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Hira Mujahid \*, Shaista Alam †

## **THE IMPACT OF COUNTRY SIZE AND TRADE LIBERALIZATION ON STEADY STATE GROWTH: IN PAKISTAN**

### **Abstract**

The purpose of this study is to examine the link between trade liberalization, country size and the growth in case of Pakistan. For this purpose, study used time series data from 1960-2010 and used co integration technique to find long run relationship. The results proposed that in long run trade liberalization and country size has influence on steady state income in Pakistan. However country size and interaction of trade liberalization and country size indirectly link with steady state income whereas trade liberalization has positive relation with steady state income. It is proposed that increase in country size reduces the growth in long run. Furthermore error correction model suggested that in short run country size, trade liberalization, and growth are positively linked.

**JEL CLASSIFICATION:** F10, F40, F62.

**KEYWORDS:** COUNTRY SIZE, GROWTH, GOVERNMENT CONSUMPTION, TRADE LIBERALIZATION.

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## **1. Introduction**

The country sizes not only influence the economic performance but also on the preferences for international trade and economic policies, since the smaller nation more inclined to free trade compare to the large nation Alesina et al. (2005, 1998). However, the new growth literature has been growing the attention on size of economy in fact increasing return is not necessary for the market size and economic performance.

According to Alesina and Spolaore (1997, 2003) and Alesina et al. (2000) country size equilibrium come into view with tradeoff between costs and benefit preferences. As, most populated country also has benefit mainly; there are good economics of scale for production public goods, less subjected to foreign hostility, also can build redistribution schemes within the country. And the cost of large size of economy is, large administration and obstruction it may conquer the benefit, it's necessary to restrict the sufficient size of administration Alesina et al. (2005). The cost and benefit of size of an economy is shifted by trade liberalization, the more open economy reduces the size benefit relative to the cost of heterogeneity. Moreover the most favorable size of country reduces with more trade liberalization. Small economies become more homogenous countries and take more benefit in free trade world. Alesina et al. (2005). Productivity depends on the market dimension, small economies can enjoy trade liberalization also can absorb the regional and cultural changes easily Alesina et al. (1998). In addition, trade liberalization leads to the economic growth when the government expenditure as independent effect on growth Rodrik (1998). Similarly, government role is extra important for more liberalized countries and for the market integration. (Cameron 1978).

This study will examine the effect of country size (population) and trade liberalization on steady state income. The country's steady state equilibrium is the state where real per capita economic variables are constant (Dorn busch et al. 2003). However this study will follow Alesina and Spolaore (1997, 2003), Alesina et al. (2000, 2005) and Spolaore and Wacziarg (2005) methodology for impact of country size and trade liberalization steady state income. The study will examine the model with help of co integration technique for long run relationship and also apply vector error correction model for short run analysis. This study will contribute by applying new approach toward the analysis of country size and trade liberalization on income in case of Pakistan.



However, there are few researches have conducted on analysis of trade liberalization, country size and income. This study is organized as follows.

Section 2 discusses a literature review with respect to trade liberalization and country size also with respect to country size and economic size .Section 3 reviews the general framework for analysis and data description with econometric methodology the empirical evidence on these issues and provides updated and new results. Section 4 briefly explains the empirical analysis on the relationship between country size, international trade and growth. The last section concludes the research.

## **2. Review of literature**

### ***2.1 Trade liberalization and income growth***

The literature on trade liberalization and income is very large and beyond the scope of this study. The study will simply add some of the salient results from recent studies. Some recent contributions are done by Bajwa and Siddqui (2011), Siddiqui and Iqbal (2005), Din and Siddique (2003), Hussain (2003), Frankel and Romer (1996), Berg and Krueger (2003) etc. Bajwa and Siddqui (2011) investigated the relationship between trade liberalization and economic growth for SAARC and found short run unidirectional causality of economic growth and trade liberalization but bi directional causality discovered long run relationship exist. Siddiqui and Iqbal (2005) analysed the causality impact of trade liberalization policy of Pakistan on GDP growth and found negative relationship between trade and GDP growth. Din and Siddique (2003), Hussain (2003), Frankel and Romer (1996), found the positive relationship between trade liberalization and growth. Hussain (2003) examined because of poor polices Pakistan loosing the potential benefit which it can achieves. Berg and Krueger (2003) discovered the positive impact and suggested trade policy and trade liberalization played a vital role in the growth. Wacziarg and Welch (2003) reported that trade policy under the regime of 1990's not significantly part of growth. Jin (2000) found that concept of long run growth is not effected by trade liberalization he added the fiscal and international shocks has greater impact on growth.

## **2.2 Country size and economic size**

Now this study is looking for the empirical evidence on the impact of country size on economic size. The literature in macroeconomics related to country size and economic size is less than microeconomic literature. Now the study will divide the review literature into time series framework and in cross sectional country framework

The work concerning respect of time series frame work; Jones (1995a, 1995b), Young (1998), Howitt (1999) and Ha and Howitt (2004) support our studies and theory. Jones (1995a, 1995b), in time series framework found the relationship of rate of long run growth of an economy and function of population size; he has taken amount of researchers as the function of population size and reported a positive relationship with respect to growth model, included Romer (1990), Grossman and Helpman (1991) and Aghion and Howitt (1992). Although, since 1870's in industrial countries, the amount of researchers destroy the growth rate this create hurdle to generate first generation growth model specifically in the absence of analytical scale in long run growth. Yet the finding of scale is not related to economic growth when the income level comes therefore not prevent the existence of scale effects. Young (1998), Howitt (1999) and Ha and Howitt (2004) done the extension endogenous growth model where as removing scale effect on growth.

Now study incorporate cross sectional frame work; Backus, Kehoe and Kehoe (1992) has done the most organized test scale of endogenous growth models; proposed the scale and economic growth is highly uncorrelated, also scale was defined as the size of total GDP. They has found that growth on the economic size has insignificant effect but positive; the amount of researcher per countries has significant effect on growth, they suggest that in manufacturing industries there was a scale effect which was due to the microeconomic studies. However on aggregate level it was empirically proved that there were no effects of scale at country level. A key problem that variable defined at national level may be worst proxies as total scale of economy, the significance of human capital externalities or the amount of research and development. However small countries implement free trade policies, anticipated to import great amount of technologies, in regression of growth on size without trade liberalization is going to biased toward zero Alesina and Wacziarg (1998) and Spolaore and Wacziarg (2005) . They added the small countries could faster growth the specialization input

production is required, but don't observe the empirical evidence which showed the variation of trade liberalization and its effect of country size on growth. The literature is lacking on the country size scrutinize, at different development stages how the size has different effect on growth, size of country could affect on different stages of development. The study suggests its better to find out the market size and growth jointly rather examine trade liberalization and country size exclusively.

### ***2.3 Trade liberalization and government size***

Cameron (1978) explained, increase in scope of government activities he defined that other than trade liberalization government spending depends on; level and growth of economic product, indirect taxes, politics in government formation and expansion and institutional structure. Zakaria and Shakoor (2011) Rodrik (1998) found that outside jolt appears more to liberalized economy and they need high government size to rescue. Liberati (2006) has taken cross sectional time series examine the relationship between trade openness, financial openness and government size. And found as the trade liberation increases the international risk same as financial liberation increase more risk. But the degree of financial liberation may reduce the government spending and may cause to reduce taxes; indirectly financial liberation has significant effect on trade liberalization, Zakaria and Shakoor (2011), Rodrik (1998), Cameron (1978) suggested the external shock could cope with government policies and those policies effected also healthier trade liberalization. Also, Government policies could protect the domestic industries from external risk. Trade openness prospers Pakistan's economy only when government protects domestic industries steadily.

### **3. Data explanation and econometric methodology**

The study covers annual time series data from 1961 to 2011. The data for the variables of General government final consumption expenditure (% of GDP), Gross fixed capital formation (% of GDP), GDP per capita, GDP (current LCU), total Population, import and export (% of GDP), growth rate, fertility rate, ratio of female to male secondary enrollment (%) for human capital are collected from world bank database. In Pakistan, ratio of female literacy increases human capital as the ratio of female is more than male

from total population. Government size is measured as the government consumption as percentage of GDP, country size is measured by total population; trade liberalization is the sum of import plus import divided by GDP. Alesina et al. (2005) drawn that mutual effect of trade and country size, per capita income, fertility rate, human capital and government consumption have negative impact on steady state income but country size, trade liberalization and investment rate has positive impact on growth.

This study employs the econometric technique of Johansen co integration for long run analysis and error correction model for short run in order to estimate the relationship between steady state income, trade liberalization and country size of Pakistan. Trace test and maximal eigen values test are used to co integration vectors. VECM technique is used because it allows the causal interference based on augmented VAR with co integration technique. The dynamic casual relationship between steady sate, country size and other potential determinants was examined by following VAR level specification:

$$Y_t = \lambda + \sum_{i=1}^{p-1} \psi Y_{t-k} + U_t \quad (1)$$

Where  $Y_t$  is an colum vector of p variables,  $\lambda$  represent coefficient matrices, k denotes the lag length, and  $U_t$  is i.i.d.

## **4. Theoretical framework**

### **4.1 Model assumptions**

There is only one state, measured the interval  $[0, W]$ . Time is continuous and the utility function in for the state is given by:

$$\int_0^{\infty} \text{Log } C(t) e^{-\mu} dt \quad (2)$$

Where  $C(t)$  denotes consumption at time  $t$  and  $\mu > 0$ . At time  $t$  state capital and labor are denoted, respectively, by  $K(t)$  and  $L(t)$ . Both inputs are supplied in elastically and are not mobile across regions. The State produces in linear production function a specific intermediate input  $X(t)$  by using

specific capital.

$$X(t) = K(t) \quad (3)$$

There exists a unique final good. State produces  $y(t)$  units of the final good, using tradable intermediate goods from its own state and other regions, according to the production function:

$$Y(t) = \left( \int_0^W X_j x(t) d_j \right) L^{1-\lambda}(t) \quad (4)$$

with  $0 < \lambda < 1$ .  $X_j(t)$  represent the amount of intermediate input  $j$ . And the trade barriers is measures by  $\gamma$ .  $R$  represents the unit of intermediate input produced in country a and shipped to the country b. for the reason of trade barriers the quantity of intermediate actually used in production is given by  $X = (1 - \gamma_a - \gamma_b)R$ .

