	3241	0.00254	3241	0.00558
3116	0.00148	43-46	0.00674	3116	0.00335	3116	0.00243	3116	0.00534
43-46	0.00138	51	0.00616	43-46	0.00314	43-46	0.00228	43-46	0.00500
51	0.00127	3118	0.00611	51	0.00287	51	0.00208	51	0.00457
3118	0.00126	3361	0.00568	3118	0.00285	3118	0.00207	3118	0.00454
3361	0.00117	3121	0.00554	3361	0.00265	3361	0.00192	3361	0.00421
3121	0.00114	3363	0.00518	3121	0.00258	3121	0.00187	3121	0.00411
3363	0.00106	72	0.00501	3363	0.00242	3363	0.00175	3363	0.00384
72	0.00103	3251	0.00445	72	0.00234	72	0.00169	72	0.00372
3251	0.00091	2111	0.00403	3251	0.00207	3251	0.00150	3251	0.00330
2111	0.00083	REST 81	0.00384	2111	0.00188	2111	0.00136	2111	0.00299
REST 81	0.00079	REST 561	0.00357	REST 81	0.00179	REST 81	0.00130	REST 81	0.00285
REST 561	0.00073	2211	0.00329	REST 561	0.00167	REST 561	0.00121	REST 561	0.00265
2211	0.00068	5221	0.00319	2211	0.00154	2211	0.00111	2211	0.00244
5221	0.00066	3115	0.00299	5221	0.00149	5221	0.00108	5221	0.00237
3115	0.00062	3254	0.00284	3115	0.00140	3115	0.00101	3115	0.00222
Row code	55	Row code	3241	Row code	9318	Row code	3113	Row code	3118
53	0.01723	53	0.00245	53	0.05332	53	0.00911	53	0.01118
REST 48	0.00770	REST 48	0.00109	REST 48	0.02385	REST 48	0.00407	REST 48	0.00500
3241	0.00600	3116	0.00081	3241	0.01856	3241	0.00317	3241	0.00389
3116	0.00573	43-46	0.00076	3116	0.01774	3116	0.00303	3116	0.00372
43-46	0.00537	51	0.00070	43-46	0.01662	43-46	0.00284	43-46	0.00349
51	0.00491	3118	0.00069	51	0.01520	51	0.00260	51	0.00319
3118	0.00487	3361	0.00064	3118	0.01508	3118	0.00258	3361	0.00294
3361	0.00452	3121	0.00063	3361	0.01400	3361	0.00239	3121	0.00287
3121	0.00442	3363	0.00059	3121	0.01367	3121	0.00234	3363	0.00268
3363	0.00413	72	0.00057	3363	0.01278	3363	0.00218	72	0.00259
72	0.00399	3251	0.00050	72	0.01236	72	0.00211	3251	0.00230
3251	0.00355	2111	0.00046	3251	0.01097	3251	0.00187	2111	0.00209
2111	0.00322	REST 81	0.00043	2111	0.00995	2111	0.00170	REST 81	0.00199
REST 81	0.00306	REST 561	0.00040	REST 81	0.00947	REST 81	0.00162	REST 561	0.00185

Table 9 continued

Row code	2122	Row code	REST 48	Row code	5224	Row code	5232	Row code	2221
REST 561	0.00285	2211	0.00037	REST 561	0.00881	REST 561	0.00150	2211	0.00170
2211	0.00263	5221	0.00036	2211	0.00813	2211	0.00139	5221	0.00165
5221	0.00254	3115	0.00034	5221	0.00787	5221	0.00135	3115	0.00155
3115	0.00239	3254	0.00032	3115	0.00739	3115	0.00126	3254	0.00147
Row code	3361	Row code	3362	Row code	3363	Row code	3161	Row code	3162
53	0.00432	53	0.00998	53	0.00520	53	0.00586	53	0.01476
REST 48	0.00193	REST 48	0.00446	REST 48	0.00233	REST 48	0.00262	REST 48	0.00660
3241	0.00150	3241	0.00347	3241	0.00181	3241	0.00204	3241	0.00514
3116	0.00144	3116	0.00332	3116	0.00173	3116	0.00195	3116	0.00491
43-46	0.00135	43-46	0.00311	43-46	0.00162	43-46	0.00183	43-46	0.00460
51	0.00123	51	0.00284	51	0.00148	51	0.00167	51	0.00421
3118	0.00122	3118	0.00282	3118	0.00147	3118	0.00166	3118	0.00417
3121	0.00111	3361	0.00262	3361	0.00137	3361	0.00154	3361	0.00388
3363	0.00104	3121	0.00256	3121	0.00133	3121	0.00150	3121	0.00378
72	0.00100	3363	0.00239	72	0.00121	3363	0.00141	3363	0.00354
3251	0.00089	72	0.00231	3251	0.00107	72	0.00136	72	0.00342
2111	0.00081	3251	0.00205	2111	0.00097	3251	0.00121	3251	0.00304
REST 81	0.00077	2111	0.00186	REST 81	0.00092	2111	0.00109	2111	0.00276
REST 561	0.00071	REST 81	0.00177	REST 561	0.00086	REST 81	0.00104	REST 81	0.00262
2211	0.00066	REST 561	0.00165	2211	0.00079	REST 561	0.00097	REST 561	0.00244
5221	0.00064	2211	0.00152	5221	0.00077	2211	0.00089	2211	0.00225
3115	0.00060	5221	0.00147	3115	0.00072	5221	0.00087	5221	0.00218
3254	0.00057	3115	0.00138	3254	0.00068	3115	0.00081	3115	0.00205

The maximum cross impacts are 0.10905 (capital of nFS), 0.02048 (rental of property of households 10 + mw), 0.01146 and 0.00605 (households with wage, salaries and contributions and mixed income of 10 + mw).

The maximum cyclical impacts are 0.01118 (53, real estate and rental and leasing), 0.00500 (rest 48, transportation except pipeline), 0.00389 (3241, petroleum and coal products manufacturing), and 0.00372 (3116, animal slaughtering and processing).

Economic activities representative of traditional Mexico are leather and hide tanning and finishing (3161) and footwear manufacturing (3162). This first strongly impacts to activity of animal slaughtering and processing (3116, 0.40348), wholesale trade & retail trade (43-46, 0.18958), and administrative and support services (the rest of the sub-sector 561, 0.10090).