#### 4.2 At equilibrium

This study assumed that intermediate inputs are traded in perfect competition. So each unit of each input will be traded at a price equal to its marginal product.  $P(t)$  represents the market price of input. Therefore:

$$P(t) = \lambda X^{\lambda-1}(t) = \lambda (1 - \gamma_a - \gamma_b)^{\lambda-1} R^{\lambda-1} \quad (5)$$

At each time the resource constraint for the state is; where  $s$  is size of country:

$$SX(t) + SR(t) = K(t) \quad (6)$$

Substituting equation 5 into 4 we will get:

$$X(t) = \frac{K(t)}{S+S(1-\gamma a-\gamma b)^{\frac{\lambda}{1-\lambda}}} \quad (7)$$

On the other hand other country purchase input as:

$$R(t) = \frac{(1-\gamma a-\gamma b)^{\frac{\lambda}{1-\lambda}} K(t)}{S+S(1-\gamma a-\gamma b)^{\frac{\lambda}{1-\lambda}}} \quad (8)$$

With help of equation 3.2.4 and 3.2.7 this study can get:

$$P(t) = \lambda [S+S(1-\gamma a-\gamma b)^{\frac{\lambda}{1-\lambda}}]^{1-\lambda} K(t)^{1-\lambda} \quad (9)$$

Capital stock  $K(t)$  is individuals net assets and the net return on capital is equal to market price  $P(t)$ , this study are not considering depreciation for simplicity. With Euler equation the standards inter temporal maximization is:

$$\frac{dc(t)}{dt} \frac{1}{c(t)} = P(t) - \mu = \lambda \left( S + S(1-\gamma a-\gamma b)^{\frac{\lambda}{1-\lambda}} \right)^{1-\lambda} K(t)^{1-\lambda} \quad (10)$$

With respect to Ramsey model the steady state capital for the above equation at  $\frac{dc(t)}{dt} \frac{1}{c(t)} = 0$  (Barro and Sala-i-Martin 1995).

$$K_t^{ss} = \left( \frac{\lambda}{\mu} \right)^{\frac{\lambda}{1-\lambda}} \left( S + S(1-\gamma a-\gamma b)^{\frac{\lambda}{1-\lambda}} \right) \quad (11)$$

The steady state level of output per capita with country size given by:  
(See Appendix)

$$Y^{ss} = \left(\frac{\lambda}{\mu}\right)^{\frac{\lambda}{1-\lambda}} \left[ S + S (1 - \gamma a - \gamma b)^{\frac{\lambda}{1-\lambda}} \right] \quad (12)$$

The growth rate of income per capita is positively link with steady state income per capita and negatively link with current income level (Barro and Sala-i- Martin 1995).

$$\frac{d \ln y(t)}{dt} = f(Y^{ss}, Y_{t-b}) \quad (13)$$

$$\text{Hence, } \frac{\partial f}{\partial Y^{ss}} > 0 \text{ and } \frac{\partial f}{\partial Y_{t-b}} < 0$$

In steady state the effect of size, trade liberalization on the level of income per capita also translated in to growth rate, growth implication will studied in the empirical section. Now the study discusses the model, to generate the link between trade liberalization, economic productivity and country size. As the trade obstacles is due to political/ governmental problem and also size of country matters. For this analysis this study will use constant rate to scale and trade liberalization response to country size by using some barriers. For this purpose the study is for country Pakistan and will follow the technique of Alesina and Spolaore (1997, 2003), Alesina, Spolaore and Wacziarg (2000, 2005) and Spolaore and Wacziarg (2005). The model suggests that growth is positively associated to country size and trade liberalization, growth to the steady state will also the function of such variables. A specification dependable with that insight is:

$$\text{Log } \frac{Y_t}{Y_{t-b}} = \phi_0 + \phi_1 \log Y_{t-b} + \phi_2 T_t + \phi_3 \text{SIZ}_t + \phi_4 T_t \log \text{SIZ}_t + \phi_5 \log \text{GC} + \phi_5 W_t + U_t \quad (14)$$

Where:

$Y_t$  is per capita income of Pakistan.

$Y_{t-b}$  is current income level.

$T_t$  is Trade liberalization; ratio of sum of export and import to GDP.

$S$  is size of the country (country total population).

$GC_t$  is government consumption % of GDP.

$W_t$  is the control endogenous variables which are additional determinant of steady state income level including investment, government consumption, fertility rate and human capital.

**Table 1. Descriptive Statistics**

	Obsv	Mean	Median	Maximum	Minimum	Std. Dev.
Average annual growth	51	5.3088	5.0652	11.3534	0.46837	2.4385
Openness ratio	51	0.0226	0.0178	0.0589	0.0036	0.0169
Log of per capita GDP	51	4.3021	4.3215	4.5412	4.0015	0.1521
Log of total GDP	51	5.7025	5.7114	7.2567	4.2857	0.8991
Log of population	51	7.9788	7.9943	8.2473	7.6724	0.1818
Fertility rate	51	0.7428	0.8039	0.8203	0.5232	0.1002
Ratio Female to male human capital	51	1.6052	1.5870	1.8911	1.1742	0.2099
Investment rate (% GDP)	51	16.591	16.9608	21.3253	11.4145	2.3316
Government consumption (% GDP)	51	11.0689	10.8130	16.7849	7.7808	1.9352

**Table 2. Pair Wise Correlations for the Main Variables Of Interest**

	TO	POP	IN	GRATE	GDP	GC	RFM	FR
TO	1.000							
POP	-0.949	1.000						
IN	0.108	0.024	1.000					
GRATE	0.387	-0.348	0.283	1.000				
GDP	-0.937	0.997	0.022	-0.343	1.000			
GC	0.156	-0.215	0.309	0.034	-0.264	1.000		
RFM	-0.957	0.984	-0.035	-0.357	0.981	-0.284	1.000	
FR	0.734	-0.859	0.027	0.322	-0.886	0.538	-0.856	1.000



**Table 3. Unit root test ADF**

	Intercept		Intercept and trend	
	Level	First Difference	Level	First Difference
<b>Average annual growth</b>	-2.455	-6.1727*	-2.352	-6.0877*
<b>Openness ratio</b>	-2.2517	-3.6285*	-1.6534	-4.0348*
<b>Log of per capita GDP</b>	-1.9247	-5.9107*	-2.4899	-6.1712*
<b>Log of total GDP</b>	1.4433	-5.1701*	-2.8012	-5.2102*
<b>Log of population</b>	-2.1383	-3.5593*	-2.801	-3.4004**
<b>Fertility rate</b>	-1.8737	2.8548***	0.191	-6.0274*
<b>Ratio Female to male human capital</b>	-2.4914	-3.3572**	-1.371	-6.1157*
<b>Investment rate (% GDP)</b>	-2.5717	-3.6838*	-2.8594	-3.6751*
<b>Government consumption (% GDP)</b>	-2.1487	-9.1522*	-2.2243	-9.2202*

Note: critical values are: -3.59, -2.93, -2.60 significant level is 1%, 5% , 10% respectively when first difference is constant and when 4.18, -3.51, -3.18 (significant level is 1%, 5% , 10% respectively when level and first difference is constant and trend) where \*,\*\*and \*\*\* represents the level of significance at 1%, 5% and 10% respectively.

**Table 4. Johansen Co Integration for Steady State Growth Rate**

Null Hypothesis	Trace Statistic	Critical Value	Null Hypothesis	Max-Eigen Statistic	Critical Value
$r=0$	572.8497	197.3709	$r=0$	156.5709	58.4335
$r\leq 1$	416.2788	159.5297	$r\leq 1$	115.0054	52.3626
$r\leq 2$	301.2735	125.6154	$r\leq 2$	73.3171	46.2314
$r\leq 3$	227.9563	95.7537	$r\leq 3$	57.9714	40.0776
$r\leq 4$	169.9850	69.8189	$r=1$	53.1672	33.8769
$r\leq 5$	116.8178	47.8561	$r\leq 4$	45.3127	27.5843
$r\leq 6$	71.5051	29.7971	$r\leq 5$	34.8600	21.1316
$r\leq 7$	36.6451	15.4947	$r\leq 6$	26.0886	14.2646
$r\leq 8$	10.5565	3.8415	$r\leq 7$	10.5565	3.8415

Variables	GDP	POP	TO	TO * LOG(SIZ)	GC	IN	RFM	FR
<b>Coefficients</b>	0.9778*	-1.1161*	149.1342*	-8.1495*	0.5458*	-0.1367*	0.5088*	-1.1468*
<b>S.E</b>	-0.0409	-0.1840	-21.7919	-1.2111	-0.0379	-0.0296	-0.0585	-0.1659
<b>t-stats</b>	-23.901	6.0658	-6.8436	6.7289	-14.402	4.6170	-8.7005	6.9107

Note: Trace and Max Eigen test indicates 8 cointegrating eqn(s) at the 0.05 level, \* representing significant at 0.01

Tables 1-2 illustrate the summary statistics for our main variables of interest, averaged over the period 1961-2010. Table 2 reveals that measures of trade liberalization are closely related with total GDP, country size and human capital -0.93, -0.94 and -0.95 respectively. This high correlation justifies examining differences in results obtained using each measure. The correlation measures among country size with total GDP, human capital and fertility rate is high 0.99, 0.98 and -0.85 respectively. Moreover, the simple correlation between growth rate and country size is -0.34 when country size is calculated by the log of total GDP, and the correlation among trade liberalization and growth is equal to 0.38. Also the correlation between human capital and fertility is -0.85. As the negative relationship between trade liberalization and country size is negative which is confirming Alesina

et al. (2005) studies that small countries are more liberal. Table 3 demonstrate unit root test through ADF technique of given variables which are stationary at first difference on both at intercept also at intercept with trend.

In Table 4 JJ co integration Trace and Max Eigen test indicated 8 co integration equations at 5% level of significance. Normalized co integrated equation suggest that total GDP has significant effect on steady state income, 0.97 million increase in total GDP also increases steady state income by one million. Also country size has significant and negative effect on steady state income, 111million increase in country size reduces the one million in steady state income.

**Table 5. Vector Error Correction for Steady State Growth Rate**

	D(SS)	D(GDP)	D(SIZ)	D(TO * LOG(SIZ))	D(GC)	D(IN)	D(RFM)	D(FR)
<b>ECM</b>	0.5311	-0.9681	0.0037*	0.2830	-3.0716*	-2.6669*	-0.0752	0.0198*
<b>D(SS(-1))</b>	0.8446	-0.7305	-0.0051*	0.8224	3.4652*	1.9570*	0.3123	-0.0218*
<b>D(SS(-2))</b>	0.8943	-0.6506	-0.0036	1.9553	2.0940	1.3090	0.2268	-0.0099*
<b>D(SS(-3))</b>	1.0498*	-1.0470*	-0.0028*	-1.0647	1.6236*	-0.7988	0.3636	-0.0085*
<b>D(GDP(-1))</b>	0.4754	-0.2819	-0.0057*	1.3260	3.3129*	3.0303*	0.1688	-0.0228*
<b>D(GDP(-2))</b>	0.9187	-0.7949	-0.0038*	1.9797	3.1305*	1.7424	0.0063	-0.0159
<b>D(GDP(-3))</b>	1.0083*	-0.8487	-0.0039*	-0.9684	1.6127	-0.0707	0.4047	-0.0108*
<b>D(SIZ(-1))</b>	50.116	-85.594*	2.580*	35.523	-77.447	-212.70*	37.311	-0.2375
<b>D(SIZ(-2))</b>	-60.05	127.38	-2.481*	-24.020	184.31	404.78*	-61.424	0.2806
<b>D(SIZ(-3))</b>	21.61	-60.73	0.9616*	0.2912	-159.57	-234.67*	20.64	0.329
<b>D(TO(-1)*LOG(SIZ(-1)))</b>	-0.032	0.072	0.003	-0.021	-0.231	-0.075	-0.090	0.016*
<b>D(TO(-2)*LOG(SIZ(-2)))</b>	-0.098	0.140	0.002	-0.135	-0.237	-0.160	-0.132*	0.014*
<b>D(TO(-3)*LOG(SIZ(-3)))</b>	-0.124	0.114	0.001	-0.525*	-0.160	-0.079	-0.082	-0.005

**Table 5 (...). Vector Error Correction for Steady State Growth Rate**

	D(SS)	D(GDP)	D(SIZ)	D(TO * LOG(SIZ))	D(GC)	D(IN)	D(RFM)	D(FR)
<b>D(GC(-1))</b>	0.011	-0.030	-0.006	-0.119	-0.367	0.136	0.036	-0.014
<b>D(GC(-2))</b>	0.0720	-0.1205	-0.0005	0.1026	-0.2195	-0.0585	0.0412	0.0007
<b>D(GC(-3))</b>	0.0445	-0.0286	-0.0003	0.1776	-0.3287	-0.1325	0.1115	0.0010
<b>D(IN(-1))</b>	0.0391	-0.0957	0.0000	0.2165	0.0585	-0.0917	0.0690	-0.0001
<b>D(IN(-2))</b>	0.1313	-0.1618	0.0001	-0.2070	0.1234	0.0206	0.1969	0.0005
<b>D(IN(-3))</b>	0.0283	0.0123	0.0005	0.7080*	0.3484	-0.0171	0.0874	-0.0007
<b>D(RFM(-1))</b>	0.2777	-0.1024	0.0000	-0.1549	-0.9321	0.4760	-0.1691	-0.0011
<b>D(RFM(-2))</b>	-0.0831	0.0898	0.0004	0.3450	-0.2924	0.4334	0.0317	0.0059*
<b>D(RFM(-3))</b>	-0.3558	0.3497	-0.0001	-0.0518	-0.1240	0.1594	-0.0214	-0.0001
<b>D(FR(-1))</b>	22.7022	-11.1538	-0.0162	4.3568	54.7978	47.8351	13.4467	2.4218*
<b>D(FR(-2))</b>	-60.2394	48.4182	0.0793	-16.2827	-89.8325	-46.9941	-42.3637	-1.9747*
<b>D(FR(-3))</b>	29.6390	-24.8220	-0.0806	2.9851	62.6610	23.2797	29.3200	0.3763
<b>C</b>	-0.2410	0.3520*	-0.0006	-0.2795	0.6535*	0.4592*	0.0603	-0.0045*
<b>R-squared</b>	0.5926	0.6312	0.9998	0.6680	0.7236	0.7983	0.5153	0.9998
<b>Adj. R-squared</b>	0.1076	0.1921	0.9995	0.2727	0.3945	0.5581	-0.0617	0.9995

Note: \* representing significant values

However, trade liberalization has significant and positive effect on steady state income, 149% of trade liberalization causes income increases by one percent. On the other hand interaction of trade liberalization and country size has significant and negative effect on income as 814% increases one percent steady state income of Pakistan decrease. Government consumption has significant and positive effect on steady state income 54 % of GDP increases, one percent steady state income increases. Investment has significant but negative effect on steady state income as investment 13% of GDP increase the steady state income decline by one percent.

**Table 6. Wald test for granger causality**

Independent variables	Dependent Variables (p values)								
	SS	GDP	SIZ	TO * LOG(SIZ)	GC	IN	RFM	GR	FR
SS	0.145	0.121	0.021**	0.210	0.085***	0.020**	0.781	0.000*	0.145
GDP	0.243	0.277	0.030**	0.100	0.187	0.003*	0.701	0.001*	0.243
SIZ	0.222	0.051**	0.000*	0.692	0.186	0.001*	0.737	0.001*	0.222
TO * LOG(SIZ)	0.505	0.343	0.678	0.024	0.448	0.558	0.241	0.002*	0.505
GC	0.940	0.688	0.202	0.780	0.209	0.497	0.651	0.031**	0.940
IN	0.723	0.477	0.384	0.055**	0.436	0.963	0.102	0.854	0.723
RFM	0.499	0.700	0.935	0.911	0.249	0.003*	0.856	0.010*	0.499
GR	0.077***	0.006*	0.082***	0.800	0.186	0.020**	0.424	0.000*	0.077***
FR	0.145	0.121	0.021	0.210	0.085	0.020	0.781	0.000	0.145

Note: \*significant at 0.01, \*\* significant at 0.05 and \*\*\*significant at 0.10 level of significance.

Human capital also has significant and positive effect on steady state income 51% ratio female to male secondary enrolment increase one percent of steady state income. Fertility rate has significant and negative effect on steady state income as 114% fertility rate increases one percent of steady state income of Pakistan increases. Table 5 depict short run relationship between variables with help of error correction model, speed of adjustment of country size, government consumption, investment and fertility rate has significant effect 0.003, -3.07, -2.66, and 0.019 respectively. However Wald test in Table 6 illustrate in short run lags of growth rate has significant effect on steady state income. Also, in short run lags of steady state, total GDP, country size, growth rate has significant effect on country size. Similarly lags of investment has significant effect on interaction of trade liberalization, in fact lags of steady state income has significant effect on government consumption, investment, human capital, growth rate and fertility rate. As well as lags of Total GDP has significant effect on investment and growth

rate. As, lags of country size has significant effect on total GDP, investment, and growth rate, and lags of interaction of trade liberalization and country size has significant effect on growth rate. Moreover, lags of government consumption have significant effect on growth rate. In addition, investment lags have significant effect on interaction of trade liberalization and country size. In addition human capital lags has significant relationship with investment and growth rate in short run, and growth rate lags has significant relationship with investment, growth rate and fertility rate.

## **5. Conclusion**

This study has discussed the impact of country size and trade liberalization on income, and taken country size as endogenous variable in growth model. This study examined Alesina, Spolaore and Wacziarg (2000) and Spolaore and Wacziarg (2005) model to explain country size and trade liberalization interaction in growth of Pakistan. This study applied JJ co integration technique for long run relationship which suggests eight co integrated equation in long run analysis with help of Trace and Max- Eigen values, including total GDP, trade liberalization, government spending, and human capital has positive impact on steady state income. Whereas country size, gross fixed capital formation and fertility rate has negative impact on growth of Pakistan. Being small economy, the country size has great influence on growth also interaction of trade liberalization and country size having noteworthy part in growth of Pakistan.

Furthermore, country size has adverse effect on growth because of insufficient knowledge and skill to meet the criteria of trade liberalization, however increase in human capital encourage growth. Similarly total GDP also improves the growth in long run, as increase in income gradually increases the growth of country. But increase in fertility rate reduces the growth as it source to increase the population without skills. However, even investment reduces the growth rate because of mistrust and high rate of capital outflow. Moreover the increase in government spending increase the growth as it boosts public trust in future. Vector error correction model for short run analysis which suggests country size, government consumption, investment and fertility rate has significant effect on income in short run. Therefore it's meaningful to incorporate country size for better analysis of growth in international economics and economic performance in small economy like Pakistan.

## Appendix

Equation (11) is attain from equation 3 by substituting domestically produced and import intermediate inputs at equilibrium as in equation 6 and 7 and the levels of capital with their steady state values, therefore this study have:

$$Y^{ss} = \left( \int_0^W X_j^{ss}(t) dj \right) = S (X^{ss})^\lambda (1 - \gamma_a - \gamma_b)^\lambda (R^{ss})^\lambda \quad (A.1)$$

And the imported inputs are given by:

$$R^{ss} = \frac{(1 - \gamma_a - \gamma_b)^{\frac{\lambda}{1-\lambda}} K}{S + S (1 - \gamma_a - \gamma_b)^{\frac{\lambda}{1-\lambda}}} = \left( \frac{\lambda}{\mu} \right)^{\frac{1}{1-\lambda}} (1 - \gamma_a - \gamma_b)^{\frac{\lambda}{1-\lambda}} \quad (A.2)$$

So we have,

$$\begin{aligned} Y^{ss} &= S \left( \frac{\lambda}{\mu} \right)^{\frac{1}{1-\lambda}} + S (1 - \gamma_a - \gamma_b)^{\frac{\lambda}{1-\lambda}} \left( \frac{\lambda}{\mu} \right)^{\frac{1}{1-\lambda}} \left[ (1 - \gamma_a - \gamma_b)^{\frac{\lambda}{1-\lambda}} \right]^\lambda \\ &= \left( \frac{\lambda}{\mu} \right)^{\frac{\lambda}{1-\lambda}} \left[ S + S (1 - \gamma_a - \gamma_b)^{\frac{\lambda}{1-\lambda}} \right] \end{aligned} \quad (A.3)$$

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Dinh Tran Ngoc Huy\*

**TO WHAT EXTENT CHANGING TAX POLICY AND  
EXTERNAL FINANCING INFLUENCE THE RISK  
LEVEL OF VIET NAM AIRLINES AND TOURISM  
INDUSTRY DURING AND AFTER THE GLOBAL  
CRISIS**

**Abstract**

Over past few years, the global financial crisis shows certain influence on emerging financial markets including Viet nam. Therefore, this study chooses an analytical approach to give some systematic opinions on how much some certain determinants such as income tax and leverage, affect the level of market risk in listed tourism companies. First, it calculates equity and asset beta values in three (3) different scenarios of changing tax rates and changing the level of financial leverage. Second, under 3 different scenarios of changing tax rates (20%, 25% and 28%), we recognized that there is not large disperse in equity beta values, estimated at 0,753 for current leverage situation. Third, by changing tax rates in 3 scenarios (25%, 20% and 28%), we recognized both equity and asset beta mean values have positive relationship with the increasing level of tax rate. Last but not least, this paper covers some ideas and policy suggestions.

**JEL CLASSIFICATION:** G00, G3, G30.

**KEYWORDS:** RISK MANAGEMENT, ASSET BETA, FINANCIAL CRISIS, CORPORATE TAX, LEVERAGE.

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## **1. Introduction**

After financial crisis and reactions in financial industry taking place recently, we find out that there are signals of impacts of tax rates and the level of financial leverage on the fluctuations of market risk, measured by both equity and asset beta values. This leads to a question on using external debt of management team in a hope that the business market value can be recovered. Despite of trying to select an easy-reading writing style, there is still some academic words need to be explained in further.

The organization of paper contents is as following. As our previous series of paper, Research literature, issues, methodology and theories are covered in the first two sessions. Next, it followed by introduction of our empirical findings in session 3 (3<sup>rd</sup>). Continuously, session four (4) covers conclusion and policy suggestion. Before last, there are exhibit session which covers some calculated results of this paper's analysis and comparison.