The economic-institutional inter-sectorial relations of this activity are with non-financial companies (0.03822), rental of property (0.01083) and wages, salaries, and contributions (0.00760) of 10 + mw households.

Close the cycle the multipliers that impact to activities: real estate and rental and leasing (0.00586), transportation except pipeline (0.00262), petroleum and coal products manufacturing (0.00204), and animal slaughtering and processing (0.00195).

The second activity, footwear manufacturing, close relation to first activity (3161, 0.26009), wholesale trade & retail trade (0.18872) and animal slaughtering and processing (0.08535). The maximum cross impacts are 0.06144 (capital of non-financial companies), 0.02741 and 0.02305 (rental of property and wages, salaries and contributions households with income of 10 + mw).

And cyclical multipliers: 0.01476, 0.00660, and 0.00514 for real estate and rental and leasing, transportation except pipeline and petroleum and coal products manufacturing respectively.

The activities of leather and hide tanning and finishing and footwear manufacturing are key sectors, while animal slaughtering and processing is strategic sector. Wholesale trade & retail trade is leading sector and administrative and support services is independent sector.

Analysis and Discussion

With regard to poverty alleviation, Minzer and Solis (2014) concluded that increasing the value added tax including drugs from 15% to 16% of households in the first quintile of income in the agricultural sector are the most affected. It is followed by the food industry and transport services. In this analysis it is also these quintiles but also in economic activities (specifically): services related to animal breeding and production and services related to forestry, grinding grains and obtaining seeds and oils and fats, slaughter, meat packing and processing of livestock, poultry and other edible animals tourism, freight transport, etcetera. Also, successful development activities such as sugar, chocolates, and sweets, and similar direct impact on other activities such as trade, growing vegetables, and manufacture of glass and glass products. Households are dedicated to this activity using (traditional) artisanal methods which are not as successful as households with incomes above 8 minimum wages.

Gaspar Núnez (2008) believed that the SAMs are perfectible because of the inaccuracy of the database. Although only disaggregated level branch of economic activity some sectors, the RAS method introduces errors increasingly moving away from the base year. In Mexico there are only input-output matrices official for the years 1975, 1980, 2003, and 2008 obtained from surveys. But if the RAS method is adjusted each year of iteration using information from surveys, this can improve outcomes, i.e., to explain aspects of the national economy. In this paper the latter applies.

Some improvements to this paper are to introduce the breakdown in men and women with or without skills as Kim (2008) did. Currently, the databases in this area have improved methodologies in Mexico.

Because the information obtained is extensive, authors can provide the full results of the industry groups and factors disaggregated to anyone who requests it in order that the data and results can be discussed.

Conclusion

Industries either representative of modern or traditional, competitive or lagged Mexico, are not significantly contributed to the household of 9 and 10 mw income either mixed income or wages, salaries and contributions. It is much less to households with income of 1-5 mw.

Strategic sectors as metal ore mining, petroleum and coal products manufacturing, and bakeries and tortilla manufacturing affect mainly in the capital of non-financial companies, domestic liabilities of rental of property and income of 10 + mw of household.

After of affect institutional sectors, the leading sectors as transport (except pipeline, manufacturing of motor vehicle, motor vehicle body and trailer and motor vehicle parts) these affect on real estate and rental and leasing, and transportation (except pipeline and petroleum and manufacturing of coal products). This explains that households with income under 5 mw do not receive profit of labor and energetic reforms or the arrival of new OEMs.

The financial sector (leading sector) is divorced of micro-companies and personal business. This sector affects to activity of management of companies and enterprises and professional, scientific, and technical services (non-traditional and low speed Mexico, households with income between 1-5 mw).

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Operating Within Legislative Restrictions Marketing Funds for Urban Restoration Supporting the Fight Against Aesthetic Pollution

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A novel marketing approach operating within legislative restrictions such as the prohibition of outdoor advertising in a city environment is suggested. The case examined is the city of Athens. The purpose of this study is to present a modified model of internalizing external costs caused by the operation of a manufacturing unit in conjunction with a new reality created. The model is shaped by means of marketing practices. The environment is characterized as a public good. Contingent Valuation Method and expert opinions were used to evaluate the effect of aesthetic pollution and estimate the potential of our proposal. The proposal describes an exemplary collaboration between private and public sector that brings multiple benefits without burdening any social group, on the basis of a Pigouvian subsidy scheme for renovation of city building facades, including motive to encourage advertising on the scaffoldings used for the renovation (which is allowed by law). Advertisers will place advertising screens on the scaffold while revenues from advertising will fund the renovation of the facade of the building. The suggested solution combines two seemingly competing activities of the city, outdoor advertising and the aesthetic reconstruction of building facades. Activity is transferred from micro- to macro-economic level, while at the same time Pareto criterion of optimality is met.

Keywords: marketing, aesthetic pollution, taxation

Introduction

Outdoor advertising is an activity that causes aesthetic (Flad, 1997) as well as material pollution (posters, billboards, sticker material, etc.). In Europe alone, there are between two and eight million billboards displayed at any given time and this number is constantly growing. Every two weeks, over six million square meters of poster paper are thrown out. The paper is not recycled, the ink is not eco-friendly, and the glue used is toxic (ECOBOARD, 2014). Due to this, billboard advertising has a disastrous effect on the environment and this issue needs to be addressed. The negative effects are pronounced on large urban centers, such as Athens. For many years, the Greek Capital faced the problem of unrestrained advertising. The

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situation led to a legal ban and final dismantling of outdoor advertising. Businesses and advertisers no longer find legally physical space to display their products. One way out is the online advertising. The online advertising however does not fully cover the needs of the advertiser since a number of social groups (e.g., the elderly) have no—or limited at best—access to electronic technology. Consequently, the justified concern for aesthetic enhancement deprived the possibility of advertising to businesses and led to income loss for dozens of employees.

On another note and completely unrelated to the above, the aesthetic state of the city of Athens is scarred by the poor condition of the facades of a great number of private or public buildings. The dark gray and black color (literally) dominates the streets of large areas of the city, creating an atmosphere of depression. On certain streets sunlight is "stifled" between "black buildings". Many buildings of great architectural value lay convicted under the "gray" pollution accumulated over decades. There is a strong relationship between the perceived lightness of a building and the opinion that it is dirty (Brimblecombe & Grossi, 2005). Blackening of light coloured fabric eventually reaches a point where it becomes publicly unacceptable and raises pressure for cleaning (Hamilton & Mansfield, 1992). This aesthetic, more specifically, visual pollution has an important-albeit undefined-cost to the social and financial life of the Greek capital.

A relevant subsidies program with the name "ΠΡΟΣΟΨΗ" ("Façade") was put in place by the Municipality of Athens. The aim of that program was the improvement of the city's general aesthetic. The effect of this effort was negligible, with the vast majority of the affected buildings remaining in this plight. In the mind of the public, external renovation of buildings is a difficult or even impossible goal. Planning authorities have a statutory responsibility to plan for the sustainable development of their areas, not only primarily through the development plan process but also through local area plans. Nonstatutory framework plans and site development briefs can supplement but can not replace the function of statutory plans (Government of Ireland, 2009).

Formulation of the Problem

Building darkening due to particle deposits is up to a point a negative externality, since the property owner is not responsible for the air pollution which is a major factor of the process. On the other hand, fouling due to time passing, as well as damage and corrosion has to be dealt with by the land owner. The result is an aesthetically polluted neighborhood and—by extend—city. This pollution affects the city functionally and financially, thus becoming a negative externality itself from the city's point of view (Hochman & Ofek, 1979). Being hard, even impossible to pinpoint the responsible for this externality, the burden for its internalization is left mainly on the land owners and in many cases they are just not willing—or simply cannot afford to pay, leading to total or partial neglecting of the necessary restoration.

Outdoor advertising on streets, building walls, and terraces is prohibited by law in Greece. This caused a crucial blow to an already struggling sector, especially the last five years of recession and led to job losses and shrinkage of the industry.

Historically, the regulation of outdoor advertising has prompted a surprisingly prodigious amount of controversy and litigation. It has been challenged as a denial of free speech, due process, and equal protection. It has been upheld on nuisance and real property grounds, and sustained on the basis of public health, safety, morality, comfort and convenience, aesthetics and the right to be let alone (Sutton, 1972). The argument against outdoor advertising which appears most often focuses on billboards' adverse visual and aesthetic impact on the

surrounding community. Advertising billboards are openly accused for "visual pollution" and how they "desecrate the landscape" (Flad, 1997).

In a study regarding the impact of billboards on real estate prices in the city of Philadelphia, USA (Snyder, 2011), it was revealed that properties purchased within a small radius of billboards have a significant decrease in sale price and the correlation is statistically significant ($p \leq 0.05$). Further, the analysis reveals a correlation between billboard density and home value. Billboards negatively impact home values.

There is compelling evidence that distraction is a major contributor to crashes (Lee, McElheny, & Gibbons, 2007; Wang, Knipling, & Goodman, 1996; Stutts, Reinfurt, Staplin, & Rodgman, 2001; Klauer, Dingus, Neale, Sudweeks, & Ramsey, 2006). The studies that have been conducted show convincingly that roadside advertising is distracting and that it may lead to poorer vehicle control. However, the evidence is presently only suggestive of, although clearly consistent with, the notion that this in turn results in crashes. Studies provid direct evidence that roadside advertising plays a significant role in distraction based crashes which are currently not available. A review by Austroads (2013) identifies the issue of distraction due to roadside advertising, but suggests that it is reasonable to conclude that far less than 1% of all crashes and near crashes involved distraction from roadside advertising.

Methodology

Contingent valuation method. In this research, the Contingent Valuation Method (CVM) was used (Carson & Mitchell, 1993). Questioners were distributed to residents of selected neighbourhoods of Athens, in order to estimate their willingness-to-pay to support restoration projects on their neighbourhood and other areas in central Athens. The questioner format aims to probe the general attitude of citizens on restoration projects and extract quantitative data in monetary units on how they value abstract ideas such as visual pollution. Additionally, it screens citizen preference on alternative strategies for urban environmental improvement. Preferences of people are examined by asking people directly their Willingness to Pay (WTP) or Willingness to Accept (WTA) a change in environmental quality.

The survey is part of an on-going wider study regarding the aesthetic pollution of the city. Since it is not formed to investigate solely the idea presented here, the quantitative data analysis is out of the scope of the present work and therefore is not presented. It presents only qualitative conclusion on "discomfort levels" due to aesthetic pollution from building facades darkening and an estimate on WTP/WTA.

Getting expert opinions. To acquire the views of experts in the fields of advertising and real estate market, telephone interviews were conducted.

Six professional advertisers were interviewed. Specific questions were addressed. Advertisers were questioned whether they would be interested to advertise on scaffolding if it is legal and if there is a relevant municipal program in place for the restoration of building facades, what would be the amount considered reasonable to allocate for the period that the restoration will last according to the size of the building and the time (for example, a seven-storey building with a width of 15-20 meters and for one month), what type of advertising they consider the most appropriate for scaffolding (general commercial or industrial), and finally asked what was their opinion on the operation of such a venture.

Eleven realtors were interviewed. They were asked on the real estate price trend on specific areas in Athens and Kozani, before and after restoration or improvement project on the area. They were asked on the importance of the facade state and how it is affected by darkening.

Towards a Solution of the Problem

Results

Regarding the CVM questioners, the answers show two seemingly contradicting trends. The majority of residents are annoyed by the visual pollution in their neighbourhood and believe that restoration programmes are the key to the solution. They seem, however, not willing to pay—or at best, willing to pay very little (around 20-30 euros each in average)—for the improvement of the aesthetic of their environment.

Also, advertisement experts, after admitting that outdoor advertisement is aesthetically unpleasant but it was (and still is in some cases albeit illegal) a substantial percentage of their income, were in general positive to the idea of scaffolding advertisement. Two of them suggested that electronic screens are the best way to go, since moving images attract more public attention. They raised concerns regarding the cost, considering that the restoration of a seven-storey building façade (working example) will last roughly a month and would cost 12,000 euros or more. They unanimously agree that the endeavour would be successful only if a relevant municipal scheme is put in place, organising the activity, offering support in the form of a subsidy, and buffering any "price war" that might arise between marketing firms, something that would cut out small firms from the deal.