## **2. Preliminary Notes**

### ***2.1. Research Issues***

This research aims to figure out two (2) issues:

Issue 1: What happen to asset beta if both FL and tax rate change in 3 scenarios

Issue 2: What happen to equity beta if both FL and tax rate change in 3 scenarios

### ***2.2. Literature review***

John (1999) mentions a two-rate tax system where land is taxed at a higher rate than structures in his research on two-rate property tax effects on land development.

Anderson (2009) recognized that the user cost tax elasticities are relatively small while the expected house price inflation elasticity is substantially larger and therefore plays a greater role in affecting housing market demand.

Beside, Modigliani and Mill (1963) show that firm value is an increasing function of leverage due to the tax deductibility of interest payments at the

corporate level. Carr and Wu (2011) stated that equity volatility increases proportionally with the level of financial leverage, the variation of which is dictated by managerial decisions on a company's capital structure based on economic conditions. And, irrespective of financial leverage, a positive shock to business risk increases the cost of capital and reduces the valuation of future cash flows, generating an instantaneous negative correlation between asset returns and asset volatility.

McCarty (2012) stated there is evidence which suggests that for the most tax risky firms investors also apply a higher discount rate to estimations of future cash flows. Then, Vello and Martinez (2012) indicated there is a negative and significant relation between the market risk and the tax planning efficiency index of firms that have good governance practices.

Next, Madhou (2012) found out, for Australia firms over the period 2003-2008, those with low leverage appear to hold higher cash holdings than high leverage ones. Then, McCauley (2013) pointed that during calm periods, portfolio investment by real money and leveraged investors in advanced countries flow into emerging markets, leading to an asymmetric asset swap (risky emerging market assets against safe reserve currency assets) and leveraging up by emerging market central banks. Last but not least, Gunarathna (2013) found out in different industries in Sri Lanka, firm size does not significantly affect the financial risk, but the degree of financial leverage has a significant positive correlation with financial risk.

### ***2.3. Conceptual theories***

The tax system not only responds to the globalization but also affects national income, investment levels and risks of doing business. Furthermore, tax system can affect the investment return and the ratio of re-investment and business growth.

The using of leverage also could create both negative and positive effects on business operational results. A firm will make decision on significant amount of debt when it hopes ROA will be higher than the lending interest. Using leverage might affect both company performance and its risk.

### ***2.4. Methodology***

In this research, analytical research method is used, philosophical method is used and specially, scenario analysis method is used. Analytical data is

from the situation of listed banking industry firms in VN stock exchange and applied current tax rate is 25%.

### **3. Main Results**

#### ***3.1. Empirical Research Findings and Discussion***

Data used are from total 10 listed tourism industry companies on VN stock exchange (HOSE and HNX mainly). In the scenario 1, current tax rate is kept as 25% as in the 2011 financial statements which is used to calculate market risk (beta) while leverage degree is kept as current, then changed from 30% up to 20% down. Then, two (2) FL scenarios are changed up when tax rate is up to 30% and down to 20%. In summary, the below table 1 shows three (3) scenarios used for analyzing the risk level of these listed firms.

Market risk (beta) under the impact of tax rate, includes: 1) equity beta; and 2) asset beta.

**Table 1. Analyzing market risk under three (3) scenarios**

	Tax rate as current (25%)	Tax rate up to 30%	Tax rate down to 20%
Leverage as current	Scenario 1	Scenario 2	Scenario 3
Leverage up 30%			
Leverage down 20%			

Source: Made by Author

a. Scenario 1: current tax rate 25% and leverage kept as current, 20% down and 30% up

In this case, all beta values of 10 listed firms on VN airline and tourism industry market as following:

**Table 2. Market risk of listed companies on VN airline and tourism industry market under a two factors model (case 1)**

Order No.	Company stock code	Leverage as current		Leverage down 20%		Leverage up 30%	
		Equity beta	Asset beta (assume debt beta = 0)	Equity beta	Asset beta (assume debt beta = 0)	Equity beta	Asset beta (assume debt beta = 0)
1	<b>CTC</b>	0,226	0,072	0,226	0,103	0,226	0,026
2	<b>DLC</b>	0,475	0,281	0,684	0,461	0,200	0,094
3	<b>DLV</b>	0,719	0,264	0,932	0,460	0,368	0,065
4	<b>FDT</b>	0,764	0,300	0,965	0,496	0,433	0,091
5	<b>HOT</b>	1,447	1,222	1,489	1,303	1,384	1,104
6	<b>PDC</b>	2,035	1,298	2,035	1,445	2,035	1,077
7	<b>PGT</b>	1,648	1,532	1,648	1,555	1,648	1,497
8	<b>TCT</b>	1,016	0,913	1,016	0,934	1,016	0,882
9	<b>TTR</b>	-1,060	-0,888	-1,060	-0,922	-1,060	-0,836
10	<b>MAS</b>	0,382	0,143	0,382	0,190	0,382	0,071

Source: VN stock exchange 2012

b. Scenario 2: tax rate increases up to 28% and leverage kept as current, 20% down and 30% up

All beta values of total 10 listed firms on VN airline and tourism industry market as below:

**Table 3. Market risks of listed airline and tourism industry firms under a two factors model (case 2)**

Order No.	Company stock code	Leverage as current		Leverage down 20%		Leverage up 30%	
		Equity beta	Asset beta (assume debt beta = 0)	Equity beta	Asset beta (assume debt beta = 0)	Equity beta	Asset beta (assume debt beta = 0)
1	<b>CTC</b>	0,226	0,072	0,226	0,103	0,226	0,026
2	<b>DLC</b>	0,492	0,292	0,704	0,474	0,210	0,099
3	<b>DLV</b>	0,735	0,270	0,948	0,468	0,380	0,067
4	<b>FDT</b>	0,780	0,307	0,981	0,505	0,446	0,094
5	<b>HOT</b>	1,455	1,228	1,495	1,308	1,393	1,111
6	<b>PDC</b>	2,035	1,298	2,035	1,445	2,035	1,077
7	<b>PGT</b>	1,648	1,532	1,648	1,555	1,648	1,497
8	<b>TCT</b>	1,016	0,913	1,016	0,934	1,016	0,882
9	<b>TTR</b>	-1,060	-0,888	-1,060	-0,922	-1,060	-0,836
10	<b>MAS</b>	0,382	0,143	0,382	0,190	0,382	0,071

Source: VN stock exchange 2012

c. Scenario 3: tax rate decreases down to 20% and leverage kept as current, 20% down and 30% up

All beta values of total 10 listed firms on VN airline and tourism industry market as below:



**Table 4. Market risks of listed airline and tourism industry firms under a two factors model (case 3)**

Order No.	Company stock code	Leverage as current		Leverage down 20%		Leverage up 30%	
		Equity beta	Asset beta (assume debt beta = 0)	Equity beta	Asset beta (assume debt beta = 0)	Equity beta	Asset beta (assume debt beta = 0)
1	<b>CTC</b>	0,226	0,072	0,226	0,103	0,226	0,026
2	<b>DLC</b>	0,447	0,265	0,653	0,440	0,184	0,087
3	<b>DLV</b>	0,693	0,254	0,905	0,447	0,350	0,062
4	<b>FDT</b>	0,737	0,290	0,939	0,483	0,413	0,087
5	<b>HOT</b>	1,436	1,212	1,479	1,295	1,369	1,092
6	<b>PDC</b>	2,035	1,298	2,035	1,445	2,035	1,077
7	<b>PGT</b>	1,648	1,532	1,648	1,555	1,648	1,497
8	<b>TCT</b>	1,016	0,913	1,016	0,934	1,016	0,882
9	<b>TTR</b>	-1,060	-0,888	-1,060	-0,922	-1,060	-0,836
10	<b>MAS</b>	0,382	0,143	0,382	0,190	0,382	0,071

Source: VN stock exchange 2012

All three above tables and data show that there are just tiny changes in the values of equity beta and there are bigger fluctuations in the values of asset beta in the three (3) cases.

**3.2. Comparing statistical results in 3 scenarios of changing leverage:**

**Table 5. Statistical results (FL in case 1)**

Statistic results	Leverage as current			Leverage down 20%			Leverage up 30%		
	Equity beta	Asset beta (assume debt beta = 0)	Difference	Equity beta	Asset beta (assume debt beta = 0)	Difference	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	2,035	1,532	0,503	2,035	1,555	0,480	2,035	1,497	0,538
MIN	-1,060	-0,888	-0,173	-1,060	-0,922	-0,138	-1,060	-0,836	-0,225
MEAN	0,765	0,514	0,251	0,831	0,603	0,229	0,663	0,603	0,060
VAR	0,7530	0,5302	0,223	0,7532	0,5572	0,196	0,7879	0,4962	0,292

Note: Sample size: 10 firms - Source: VN stock exchange 2012

**Table 6. Statistical results (FL in case 2)**

Statistic results	Leverage as current			Leverage down 20%			Leverage up 30%		
	Equity beta	Asset beta (assume debt beta = 0)	Difference	Equity beta	Asset beta (assume debt beta = 0)	Difference	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	2,035	1,532	0,503	2,035	1,555	0,480	2,035	1,497	0,538
MIN	-1,060	-0,888	-0,173	-1,060	-0,922	-0,138	-1,060	-0,836	-0,225
MEAN	0,771	0,517	0,254	0,837	0,606	0,231	0,667	0,606	0,061
VAR	0,7528	0,5299	0,223	0,7543	0,5571	0,197	0,7869	0,4966	0,290

Note: Sample size: 10 firms - Source: VN stock exchange 2012

**Table 7. Statistical results (FL in case 3)**

Statistic results	Leverage as current			Leverage down 20%			Leverage up 30%		
	Equity beta	Asset beta (assume debt beta = 0)	Difference	Equity beta	Asset beta (assume debt beta = 0)	Difference	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	2,035	1,532	0,503	2,035	1,555	0,480	2,035	1,497	0,538
MIN	-1,060	-0,888	-0,173	-1,060	-0,922	-0,138	-1,060	-0,836	-0,225
MEAN	0,756	0,509	0,247	0,822	0,597	0,225	0,656	0,597	0,059
VAR	0,7534	0,5305	0,223	0,7516	0,5573	0,194	0,7895	0,4954	0,294

Note: Sample size: 10 firms - Source: VN stock exchange 2012

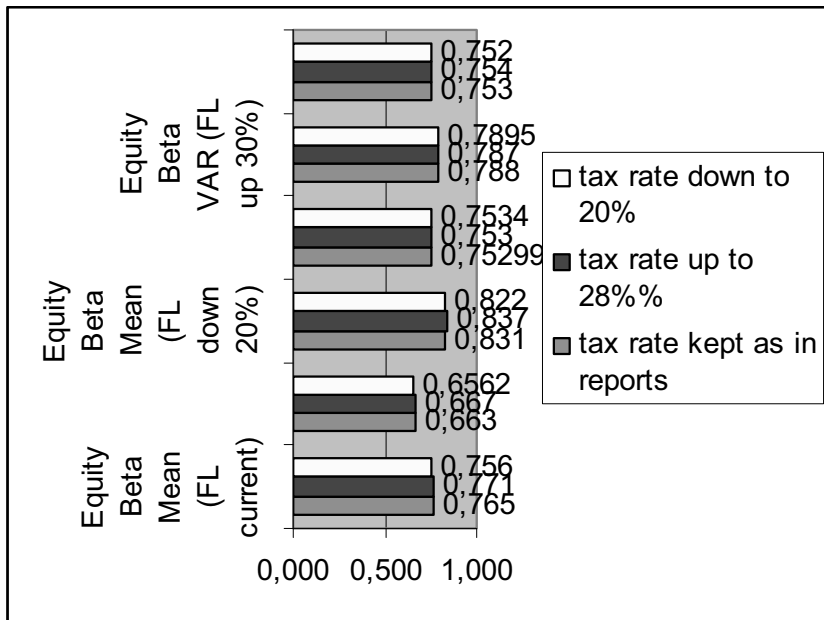
The above calculated figures generate some following results:

First of all, Equity beta mean values in all 3 scenarios are acceptable ( $< 0,9$ ) and asset beta mean values are also small ( $< 0,7$ ). If leverage increases to 30%, asset beta max values keep the same value of 1,497 when tax rate is up to 28% or down to 20%. Finally, when leverage decreases down to 20%, asset beta max values keep the same value of 1,555 in both cases: tax rate up and down.