Realtors unanimously verified the hypothesis that aesthetic degradation of a location leads inevitably to lower market value of the neighbourhood properties. The opposite happens when the aesthetic value of the location is improved by restoration projects, with the land property prices following an upward trend. They generally agreed that properties next to billboards or on neighbourhoods that unrestricted outdoor advertising is in practice have lower prices. They unanimously agreed in the most emphatic way on the positive correlation between the price of the property and the appearance of the building facade, especially the shading of the colour. As one realtor said: "No one will buy a flat on a dirty building", proving that in his mind a darkened façade implies an overall unclean building.

Aesthetic Pollution and Urban Restoration

The valuation of aesthetic pollution from buildings in the centre of Athens can be made with the tools offered by the environment economics. Environmental economics, as a branch of economics, has a parallel course to the general economic theory at least since the 18th century. Each resource alone or in combination with others can be used in alternative ways. The problem that arises is how natural resources are distributed optimally on options presented. To establish a conceptual framework for our working hypothesis, it is assumed that environmental issues are basically microeconomic problems (Tye, 1985; Kinnaman, 2013). Consequently, their examination involves the use of basic concepts and analytical tools of neoclassical microeconomic theory. Any suggested plan must satisfy the principles of sustainable development: financial, social, and environmental sustainability.

The trend of area redevelopment first appeared in Western European metropolitan areas, particularly in cities with heavy urban heritage and fewer suburbanization tendencies. In the late 60s, the demand for maintaining/upgrading of the cultural heritage in cities or regions with strong historical character was vocalized. At the same time, existing models and methods of urban development were challenged (Loures, 2015). During that period the renovation of the Jordaan district in Amsterdam and Harlem and VINGO in Stockholm began. In North America, an area with lighter urban tradition, the reuse of central areas for housing occurs largely combined with the questioning of the suburban model from an economic perspective. The oil crisis made the

middle class realize the advantages of the central areas. Residential rebirth of neighborhoods developed in the 19th century, with massive renovation of old residential buildings, cannot be classified as redevelopment in the sense of total intervention in the public and private urban space, it gives however a vivid picture of the problems arising from upgrading a low-income strata residential area to a high income one (Karadimitriou, 2013). Similar cases, but in milder form, appeared in European cities, such as Maris district of Paris.

Redevelopment projects of building facades have already been completed on five locations in the city of Athens. In those cases private companies, acting as donors, played a pivotal role. Moreover, seven building blocks located at Prospsygika Dourgouti area were completely renovated with funds deriving from private sponsors and the Municipality of Athens. More specifically:

(1) Varvakeio Market, sponsored by "LIQUIMAR TANKER MANAGEMENT SA";

(2) Pangratiou square, sponsored by the company "Titan AE";

(3) Athanasios Kanellopoulos square, sponsored by "VIOHALCO GREEK COPPER AND ALUMINIUM INDUSTRY";

(4) Dexamenis Square, sponsored by "TERNA TOURIST AND SHIPPING COMPANY SA";

(5) Madrid square, sponsored by "TOYOTA HELLAS SA";

(6) Dourgouti Area, sponsored by the companies "J&P Avax SA" and "ATHINEON SA".

The Case of the Municipal Garden at Kozani

In an attempt to screen a quantitative correlation between the aesthetic upgrade of a location and the benefits acquired by the land owners, the neighbourhood, and the municipality it is relevant to refer to the positive effects by the creation of the municipal garden at the city of Kozani, effects reflected at neighbourhood as well as city level. The decision to reform the former military camp, placed within the urban area of Kozani, was a turning point for the wider upgrade of the region, from the point of utilising the existing space as well as promoting the construction of new infrastructure, leading to the redevelopment of the area and eventually the creation of a "cultural neighbourhood", a centre for multiple activities just a short distance from the commercial centre. The construction of the garden with all its technicalities marked the beginning for the aesthetic improvement of the area as well as its enrichment with cultural and sporting activities with substantial benefits that exceeds the scale of the neighbourhood and reaches the scale of the entire municipality.

Regarding the impact of the project in financial terms, two factors should be considered: (a) the increase of the neighbourhood property values and (b) the additional municipal revenues due to the activities in the region. Following an investigation on real estate pricing from agencies activated at the city of Kozani, the years between the construction of the park and the burst of the financial crisis, the real estate values were steadily increasing for properties in the vicinity of the municipal gardens. Specifically, the average land price in the region within 2002-2004 amounted to 500 euro/sq.m. This value increased to 600 euro/sq.m. in the next few years, an increase of 20%. According to city realtors (six experts who replied anonymously to a telephone inquiry), real estate property values have trended upward, estimated that it would have risen even further if not for the financial crisis in 2009 which marked a sharp decline in construction activity and a consequent drop of commercial prices for land and buildings properties. Despite the recession though, prices have not dropped to levels below those of 2004. Further, according to the same realtors operating in the region, while rental housing prices follow the general downward trend in prices, the neighbourhood rents remain relatively high, even higher than the city's commercial centre.

Discussion

It is obvious that the effect of the restoration of a neibourhood, either by restoring the buildings or improving existing space is—as it was expected—positive in general, both in economic as well as environmental and aesthetique terms. Property values go up, recreational and cultural activities are boosted, the commercial activity is healthier and the satisfaction level of residents and visitors is increased. Property value and social containment are negatively affected by the "darkening" of building facades as well as outdoor advertising. The obvious course of action should be the removal of the negative factors and the promotion of the positive ones. The necessary restoration (painting and/or cleaning the facades) has a cost. Further, the ban of outdoor advertising deprives physical space from the marketing industry, leading to income loss and increased unemployment among the industry professionals. It is pivotal to emphasize that the proposal presented here is applicable only when and where there is legislative restriction to outdoor advertising.

A Pigouvian subsidy scheme can be established on the grounds that the activity would generate external benefits, or else positive externalities. The externality caused by time and pollution, affecting the property owners directly and the city indirectly (as shown above), is in turn, internalized mainly to the advertised parties. As the marketing experts pointed out, the advertised parties would be more willing to participate if they can demonstrate corporate social responsibility (CSR) (Miles & Govin, 2000). And CSR is a source of competitive advantage (Porter & Kramer, 2006). The private provision of public goods can generate value (McWilliams, 2011), and urban environment is a public good. Subsequently, the necessary investment on advertisement becomes also a tool to demonstrate CSR.

Conclusion

The present proposal describes an exemplary collaboration between private and public sector, presenting multiple benefits without burdening any social group. Energy is transferred from micro to macro level of economic activity, elevating practices from unit to the sum. According to V. Pareto condition an activity is beneficial to society when it improves the socioeconomic status of individuals, without a corresponding worsening of the socio-economic situation of others. Only thus, activities tend to maximize social welfare and the Pareto criterion is met. The activity benefits the sum of society without harming any of its parts. The case combines issues addressed by different disciplines, such as marketing, natural resources management, and public economics for reaching the socially optimal solution.

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Golden Quantity Theory: Against Monetarist School

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This paper proposes a new perspective on quantity theory of economics. Historically, golden and silver were money, especially in Greek civilizations. Golden money standard existed during 19th century, and banknote system started in 20th century with quantity theory of Irving Fisher. Accordingly, central bank possesses banknotes in markets, which equals to total GDP (emission). This paper suggests golden quantity. In modern economy, there is IMF. It manages global monetary. Golden quantity theory is the policy that may be applied in economic crises. Accordingly, central bank prints golden, and prints banknote aligned with golden amount. That policy may increase emissions in markets, and increase total demand.

Keywords: golden quantity, IMF, central banks, emissions

Introduction

This study aims to study new phase on quantity theory of economy. There are traditional quantity theory and modern quantity theory (Uysal, 2015a). It is golden quantity theory. Traditional quantity theory is developed by Irving Fisher of Yale University (Heilbroner, 1995). It is based on national GDP. Central bank equals to emission in markets with national GDP (Uysal, 2015b). Suppose national GDP is 100 billion dollars. So, there are 100 billion dollars' emissions in markets. If emission is over than GDP, that leads to inflation in economy. Modern quantity theory is developed by Milton Friedman of Chicago University in 1970s (Heilbroner, 1995). It is based on independence of central bank. Because government forces central banks for over money supply, and that results in inflation. Monetarist policy defends independence of CB to hinder over moneysupply and inflation. This study presents a new perspective in quantity theory. Maybe, it is accepted as a modern quantity theory of economics.

Literature Review: Golden Quantity Theory

This study suggests a new quantity, especially for crises term. In economics crises GDP and emissions are decreasing; therefore, total demand in economy is lessening, and recession starts due to lack of total demand. Therefore, central bank may apply golden quantity theory to further demands. Golden quantity theory has three perspectives, centers are central bank and IMF.

(1) Central bank prints, golden. It is quantity.

(2) Central bank issues national currency according to golden quantity.

(3) IMF approval is necessary to print golden-national currency.

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For example, GDP was 100 billion dollars in economy, and GDP is decreasing from 100 to 50 billion dollars in economy due to crises. Therefore, money supply is smalling by time. What policy to implement? Central bank may apply golden quantity. Therefore, central bank prints 25 billion golden, and it prints 25 billion national currency, and it penetrates 25 billion national currency in markets. That policy may inflate demand in economy, and recessions stop.

Equality of quantity is important in monetarism and quantity theory. Because money supply is over, this leads to inflation in economy politics. So, if it prints 25 billion golden, and prints 25 billion national currency. This is equality in quantity.

Fix Quantity Theory

Fix quantity theory might become another alternative in money policy. Essential of money policy by CBs is to increase demand in economy. For his case, golden quantity may increase emission and demand. Total demand approach is key purpose of Keynes J. M. (Backhouse & Bateman, 2006), Keynes aims to increase total demand in economy through IS-LM (Investment Savings-Liquidity Monetary) policy. According to IS, a central bank may issue its national currency aligned with quantity of national savings in banks. That policy would increase monetary and liquidity in markets. For example, Turkey may increase its emission by five triple of national savings. Suppose it has 1,000 TL (Turkish Lira) savings in banks; and it may print and issue 5,000 TL formarkets. Keynesian economy achieved total demand and money supply by budget deficit policy. John Hicks, economists, figured Keynesian policy as a IS-LM curve later (Backhouse & Bateman, 2006).

This study sets fix quantity theory with national savings and foreign currency reserves. A central bank may print, issue, and penetrate national currency into business markets according to national savings of citizens in financial banks. This money policy might be proper for England economy. Because national savings are higher in economy, and Bank of England may penetrate sterlings into markets aligned with quantity of savings. For example, suppose there are 50 billion sterlings' savings in banks. BOE prints 50 billion sterling equality, and distributes this quantity into business markets in order for bumped emission and total demand.

Secondly, a central bank may print and distribute national currency aligned with foreign currency reserves in central bank accounts. This monetary policy is proper for Chinese economy. Because China is a country that has the highest foreign currency reserve in central bank. Suppose China has one billion dollars reserve in its reserve. Therefore, Chinese central bank prints juan according to dollar/juan parity (this print is aligned with quantity of dollar reserves), and it penetrates this juan into markets in order to heighten total demand.

Research Methods

In this paper, quantity theories are scanned in research. They are modern quantity theory and traditional quantity theory (Hunt, 2002). According to proposal of this study, golden quantity theory may be accepted as a modern quantity theory (Uysal, 2015c).

Research Results

IMF is center for golden quantity. A country may print and issue golden-national currency. Aim of that policy is to increase total demand in economy by emission. It is expected that golden quantity penetrates money into markets, and that increases emission level. But apply of golden quantity might be undercontrol of IMF governance.

Analysis: Silver Money

Silver money theory is based on central bank's print of silver plates. It is similar to monetary policy and quantity theory above. So, CB prints silver money equaled to quantity of silver plate. It is ancient system in ancient's economies such as ancient Greek civilization. Because emission is smalling in economy in crises, and economy needs alternative money to do business. So, silver becomes alternative currency, and central bank withdraws these silvers from markets by issuing national currency equally. So, silver becomes alternative exchange currency in business markets in order to support business processes.

It is maybe also used for international business transactions. But IMF's control is needed. Because IMF is based on international monetary operations.

There might become four policies for economic crises:

(1) neomerchantalism;

(2) echell mobil theory;

(3) coin model;

(4) golden quantity theory.