The below chart 1 shows us: when leverage degree decreases down to 20%, if tax rate is up to 28%, average equity beta value increases slightly (0,837) compared to that at the decrease of tax rate of 20% (0,822). However, equity beta var is 0,754 (tax rate up), little higher than 0,752 (tax rate down). Then, when leverage degree increases up to 30%, if tax rate is up to 28%, average equity beta increases little (to 0,667) compared to that at the decrease of tax rate of 20% (0,656). However, in case the tax rate up, the equity beta var is 0,787, smaller than 0,790 (tax rate down).

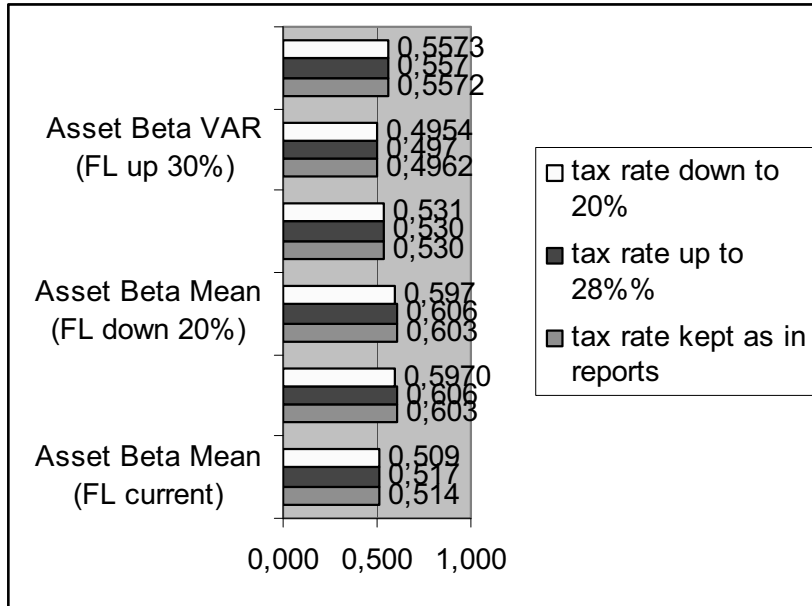
The below chart 2 shows us: when leverage degree decreases down to 20%, if tax rate is up to 28%, average asset beta value increases slightly (0,606) compared to that at the decrease of tax rate of 20% (0,597). However, asset beta var is 0,557 (tax rate up), the same as that in the case of tax rate down. Then, when leverage degree increases up to 30%, if tax rate is up to 28%, average asset beta also increases little more (to 0,606) compared to that at the decrease of tax rate of 20% (0,597). However, in case the tax rate up, the asset beta var is 0,497, higher than 0,495 (tax rate down).

**Figure 1. Comparing statistical results of equity beta var and mean in three (3) scenarios of changing FL and tax rate**



Source: VN stock exchange 2012

**Figure 2. Comparing statistical results of asset beta var and mean in three (3) scenarios of changing FL and tax rate**



Source: VN stock exchange 2012

#### 4. Conclusion and Policy suggestion

In summary, the government has to consider the impacts on the movement of market risk in the markets when it changes the macro policies and the legal system and regulation for developing the tourism market. The Ministry of Finance continues to increase the effectiveness of fiscal policies and tax policies which are needed to combine with other macro policies at the same time. The State Bank of Viet Nam continues to increase the effectiveness of capital providing channels for tourism companies as we might note that in this study when leverage is going to increase up to 30%, the risk level decreases (asset beta mean decreases to 0,597 if tax rate moves down to 20%).

Furthermore, the entire efforts among many different government bodies need to be coordinated.

Finally, this paper suggests implications for further research and policy suggestion for the Viet Nam government and relevant organizations, economists and investors from current market conditions.

### **Acknowledgements**

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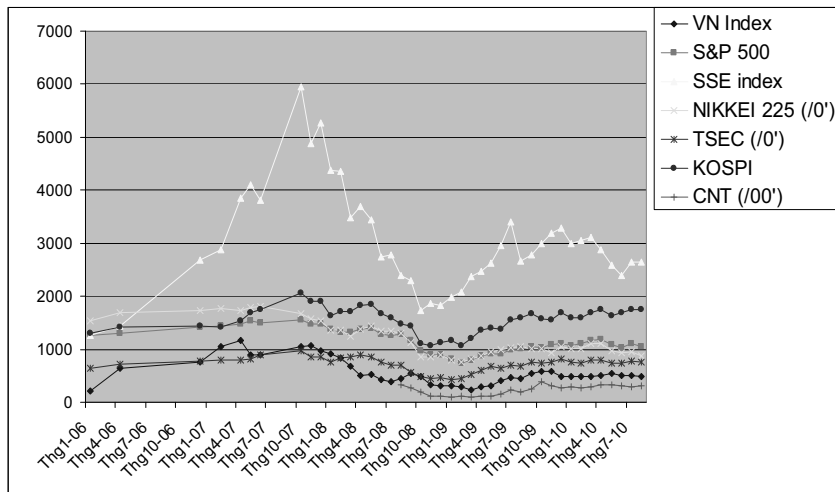
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<http://www.mofa.gov.vn/vi/>



**Exhibit**

**Exhibit 1. VNI Index and other stock market index during crisis 2006-2010**



Source: global stock exchange 2012

**Exhibit 2. Comparable firms and changing leverage for Viet Nam  
airline and tourism firms**

<b>Order No.</b>	<b>Company Stock code</b>	<b>Comparable firm</b>	<b>FL as current</b>	<b>FL up 30%</b>	<b>FL down 20%</b>
1	<b>CTC</b>		68,1%	88,5%	54,5%
2	<b>DLC</b>	DLV as comparable	40,7%	52,9%	32,6%
3	<b>DLV</b>	PGT as comparable	63,3%	82,3%	50,6%
4	<b>FDT</b>	PGT as comparable	60,7%	78,9%	48,6%
5	<b>HOT</b>	PGT as comparable	15,6%	20,3%	12,5%
6	<b>PDC</b>		36,2%	47,0%	29,0%
7	<b>PGT</b>		7,1%	9,2%	5,6%
8	<b>TCT</b>		10,1%	13,2%	8,1%
9	<b>TTR</b>		16,3%	21,2%	13,0%
10	<b>MAS</b>		62,6%	81,4%	50,1%
		<b>Average</b>	38,1%	49,5%	30,5%

Source: Viet Nam stock exchange 2012

Werner Baer<sup>\*</sup>, Rahul A. Sirohi<sup>†</sup>

**TRANSPORTATION INFRASTRUCTURE AND  
ECONOMIC DEVELOPMENT: A COMPARATIVE  
ANALYSIS OF BRAZIL AND INDIA<sup>\*</sup>**

**Abstract**

In this paper we present a comparative analysis of railway infrastructure in Brazil and India. We argue that historical differences generated substantially different patterns of railway development in both these countries. In Brazil, in the 19th century, railways were built to meet the demands of primary good exporters and to integrate production centers with ports. In India, the railways were developed by a colonial state for purposes of gaining better political and military control of the country. Though commercial factors were important, we argue that the differentiating feature of Indian railways is that they were built “ahead of demand”.

**JEL CLASSIFICATION:** N6, 0570, R4, B52.

**KEYWORDS:** ECONOMIC DEVELOPMENT, INSTITUTIONAL ECONOMICS, COMPARATIVE ECONOMIC HISTORY, TRANSPORTATION ECONOMICS

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## **1. Introduction**

An adequate infrastructure is a fundamental requirement to get the process of economic development started and to sustain its growth. By infrastructure we mean an efficient transportation system, an adequate power generation and distribution system, an efficient telecommunication structure, a modern system of ports and airports, and an adequate social infrastructure (water supply, sewage, and waste disposal system). When most Third World countries were exporters of primary products the infrastructure needed to make them efficient exporters were a railroad system to transport goods from the interior, and adequate port facilities. As many of these countries industrialized and urbanized, an expanded and more diversified infrastructure, especially transport, became extremely important.

In his pioneering study *The Strategy of Economic Development* (1958), Hirschman dealt with infrastructure (which he called Social Overhead Capital - SOC) within the context of the debate concerning balanced vs. unbalanced growth. Hirschman divided the economy into two broad sectors: directly productive activities (DPA) and SOC. Given the scarcity of capital (including human capital) and the fact that infrastructure (SOC) was *lumpy*, Hirschman argued that *balanced growth* between directly productive investment and SOC was difficult, if not impossible, to achieve. He thus advocated *unbalanced growth* between DPA and SOC. Given the lumpy nature of SOC, it would be difficult to convince governments to spend huge amounts on it when there was no crisis (such as power shortages, or decrepit roads, etc.). Thus countries could emphasize DPA at the expense of SOC (*development via shortages*) investments until a crisis of SOC shortages would make it feasible to convince the political establishment (and/or multilateral institutions) to take necessary measures to finance a period of SOC investment. But he also noted that countries could develop SOC ahead of DPA (*development via excess capacity*). Creating excess supply of SOC would drive down costs of production, thereby stimulating DPA. In the context of railways, Fogel (1960), Mercer (1974), have argued that in the US, railways were built "ahead of demand". Recent analysis by Atack *et al.* (2010) provides some supporting evidence for this hypothesis. Fishlow (1965) on the other hand contended that American railways were not built "ahead of demand".

It is within this context that we present a comparative analysis of railway infrastructure in Brazil and India. Both countries began to construct a railway network in the second half of the 19<sup>th</sup> century, but the pattern of railway development was strikingly different. In Brazil railways were developed to meet the needs of primary goods producers, to integrate

production centers with ports. In other words the railways were built to meet pre-existing demand. In India the railways were developed by a colonial state for purposes of gaining better political and military control of the country. Though commercial factors were important, we argue that the differentiating feature of Indian railways is that they were built “ahead of demand”.