Coin Model is applied in crises term. Central banks penetrate coins into market in economic crises. Because craftsmen and tradesmen need small money in crisis. So, CB prints one dollar, two dollars, five dollars, 10 dollars, 10 cents, 20 cents, and 50 cents, and it distributes this money into markets. So, traders use it to do business. For example, Turkish economy currently needs 1 TL and 2 TL print. Because emission is smalling economy, and traders need coin to do their business such as dolmush system, or smithchies. Therefore, small money support and finance businesses of those craftsmen. Fix Quantity approach appears in normal economy conditions. Golden quantity theory may be applied in crises time to support emission and demand in business markets. Finally, this paper argues new approaches of quantity theory for global economies.

Conclusions

To conclude, quantity is important for money supply, because if money supply is over than quantity, that policy may create inflation in economy. This is critics of monetarist school, Milton Friedman. Major quantity theory of economy is Fisher's Quantity Theory (Aren, 2014). It has acceptance worldwide by national governance. That study suggests another quantity measure for economics, it is golden. Golden is traditional investment tool; therefore, it may be accepted as a quantity variable. CBs may apply golden quantity policy in economic turmoils for increasing demand and lessening recessions.

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How Did the Globally Top Competitive Countries Perform?

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Countries do also compete among themselves to develop their economies like business organizations compete. This paper assesses the performance of the top globally competitive countries in terms of the degree of globalization, international trade, investment in research and technology, tariffs, foreign direct investment, and ethical practices in carrying-out international business. Analysis of these factors indicates that all the top globally competitive countries could not exhibit corresponding performance in the globalization levels, exports, investment in research and development, attracting and providing foreign direct investment, and doing business ethically. Therefore, it is suggested that these countries should implement the practices that would reflect their position as one of the top globally competitive countries.

Keywords: Globally Competitive Countries, Index of Globalization, Corruption Index of Transparency International, Basel Index

Introduction

Countries do also compete among themselves to develop their economies as business organizations do. World Economic Forum has been constructing Global Competitiveness Index of world economies. Global Competitiveness Index measures the microeconomic and macroeconomic foundations of national competitiveness (World Economic Forum: 2014-15). World Economic Forum measures the Global Competitiveness index using 12 pillars like institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labour market efficiency, financial market development, technological readiness, market size, business sophistication, and innovation. The *Global Competitiveness* assesses the competitiveness landscape and provides competitive index for 144 economies (World Economic Forum: 2014-15).

Table 1 depicts the global competitiveness index for the top 10 countries during 2012-13 to 2014-15. The top 10 globally competitive countries during the study period include Switzerland, Singapore, the USA, Finland, Germany, Japan, Hong Kong, Netherland, UK, and Sweden. Though the index of the countries varied, all these countries remain as the best globally competitive countries during 2012-13, 2013-14, and 2014-15.

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Table 1

Global Competitiveness Index During 2012-13 to 2014-15 (for Selected Countries Only)

Country	Rank for 2014-15	Rank for 2013-14	Rank for 2012-13
Switzerland	1	1	1
Singapore	2	2	2
USA	3	3	7
Finland	4	8	10
Germany	5	4	6
Japan	6	6	3
Hong Kong	7	7	9
Netherlands	8	5	5
UK	9	10	8
Sweden	10	9	4

Source: http://www.weforum.org/reports/global-competitiveness-report-2014-15, 2013-2014 and 2012-13.

Literature Review

Globally competitive countries are expected to exhibit exemplary performance in various aspects like the performance in terms of the degree of globalization, international trade, investment in research and technology, tariffs, foreign direct investment, and ethical practices in carrying-out international business. Against this background a research study is undertaken to assess the performance of the globally competitive countries against the aspects indicated earlier. Review of the existing literature on the theme of the study indicates that there are no studies dealing with the theme. However, a few studies make a mention of the performance of the countries, Deresky (2004), Mead (2005), Hodgetts, Luthans, and Doh (2008), and Subba (2014). Therefore, the present study is expected to contribute towards plugging this knowledge gap.

Research Methods

Data used for this study were collected from secondary sources like KOF Index of Globalization, World Trade Organization, UNCTAD (United Nations Conference on Trade and Development) World Investment Report, and Corruption Index of Transparency International. The study is limited to top-10 globally competitive countries based on the World Economic Forum's Global Competitiveness index for the years 2012-13, 2013-14, and 2014-15. Performance of the globally top-10 competitive countries is measured against globalization index, global trade, investment in research and development, corruption, money laundering and terrorist financing, and software piracy. Data of the performance indicators are related to different periods. As such the findings of this study are subject to these limitations.

Research Results

Globally competitive countries are expected to achieve higher degree of globalization in terms of economies, societies, and political systems. The KOF Index of Globalization, measures globalization on economic, social, political, and overall dimensions by looking at economic flows, restrictions, information flows, personal contact, and cultural proximity (http://globaledge.msu.edu/global-resources/resource/433).

Table 2 depicts KOF Index of economic, social and political globalization, and overall globalization. The top globally competitive country i.e., Switzerland scored only the 9th position in overall globalization, the 35th

position in economic globalization, the 3rd position in social globalization, and the 11th position in political globalization. Similarly, all other top-10 global competitive countries could not retain their positions in overall globalization, economic globalization, social globalization, and political globalization. In fact, Japan's economic globalization position is as high as the 126. It is clear from this analysis that the top-10 globally competitive countries could not succeed in globalizing their economies, societies, and political systems to the extent corresponding to their positions as globally competitive countries.

Table 2

KOF Index of Economic, Social and Political Globalization for Selected Years and Countries

Country	Overall globalization	Economic globalization	Social globalization	Political globalization
Switzerland	9	35	3	11
Singapore	5	1	2	85
USA	34	90	28	16
Finland	10	10	17	21
Germany	27	63	15	17
Japan	54	126	54	28
Hong Kong	NA	NA	NA	NA
Netherlands	2	4	4	9
UK	19	48	11	6
Sweden	6	15	13	7

Source: Axel, D. (2006), Updated in: Axel, D., Gaston, N., & Martens, P. (2008).

Global trade comprises of trade in merchandise and commercial services. Merchandise trade includes exports and imports of goods (Pathak, Bhagat, & Kashlak, 2006). Though all the world countries participate in merchandise trade, some countries lead merchandise exports and imports. In terms of global merchandise exports, out of the top-10 globally competitive countries USA occupied the second position, Germany occupied the third position, Japan and Netherlands occupied the fourth, and the fifth positions respectively among the top-10 leading exporters of world merchandise in 2012. Other top-10 globally competitive countries like UK (the 11th position), Singapore (the 14th position), Switzerland (the 25th position), and Sweden (the 28th position) were out of the top-10 leading exporters of global merchandise in 2012. However, Finland though it was in the fourth position of top-10 globally competitive countries, it failed to be in the top-40 leading exporters of merchandise in 2012. USA was the largest global importer of merchandise with a share of 12.6% of global imports. Top-10 globally competitive countries like USA, Germany, Japan, Netherlands, UK, and Hong Kong were also among the top-10 leading merchandise importing countries in 2012. Other top-10 globally competitive countries like Singapore (the 14th position), Switzerland (the 24th position), and Finland (the 40th position) were out of the top-10 leading merchandise importing countries in 2012.

The USA was the largest exporter of commercial services followed by United Kingdom and Germany respectively in 2012. Other top-10 globally competitive countries that were among the top-10 leading countries of commercial services in 2012 include Japan (the 6th position), Netherlands (the 9th position), and Hong Kong (the 10th position). Other top-10 globally competitive countries like Singapore (the 12th position), Switzerland (the 16th position), and Sweden (the 18th position) were out of top-10 leading exporters of commercial services. However, Finland though it was in the fourth position of top-10 globally competitive countries, it failed to be in the top-40 leading exporters of commercial services in 2012. The USA was also the largest importer of

commercial services followed by Germany, Japan, UK, Netherlands, and Singapore in the order of their shares in global commercial services imports in 2012. Other top-10 globally competitive countries that were placed out of top-10 leading importers of commercial services in 2012 were Hong Kong (the 21st position), Switzerland (the 26th position), and Finland (the 33rd position).

Globally competitive economies are also expected to spend significant amount on research and development for further advancement of technology as well as for innovation. Table 3 presents top 10 countries in 2011 in terms of amount of expenditure on research and development. USA bagged the top rank with an expenditure of $405.3 billion (PPP) followed by China and Japan. India occupied the eighth rank. However, Israel occupied the first position in terms of percentage of expenditure on research and development to GDP (4.39%) in 2011 followed by Finland (3.78%) and South Korea (3.74%). However, among the top-10 globally competitive economies, only USA, Japan, and Germany could find a place in top-10 countries in terms of spending on research and development in 2011.

Table 3

Top 10 Countries in Terms of Spending on Research & Development in 2011

Rank	Country	Expenditure on R&D (in billions of $) (PPP)	Percentage of expenditure on R&D to GDP (PPP)
1	USA	405.3	2.7
2	China	296.8	1.97
3	Japan	160.3	3.67
4	Germany	69.5	2.3
5	South Korea	55.8	3.74
6	France	42.2	1.9
7	UK	38.4	1.7
8	India	36.1	0.9
9	Canada	24.3	1.8
10	Russia	23.8	1.0

Source: www.enwikpedia.org.

Top globally competitive countries are also expected to impose lower tariff rates compared to less competitive countries as they are strong in macro-economics. Table 4 presents the average tariff rates of selected countries in 2012. It is observed from Table 4 that the rate of tariff was just 0.00% in Hong Kong, where as it was 6.5% among the top-10 globally competitive countries. The tariff rate in non-top 10 globally competitive countries like Australia and Canada was less than that of top-10 globally competitive countries in 2012. It is, thus, clear that some of the top-10 globally competitive countries performed less than that of non-top 10 globally competitive countries in fixing tariff rates.

Globally competitive countries attract foreign direct investment and also provide foreign direct investment (FDI) to various other less competitive countries. Table 5 provides the largest recipients and providers of FDI in 2012. It is observed from this table that among the top-10 globally competitive counties, the USA was the largest recipient of FDI followed by Hong Kong (3rd position), UK (6th position), and Singapore (8th position) among the largest recipient countries of FDI in 2012. Other top-10 globally competitive countries like Switzerland, Finland, Germany, and Netherlands could not find a place among the largest recipient countries of FDI in 2012. China was the second largest recipient of FDI, even though it was not one among the top-10 globally competitive countries.

Table 4

Average Tariff Rates in Selected Countries on All Products in 2012

Top 10 globally	Competitive countries	Globally less	Competitive countries
Country	Simple average tariff rate		Simple average tariff rate
Hong Kong	0.00%	Australia	2.7%
Japan	4.6%	Canada	4.3%
Singapore	0.2%	China	9.6%
Switzerland	6.5%	India	13.7%
USA	3.4%	Malaysia	6.5%
		Russian Federation	7.6%

Source: World Trade Organization-World Tariff Profile 2013.

It is further observed from Table 5 that among the top-10 globally competitive countries the USA was the largest provider of FDI followed by Japan (2nd position), Hong Kong (4th position), UK (5th position), Germany (6th position), Switzerland (9th position), Sweden (12th position), and Singapore (16th position) among the largest providers of FDI. Thus, Sweden and Singapore which were among the top-10 globally competitive countries could not have a position among the top-10 providers of FDI in 2012. Similarly Finland and Netherlands which were among the top-10 globally competitive countries could not find a position among the top-16 providers of FDI in 2012. In addition, the top-10 globally competitive countries could not retain their ranks in the providers of FDI.

However, China occupied the 3rd position among the top-16 providers of FDI in 2012 even though it was not one among the top-10 globally competitive countries.

Table 5

Largest Recipients and Providers of FDI in 2012 (in Billions of US $)

Largest recipients of FDI		Largest providers of FDI	
Country	Amount	Country	Amount
USA	168	USA	329
China	121	Japan	123
Hong Kong	75	China	84
Brazil	65	Hong Kong	84
British Virgin Islands	65	UK	71
UK	62	Germany	67
Australia	57	Canada	54
Singapore	57	Russia	51
Russia	51	Switzerland	44
Canada	45	British Virgin Islands	42
Chile	30	France	37
Ireland	29	Sweden	33
Luxemburg	28	South Korea	33
Spain	28	Italy	30
India	26	Mexico	26
		Singapore	23

Source: UNCTAD World Investment Report, 2013.