Here the role of historical context is important in explaining these differences. Previous literature has suggested that historical conditions play a crucial role in shaping the future developmental trajectories of economies. These studies show how small differences in initial conditions can lead to large differences in long run institutional quality, human capital levels, tax systems and political organizations (Sokoloff, Engerman 2000; Mookherjee Ray 2001; North 2005; Acemoglu *et al.* 2001, 2002, 2005; La Porta *et al.* 1997; Glaeser *et al.* 2004; Bolt and Bezemer 2009). The channels through which history exerts these influences are varied. Acemoglu *et al.* (2001, 2005) concentrate on colonial institutions. They argue that colonialism created diverse institutional structures across the non-European world and that these differences in colonial origins had a permanent impact on the institutional and political structures of these economies. La Porta *et al.* (1997) point to the identity of the colonizer as an important determinant of institutional quality. They note that those economies that came under British rule tended to have more secure property rights and were able to make greater progress than those which came under French rule. In contrast with the institutional hypothesis, Glaeser *et al.* (2004) and Bolt and Bezemer (2009) shift attention to the human capital investments made by colonial regimes and show that initial investments in education had long lasting effects on economic development.

This paper draws on these approaches to show how historical context matters for the development of railroads. In the case of Brazil and India not only were the identities of colonizing nations substantially different, but the political and economic structure of the two economies was a complete contrast as well. By the late 19<sup>th</sup> century Brazil was a sovereign nation with a highly fragmented administrative and political structure. The lack of centralized state authority created barriers for developing and maintaining a national railway system. India on the other hand was a classic colony. Since colonial control required extensive centralization of administrative and decision making capabilities, basic ingredients for large scale infrastructural development were present. In this way different historical conditions led to two distinct patterns of infrastructural development across Brazil and India.

The basic structure of the paper is as follows: In the first two sections, we briefly analyze the development of transport in Brazil and India from a

historical perspective. In the following section we compare and contrast the Brazilian and Indian patterns of railway development, before finally concluding the analysis in the final section.

## **2. Infrastructure in Historical Perspective**

### ***2.1 Brazil***

Brazil's first railroad was inaugurated in 1854, linking Rio de Janeiro and Petropolis, the Emperor Pedro II's mountain summer residence. Most Brazilian railway construction in the following decades connected agricultural producing areas in the interior to ports. There were individual lines in various parts of the country, some of which were built and run by private domestic and foreign groups on a "concession contract" basis and some were controlled by the state. The system that emerged did not tie various parts of this huge country into a national market (Neto *et al.* 2010, Baer 2014).

Political uncertainty and the lack of an adequate capital market explains the failure to develop railroads in the first half of the 19<sup>th</sup> century. Though probably far less important, the lack of labour was also seen as a constraint on railway development. During the initial phases of railway construction local politicians and planters raised concerns about labour shortages (Mattoon 1977). Lamounier (2000) however notes that despite initial apprehensions, labour supply was a binding constraint only in particular regions like the Amazon or during planting seasons and that in general immigrant and local labour were adequate enough to meet the needs of rail construction. The rapid construction of railroads in the following half century was the result of pressures on the government from the land-owning elite to improve transport to the ports. The government guaranteed minimum dividend payment, which "harmonized the goals of the planter class with the desire of railroad investors to avoid excessive risk." (Summerhill 1997, p. 319)<sup>1</sup> Summerhill (1998, p. 542) found that "... No sector of activity manifested greater government involvement, or higher levels of foreign investment, than railways... Lacking even a single railway in 1852, Brazil

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<sup>1</sup> See also: Sochaczewski, (1993, pp. 23-24). Benicio Viero Schmidt points out that a British investor, Thomas Cochrane, "...noticed that Great Britain and Russia had instituted incentives (such as guaranteed interest on invested capital) for the construction of railroads and asked the Brazilian government for similar guarantees. His request was turned down by the Chamber of Deputies in 1852." Schmidt, (1982, p. 255). However, shortly thereafter, in June 1852 a law was passed authorizing the government to use special guarantees.

had some 20,000 kilometers of track by 1900<sup>2</sup>.

In the 19<sup>th</sup> century the state played an important role in developing transportation, in many countries. State assistance included cheap credit, guaranteed returns and, as in the case of the U.S., land grants (Summerhill 1998). In Brazil it was rare for the state to provide land grants. Occasionally of course the state provided “privileged zones” which effectively gave railway builders, a monopoly over a small area around the railway line (Mattoon 1977). Instead, the preferred mode of state support was through minimum investment guarantees- often as high as 7 percent (Mattoon 1977). There was considerable debate regarding the efficacy of these concessions and many 19<sup>th</sup> century Brazilian policy makers were critical of the structure of government support, which they felt was inefficient. It was pointed out that because rail subsidies were based on trackage, builders had the perverse incentive to actually indulge in wasteful construction (Blasenheim 1994). Summerhill (1998, p. 543) found that although these guarantees helped in attracting domestic and foreign savings, “...not all of the railways built with guarantees needed subsidies to attain profit levels sufficiently large to secure investment”. In his view of the six major lines, the unaided rates of returns for four were high enough to have generated adequate profits and should not have required guarantees<sup>3</sup>.

The railroad system which evolved consisted of individual lines linking various interior locations which produced export crops (mainly coffee) to ports. Though these lines reduced transportation costs considerably, they did not produce an integrated domestic market. Summerhill (1997, p. 319) concludes that “...Given the ready availability of coastwise shipping, most lines were built to link ports to the interior...” And the resulting pattern of construction “...proceeded with little consideration given to establishing a large, national network.” The pattern of railway construction in the Minas Gerais area provides an instructive example, where by 1884, 60 percent of the entire rail network of the region was concentrated in the coffee producing Zona da Mata, which spanned a mere 5 percent of the total land area (Blasenheim 1994). The importance of coffee exports for railway development has been highlighted by Lamounier (2000) who noted that in 1876 more than 50 percent of the rail lines were concentrated in coffee producing locations like Sao Paulo and Rio de Janeiro while sugar producing regions like Pernambuco had substantially smaller networks. Schmidt (1982, p. 256) comments that “...the expansion of the railway system did not follow the frontier, but looked to areas in which coffee was being cultivated.

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<sup>2</sup> See also Summerhill (2003).

<sup>3</sup> On the other hand Summerhill (1998) notes that state intervention was particularly effective in lowering charges of railways.

Whereas in the United States, the railways were pioneers in opening up frontier areas, in São Paulo they were built to meet preexisting demand.”

By the beginning of the 20<sup>th</sup> century many Brazilian railroad companies began to suffer losses<sup>4</sup>. The state had little option but to nationalize railway lines and by the 1920's a large share of the network came under government control (OECD 2008; Baer 2014; Estache *et al.* 2001). In 1957 the federal government founded the RFSSA (Federal Railroad Network Corporation), which consolidated all the lines that the government had acquired over the previous decades (Amann *et al.* 2014). However, over most of the second half of the 20<sup>th</sup> century little renovation or expansion of the railroad system occurred, and the transportation network which was needed to accommodate industrial and urban growth was left to the expansion of the road system<sup>5</sup>. This was partly due to the fact that the country's import substitution industrialization project in the second half of the 20<sup>th</sup> century was, to a large extent, based on the development of an automobile industry (Estache *et al.* 2001).

In 1930 Brazil's total rails amounted to 34,207 kms; by 2010 it declined to 29, 817 kms, a reduction of 12.83%. The rail density of Brazil (rail per 1000 Km<sup>2</sup>) was 3.4 in the early decades of the 21<sup>st</sup> century. In contrast, the rail density was 6.3 in China, 5.0 in Russia and 19.2 in India (World Bank 2012).

In the more recent period private organizations have come to play a larger role in Brazil's transportation system. The Federal Privatization Program of 1992 liberalized the transportation sector through *concession* contracts with private companies. This allowed the state to own railways while reducing the need for the public sector spend resources on running and maintaining transport facilities (OECD 2008; World Bank 2012). However, there were several problems with the emerging public-private system, including “lack of clear rules for tariff calculation and asset prices, the lack of penalties for noncompliance with contract targets and an inadequate ownership structure to promote competition”(World Bank 2012, p. 76).

From 1995 to 2010 railway output (in terms of freight) increased by more than 90%, rising from 136,437 million ton-kilometers to 267,700 million ton-kilometers (World Development Indicators). In terms of percentages, railway lines accounted for almost 50 percent of transported freight in Brazil by 2007 (World Bank 2012). The main product transported through railways is iron ore, which accounts for a little less than 80% of total cargo transported by railways (Amann *et al.* 2010). Despite significant increases in

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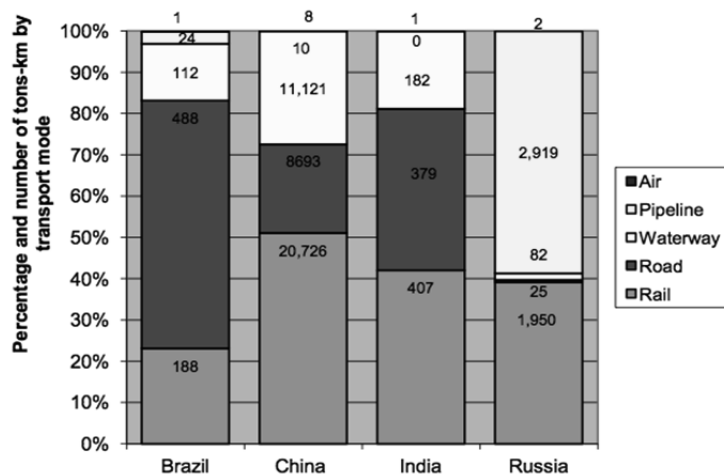
<sup>4</sup> Many of the railroads were constructed because of powerful local landlords and some were laid out to zigzag from one planter's estate to another's.

<sup>5</sup> The highway between São Paulo and Porto Alegre was only completed in 1960.



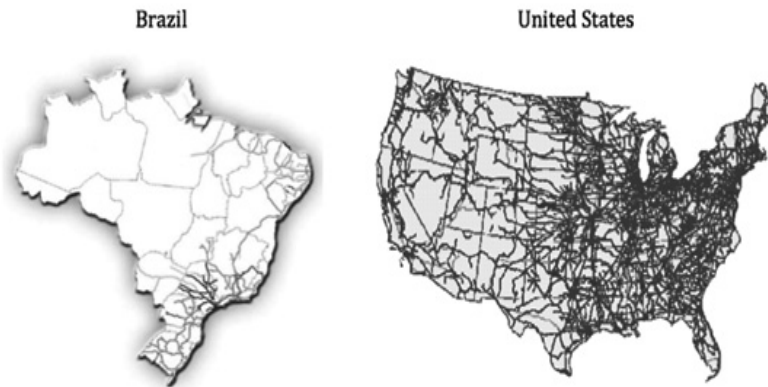
railway freight, on a comparative scale the volume of goods transported via the railroad network remains low. Table 1 shows that even at the beginning of the second decade of the 21<sup>st</sup> century, Brazil’s use of railways was much smaller than other emerging countries. A recent World Bank report has stated that: “The paved road network is about 5 times longer than the railway network, and the combined paved and non-paved road network is almost 50 times longer than the rail network” (World Bank 2012, p. 78). According to the report one of the reasons for the less frequent use of railways for cargo and passenger transport is the uneven layout of the railway lines, as shown in Figure 2.

**Table 1. A Comparative View of Transportation Modes**



Source: World Bank (2012)

**Figure 1. Comparative Railroad Networks**



*Source: Associação Nacional de Transporte Ferroviário (2006), Association of American Railroads (2006)*

By the first decade of the 21<sup>st</sup> century it became obvious that the road infrastructure of Brazil could not be replaced by railways. The existing road network had to be improved considerably in order to increase the efficiency of the country's industrial centers. However, with the growth of world demand for the country's minerals and food products, an expansion of railway lines could be economically justified. This has led the country to expand on the construction of some key new rail corridors<sup>6</sup>.

## **2.2 India**

The development of transportation in colonial India was centered on the railways. The Indian Railways were an important form of infrastructure, but they were also an integral part of the Indian culture and politics: they were frequently used for pilgrimages which constituted an important aspect of Indian lives and were instrumental in promoting nationalism (Kerr 2001, 2007; Thorner 1955). In 1853, when the first railway line became operational, the railway tracks covered a mere 32 kilometers. By 1880 the railways had spread to 15,764 kilometers and finally by 1920, there were

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<sup>6</sup> *Infraestrutura Econômica no Brasil: diagnósticos e perspectivas para 2015, Livro 6, Volume 1* (Brasília: IPEA 2010, p. 519).

61,957 kilometers of railways tracks. The quantity of passengers using the railway system grew from 80 million in 1880 to 500 million by 1920 and by 1946 a staggering one billion passengers used the Indian railway system (Headrick 1988).

There were a number of factors that motivated the establishment of a vast railway network. Broadly speaking one can identify four such factors: military, commercial, social and cultural. Militarism was the cornerstone of British colonialism and in 1881-82 alone almost 42% of total public expenditure was spent on the army (Prashad 2001). Not surprisingly, the pattern of railway development was also determined by military concerns. In the first half of the 19<sup>th</sup> century, British administrators showed little interest in railway development. But this began to change as British rule in India began to face serious military challenges. Internal unrest during the *First War of Indian Independence*<sup>7</sup> (in 1857) together with the threat of external aggression, prompted British rulers to undertake greater investments in the railway system. Thus by the second half of the 19<sup>th</sup> century, the need to develop a national transportation became more pressing from a military point of view (Sweeney 2011; Kerr 2007, 2001; Macpherson 1955; Thorner 1955). Added to the immediate military needs, British commercial interests played an equally important role in motivating the colonial government to introduce railways. Textile interests in Britain, in particular, vociferously lobbied for the development of railways in the hopes of gaining access to Indian markets and for opening up new sources of raw materials. Similarly steel manufacturing, ship building and financial interests were also supportive of these demands (Thorner 1955; Macpherson 1955; Sweeney 2011). Third, terrible famines in the second half of the 19<sup>th</sup> century had resulted in substantial mortality. The inability of the government to provide relief had resulted in wide spread condemnation of colonial administration. Railways were seen as crucial for improving food security and for preventing further famines (Hurd 2001). Finally, cultural beliefs of the British themselves may have played a substantial role in promoting the railways. Headrick (1988, p. 58) argues that railways were an essential part of the Victorian cultural imaginary and that to a number of British officials they "...deserved to be built for their own sake, even if it meant finding commercial or political justification to obtain the necessary backing"<sup>8</sup>.

The development of the Indian railways system can be divided into four

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<sup>7</sup> This was the first pan-Indian movement against colonialism, often referred to as the Sepoy Mutiny amongst British historians.

<sup>8</sup> The idea that the cultural and social identity of the colonizing nation determines institutional structures and developmental trajectories of the colonies has received substantial attention within economics (North 2005, La-Porta *et al.* 1997).

distinct periods. Between 1850 and 1869, most of the construction and operation was undertaken by private British firms under concession contracts. In this system, private British companies were guaranteed a return of five percent on investments and a host of other incentives including access to land free of cost (Macpherson 1955). These railway contracts were generally valid for a period of 99 years though the state had the power to buy railway lines after a period of 25 years (Thorner 1951). There are two interesting features of this period. First, despite substantial private ownership, decisions regarding the location of the railway lines were heavily based on military and political needs. Second, though the system of guaranteed returns was successful in attracting a large number of investors, some studies have pointed out that these concessions did not create incentives for private firms to economize their operations (Sweeney 2011; Headrick 1988). As long as investors obtained a guaranteed return on their investments, they had no reason to optimize costs. Thus single track trunk lines that were supposed to have cost 5,600 pounds per kilometer ended up costing over 10,000 pounds per kilometer on an average (Headrick 1988). Obviously a part of this reflected costs of initial experimentation and construction. Further as Flyvbjerg *et al.* (2003) have argued, the uncertain nature of infrastructural investments, almost always result in cost overruns. Despite these caveats the incentive structure generated by the concession contracts did aggravate the problem<sup>9</sup>. That this was indeed the case, explained why railway lines constructed by the state from 1869 onwards (which arguably faced similar if not identical conditions as did private firms) were far more economical than those constructed by private investors.

By the 1869, the payments on account of guarantees had become onerous. It was at this time that the state decided to take over construction and operations of new tracks. The period between 1869 and 1880 heralded a massive state led railways development effort. Costs of construction reduced dramatically. Bogart and Chaudhary (2012) note that the colonial state was particularly effective in reducing labour costs and this resulted in an overall decrease in railway costs. However this era came to an abrupt end in 1880 as a wave of famines and wars squeezed government budgets, making it harder for the state to take on the responsibility for railway construction (Headrick 1988). In addition, the heavy lobbying from commercial interests in the British parliament added to the pressure on the colonial administration to re privatize the railways (Sweeney 2011). By 1880 private British firms were allowed back into this sector, though on slightly lower guarantee rates of 4 percent. What followed was a period of “public-private” ownership, where

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<sup>9</sup> Eichengreen (1995) makes similar observations regarding railways construction in North America.

substantial amounts of lines may have been owned by the State, but were operated by private firms (Hurd 2001; Headrick 1988). In the aftermath of the First World War, the railways fell into disrepair due to lack of investments. These deteriorating conditions along with surging nationalist sentiments added pressure to the local administration to place railways under direct state control (Thorner 1955). As a result, between 1920 and 1947 the ownership and management of several railway lines were brought within the ambit of the state sector.

There are a number of interesting conclusions that may be drawn from the experiences of the Indian railways during this period. It must be remembered that the Indian railways were developed not simply to connect existing markets and ports, but also to meet military and social needs. There seems to be substantial evidence that a number of railways lines were developed in non-profitable regions (Hurd 2001). It might be tempting to argue therefore, that the Indian railways may have been built *ahead of demand* so to speak. If this proposition were to hold one would expect profits to have been negligible at initial stages of railway development (because of excess capacity) and positive at later stages of construction (as demand caught up to supply)<sup>10</sup>. This was precisely the case with the Indian railways. Initially private investors did not earn sufficient returns to cover costs, but after 1900 profitability improved and the railways had begun to generate sufficiently high returns (Anstey 1929; Sanyal 1930; Thorner 1955, 1951; Headrick 1988; Bogart and Chaudhary 2012). Furthermore there is direct evidence that the mere existence of railways may have encouraged the development of new markets in areas where, prior to the advent of the railroads, there were none. In the Khandesh region, Haynes (1999) suggests that by 1880, out of 10 major commercial centers in the region, 7 were located along railway lines. He concludes that "...building of railroads clearly was an important stimulus to the emergence of intermediate markets" (Haynes 1980: p. 292). In another study Kerr (2001) has suggested that railway workshops in the city of Ajmer were decisive factor in attracting migrants from rural areas and in converting the region into a major city<sup>11</sup>.

Though railways restructured the 19<sup>th</sup> century economy in many ways, one should be cautious not to overestimate the actual impact of railways on economic development. Hurd (2001), for instance has points out that the

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<sup>10</sup> See Mercer (1974, p. 492). Hurd (2001) hints that certain railway lines were extremely profitable and may not have required state assistance. But in other regions state assistance was crucial for rail lines.

<sup>11</sup> It may be noted that Bogart and Chaudhary (2013) find weak evidence for the proposition that railways were built ahead of demand. They suggest that capital utilization was an important but not primary driver of TFP growth.

population in the city of Mirzapur declined after the arrival of the railways<sup>12</sup>. Similarly Naoroji (1901), Thorner (1955), Habib (1975), Satya (2008) are skeptical about the actual (positive) impact of the railways on the Indian economy. Railways may have been responsible for aggravating food shortages during famines. Moreover by allowing imported goods greater access to Indian markets, railways may have been instrumental in displacing local production, causing de-industrialization and de-urbanization of the economy (Satya 2008).

With India attaining its independence in 1947, the post-colonial railway policy was aimed at reversing the institutional framework it had inherited from its past. Between 1950 and 2000 the railways were extended by around 10,000 Km and there was extensive modernization of the entire railway sector. Steam engines were replaced by domestically produced electric and diesel locomotives by the 1970's and on the technological front indigenous R&D facilities were developed and nurtured (Kerr 2007). On the organizational front, the entire national network was sub-divided into various zonal regions to increase operational efficacy (Alivelu 2010). Over the 20<sup>th</sup> century this sector also became a major source of employment: In 1947 around 1 million people were employed and by 2005 the figure was more than 1.4 million (Kerr 2007).

Starting from the 1990's the Indian economy began to undertake substantial reforms with a stress on creating a more deregulated and market friendly environment. Though a number of sectors have witnessed a gradual retreat of state involvement, the state continues to play a substantial role in the railway sector. There have been attempts at encouraging public-private initiatives (PPI). Between 1990 and 2013 eight PPI's worth 7,826 million USD have been initiated. From a comparative perspective the number of PPIs is still low. During the same period Brazilian railways have initiated 18 PPI projects worth 28, 258 million USD<sup>13</sup>. On the whole indicators of freight and passenger outputs have shown substantial increases during the neoliberal period. The total number of passengers carried by the railways has increased from 326,196 million passengers-km to over 903,000 million passengers-km between 1995 and 2010. Revenue freight has increased from 270,489 million tons-km in 1995 to over 600,000 million tons-km in 2010. In terms of trackage, the progress has been slow. Between 1995 and 2010 a little more than 1,300 km have been added to the rail network (World Development Indicators). A recent study undertaken by Ernst & Young and FICCI (2012) suggests that the growth of railways over the past few years has been

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<sup>12</sup> Hurd (2001) is largely supportive of the positive impact of railways.

<sup>13</sup> See World Bank PPI Database.

inadequate to meet the demands of the growing Indian economy. Though there are several reasons for this, the study points to a severe inadequacy of public and private investments in the sector.