Top-10 globally competitive countries are further expected to carry business ethically, though ethical issues vary from country to country. There are certain common issues of unethical practices of international business like corruption, money laundering, and software piracy.

Corruption is a major unethical practice and obstacle of not only domestic business but also international business. Transparency International constructed the corruption perception index for various years. Table 6 presents the corruption perceptions index for the year 2014, 2013, and 2012 for selected countries. The Corruption Perceptions Index ranks countries and territories based on how corrupt their public sector is perceived to be. A country or territory's score indicates the perceived level of public sector corruption on a scale of 0-100, where 0 means that a country is perceived as highly corrupt and 100 means it is perceived as very clean. A country's rank indicates its position relative to the other countries and territories included in the index.

Table 6

Corruption Index for the Year 2014, 2013, and 2012 for Selected Countries

Rank	Country	2014 score	2013 score	2012 score
1	Denmark	92	91	90
2	New Zealand	91	91	90
3	Finland	89	89	90
4	Sweden	87	89	88
5	Norway	86	86	85
5	Switzerland	86	85	86
7	Singapore	84	86	87
8	Netherlands	83	83	84
9	Luxembourg	82	80	80
10	Canada	81	81	84
11	Australia	80	81	85
12	Germany	79	78	79
12	Iceland	79	78	82
14	United Kingdom	78	76	74
15	Belgium	76	75	75
15	Japan	76	74	74
17	Barbados	74	75	76
17	Hong Kong	74	75	77
17	Ireland	74	72	69
17	United States	74	73	73
21	Chile	73	71	72

Source: http://www.transparency.org/cpi2014/results.

It is observed from Table 6 that among the top-10 globally competitive countries, Finland (3rd rank), Sweden (4th Rank), Switzerland (5th rank), Singapore (7th rank), and Netherlands (8th rank) could find a place among the top-10 globally corruption clean countries. Other top-10 globally competitive countries like Germany, UK, Japan, Hong Kong, and USA could find a place among the top-11 to 20 globally corruption clean countries in 2012, 2013, and 2014.

It is further observed that though Switzerland occupied the first position among the top-10 globally competitive countries, it was placed in the 5th position in corruption-free countries in 2012, 2013, and 2014

contrary to Sweden that occupied the 10th position among top-10 globally competitive countries occupied the 4th position among the corruption free countries. The USA which occupied the third position among top-10 globally competitive countries occupied the 17th positon among the corruption free countries.

The Basel AML Index is an annual ranking assessing country risk regarding money laundering/terrorism financing. It focuses on anti-money laundering and counter terrorist financing (AML/CTF) frameworks and other related factors such as financial/public transparency and judicial strength. The scale ranges from 0 (low risk) to 10 (high risk). Table 7 provides Basel AML Index for the year of 2015 for the top-10 globally competitive countries and selected non-top-10 globally competitive countries. It is observed from this table that the risk level of money laundering and terrorist financing is above moderate level (moderate level is 5.00) for Japan (5.80), Hong Kong (5.52), Switzerland (5.51), Germany (5.48), and the USA (5.18). Thus, it is clear that money laundering and terrorist financing risk is high in Hong Kong, Switzerland, Germany, and the USA. Risk level of money laundering and terrorist financing is less than moderate for Singapore (4.91), UK (4.68), Sweden (3.99), and Finland (2.53). Risk level of money laundering and terrorist financing was the lowest in Finland. It was further observed from this table that the risk level of money laundering and terrorist financing is relatively less in non-top-10 globally competitive countries than that of top-10 globally competitive countries. These countries include India (5.77), South Korea (5.20), Australia (4.94), Norway (4.60), New Zealand (3.78), Lithuania (3.67), and Estonia (3.19). Thus, performance of some of the top-10 globally competitive countries in maintaining low risk level of money laundering and terrorist financing was not satisfactory as it was above moderate level.

Table 7
Base AML Index for 2015

Top-10 Globally competitive countries	AML Index	Non top-10 globally competitive countries (Selected only)	AML Index
Switzerland	5.51	Iran	8.59
Singapore	4.91	Thailand	6.52
USA	5.18	Papua New Guinea	6.11
Finland	2.53	India	5.77
Germany	5.48	South Korea	5.20
Japan	5.80	Norway	4.60
Hong Kong	5.52	Australia	4.94
Netherlands	5.02	New Zealand	3.78
UK	4.68	Lithuania	3.67
Sweden	3.99	Estonia	3.19

Source: https://index2015.baselgovernance.org/ranking.

Business Software Alliance (BSA) has been studying global trends in personal computer software piracy for more than a decade. Table 8 depicts the rate of software piracy in top-10 globally competitive and non-top-10 globally competitive countries. It is observed from Table 8 that the USA (software piracy rate of 20%) ranked first among the countries with the lowest rate of software piracy followed by Japan (software piracy rate of 21%) in 2009. Luxembourg (software piracy rate of 21%) ranked first with the lowest rate of software piracy followed by Belgium (software piracy rate of 25%), Australia (software piracy rate of 25%), and Austria (25%) among the non-top-10 globally competitive countries in 2009. All other (other than the USA

and Japan) top-10 globally competitive countries had the rate of software piracy either equal to or higher than 25%. It is heartening to note that even though Hong Kong was the 7th globally completive country in the world, it experienced software piracy as high as 47% in 2009. Rate of software piracy in Hong Kong was even higher than all other countries in 2009.

Table 8

Software Piracy Rates in 2009

Top-10 globally competitive countries	Software piracy rate (%)	Non top-10 globally competitive countries (selected only)	Software piracy rate (%)
Switzerland	25	Luxembourg	21
Singapore	35	Belgium	25
USA	20	Australia	25
Finland	25	Austria	25
Germany	28	Canada	29
Japan	21	Norway	29
Hong Kong	47	Denmark	26
Netherlands	28	New Zealand	22
UK	27	France	40
Sweden	25	Ireland	35

Source: http://chartsbin.com/view/1186.

Conclusion

Analysis of these factors indicates that the top globally competitive countries could not exhibit corresponding performance in the globalization levels, global trade, investment in research and development, corruption levels, money laundering and terrorist financing, and software piracy. Therefore, it is suggested that these countries should implement the practices that would reflect their position as one of the top globally competitive countries.

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