### 3. Comparative Analysis of Railways in Brazil and India

The process of development can take a number of different forms and can have a variety of outcomes. The precise nature and pattern of development is deeply influenced by historical and institutional pre conditions of individual countries. There is by now a large literature on how historical events shape the nature of economic development. Economists believe that initial levels of inequality, historically determined cultural and economic endowments, incipient institutional frameworks etc. set in motion processes that exert long lasting influences on the way economies develop (Sokoloff and Engerman 2000; Acemoglu *et al.* 2001, 2002, 2005; Mookherjee and Ray 2001; Bowles *et al.* 2006; Krugman 1991). Both Brazil and India began constructing railway infrastructure in the 19<sup>th</sup> century, yet individual specificities of each economy generated long lasting differences. While in Brazil, railways were built to serve pre-existing markets, in India railways were built ahead of commercial demand. In this section we compare and contrast the experiences of railway development in Brazil and India and trace these differences to historical and institutional specificities of the two countries.

Brazil was a colony of Portugal for over three centuries and obtained its independence only in 1822. During the colonial period the Brazilian economy was geared towards production of primary goods, but unlike the Indian case, the process of colonization did not lead to the emergence of a centralized state apparatus. As a result, economic and political power became increasingly concentrated in the hands of a few local elites, a set up that is often referred to as *coronelismo* (Kohli 2004). Even after independence, despite attempts to construct a centralized state, economic and political power remained scattered in the hand of a minority of elites. National political organizations were non-existent while commercial associations tended to prioritize local over national interests (Ridings 1977). Kohli (2004, p. 134) argues that “Powerful Brazilian elites also championed *laissez faire*, reflecting an early lack of confidence and an absence of national assertiveness that has continued to cast a long shadow on how Brazil is ruled”. The lack of centralized control ended up creating a number of competing centers and this competitive atmosphere precluded long-term “collective action” that could have generated a national market and integrated economy (Mattoon 1977).

It is important not to exaggerate the role of centralization. Despite the

lopsided distribution of power, there is no doubt that the Brazilian state did play an extremely significant developmental role in the economy. As Topik (1979) suggests, the state was instrumental in setting up supporting institutions like banks, schools and helped encourage the development of the railways too. Similarly the state of São Paulo played an important role in local development in the region (Love 1980). Yet when looked at from the perspective of the Indian developmental experience, the lack of centralized state authority in Brazil is particularly glaring.

It is within this context that one should view the development of Brazil's railway infrastructure. By the mid-nineteenth century coffee had become the primary export of Brazil. Exceedingly high transport costs (often as high as 50 percent of profits) created incentives for local planters to demand for railroads. Not surprisingly, the initial drive for the development of railways- in São Paulo for instance- was taken by plantation owners (Mattoon 1977). Yet it was precisely the nature of the cultural and political configuration of the Brazilian economy that restricted the reach and spread of the railway network. The railways were constructed to connect coffee producing regions to ports and not so much to encourage a national market, reflecting the provincialism of local decision makers. Moreover as Ridings (1977) suggests, intra-regional rivalries amongst agrarian elites created further disincentives for the emergence of an integrated rail network. He cites the example of the Commercial Association of Pernambuco and the Commercial Association of Pará both of which made several attempts to thwart railway connections to rival ports. Thus by the time when Brazil entered into the import substituting industrialization era, not only was the railway network woefully inadequate, but the ISI itself encouraged the development of an automobile sector which left little room for investments in railways. It is only very recently, in the 21<sup>st</sup> century, that policy makers began to feel the need to invest in a more nationally integrated railway network, as the exports of commodities became increasingly important.

The Indian historical experience stands in sharp contrast with the Brazilian one. The colonization of the Indian economy is best understood as an inter-play of two contradictory impulses. On the one hand colonial rule over the sub-continent was designed to bestow economic benefits to Britain<sup>14</sup>. But for colonization to be profitable, a centralized state apparatus

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<sup>14</sup> Some historians and economists have suggested that vast amounts of resources and wealth in the form of tributes were transferred from the Indian economy (Naoroji 1901; Chandra 1999; Habib 1975; Bagchi 2002). Others, however, have questioned this proposition (Chaudhuri 1968). The role of Indian markets as a source of demand for British goods however cannot be denied. British exports accounted for 9.4 percent of cloth consumption in 1839 and 27 percent by 1860. Britain cotton goods exports to India in



including an efficient army, a bureaucracy and a national system of transport were essential. So great was the British control over the Indian sub-continent that, following Edmund Burke, Bagchi (2002) has characterized the colonial system as a “coercive monopoly”<sup>15</sup>. Furthermore one has to remember that by the 19<sup>th</sup> century Britain was already an economic and military superpower. This meant that unlike a smaller and less advanced colonizing nation like Portugal, 19<sup>th</sup> century Britain had the resources and organizational capacity to establish a strong colonial apparatus in the Indian sub-continent.

The mechanism of inter rail coordination in India provides an instructive example of the benefits of centralized decision making. By the late 19<sup>th</sup> century a number of private and state owned rail lines had begun to emerge, forcing the colonial regime to experiment with various mechanisms to increase co-ordination amongst various railway lines. Kerr (2007) notes that the Railway Conference set up in 1879 and the establishment of the Railway Board in 1905 played a crucial role in this regard. These forums provided opportunities for railway managers and colonial bureaucrats to learn from each other’s experiences and also helped them to create greater co-ordination across regions (Bogart and Chaudhary 2013). Such experiences stand in sharp contrast to the Brazilian one where in the absence of such mechanisms, coordination amongst a whole plethora of decision makers may have been weak.

The Indian railways were a product of these contradictory impulses. Strengthening military and political control over the sub-continent was a precondition to achieving economic control and this necessitated the development of a centralized system of governance and this, apart from other things, meant constructing an extensive transportation network. Marx, in his writings on India provides a particularly interesting analysis of these unintended consequences of colonization. In an essay titled “The Future Results of British Rule in India”, Marx (1853) argued that colonization in India would unleash both “destructive” and “regenerating” forces<sup>16</sup>: “England has to fulfill a double mission in India: one destructive, the other regenerating the annihilation of old Asiatic society, and the laying the material foundations of Western society in Asia.” The “political unity” that colonization had brought about, in his view, “was the first condition of its

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1815 stood at 0.8 million yards. But by 1839, cotton goods exports rose to 100.5 million yards (Habib 1975).

<sup>15</sup> Though the extent and the reach of the state are obviously striking, it should not be overemphasized. The colonial state may have had a monopoly on the use of power and force, yet its stability depended greatly on the extent to which local agrarian elites could be co-opted into the system (Kohli 2004)

<sup>16</sup> See Mukherjee (2008) for a discussion on Marx’s writings on India.

regeneration". But this unity could only be ensured by developing a nationwide system of transport and communication. He predicted that the introduction of railways, though intended to subjugate the Indian economy, would eventually end up revolutionizing it:

"But when you have once introduced machinery into the locomotion of a country, which possesses iron and coals, you are unable to withhold it from its fabrication. You cannot maintain a net of railways over an immense country without introducing all those industrial processes necessary to meet the immediate and current wants of railway locomotion, and out of which there must grow the application of machinery to those branches of industry not immediately connected with railways. The railway-system will therefore become, in India, truly the forerunner of modern industry".

Marx's predictions did not prove to be correct. Colonialism did not develop and industrialize the economy. But it is equally apparent that the colonial regime did bestow upon India a massive rail network. In the post-colonial era, rehabilitating and developing the Indian railways became integral aspect of Indian development and unlike Brazil the Indian ISI policies did not encourage the automobile sector adding to the centrality of railways as a mode of transport<sup>17</sup>.

From a policy perspective, the comparative experience of Brazil and India raises important questions regarding the role of railways as a catalyst for economic development. By the middle of the 20th century, Brazil, despite having built a relatively smaller rail network, ended up with higher levels of development and industrialization than India. The striking irony of the Indian railways experience has been summed up by Thorner (1955, p. 201) as follows: "India alone of the countries with great railway networks is unindustrialized". Why did the availability of a vast railway infrastructure not stimulate economic development in India and why did Brazil end up industrializing to the extent that it did without having a comparable rail network? A partial answer to this puzzle lies in the nature of the political and social organization of the two countries. Despite its relative economic backwardness in the world economy, Brazil was a sovereign nation for much of the 19<sup>th</sup> century. As a result even though the Brazilian state lacked the sort of centralized state structure that colonial India had, it nonetheless enjoyed certain flexibility in determining its economic policies (Kohli 2004; Baer and Sirohi 2013). The Brazilian state was instrumental in protecting local industrial and agricultural interests (through protective tariffs, buffer stock schemes for coffee, provision of credit etc.). In the railway sector for

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<sup>17</sup> In 1980, Brazilian car production was much higher than car production in India (Humphrey *et al.* 1998).

example, freight rates were designed in such a way that they benefitted domestic agriculture and industry (Leff 1997). Thus despite having a substantially smaller railway network the Brazilian economy was able to develop at a relatively fast pace. India on the other hand was a British colony and had very little flexibility when it came to its economic policies (Baer and Sirohi 2013). Fearful of potential competition to British industries, the colonial administrators actively intervened in the domestic markets to discourage local entrepreneurs from entering sectors dominated by British firms (Chandra 1999; Bagchi 2002). This was also true in the case of the railways. For instance in 1868 almost 99 % of railway investments were made by British firms (Headrick 1988). Similarly, the colonial state's "buy British" railway policy, favored British firms over Indian ones with the result that a vast majority of meter gauge and broad gauge locomotives were produced in Britain (Kerr 2007). Bagchi (2002) underscores how railway freight policies were biased against Indian businesses. In particular he notes that "...freight rates were higher for transport between two internal points than between a point in the hinterland and the port" and that "Goods produced in India paid higher freight rates than similar imported goods" (Bagchi 2002, p. 2231). The colonial regime was therefore heavily tipped against local developmental interests and these discriminatory practices weakened the potential economic impact of the railway system.

The above analysis suggests that the relationship between infrastructure and economic growth is extremely complex. Previous literature on infrastructure has provided conflicting results with some empirical studies finding a weak relationship between growth and infrastructure (Holtz-Eakin 1994; Holtz-Eakin and Schwartz 1995). In this context, Esfahani and Ramírez (2003) have indicated that the success of infrastructural investments ultimately hinges on a host of factors including the role of the state and the quality of institutions (regulatory framework, contract enforcement and corruption). In recent years both Brazil and India have stepped up investments in their infrastructural sectors. In Brazil, the second phase of the PAC program (Plan for Accelerated Growth) has allocated over 500 Billion USD for infrastructural projects. Though it is hoped that the re-invigoration of infrastructure will increase economic growth, the outdated and inefficient institutional structure makes this less than likely. To take an example, in 2014 on an average it take 84 days to start a business in Brazil and 24 days in India compared to 6 days in the US (World Development Indicators). Brazil is ranked 120 and India 142 on the "ease of doing business" index (World Bank). Problems of corruption continue to pose major problems for governance in both economies. Under such conditions, infrastructural investments in themselves may not increase economic growth. As Esfahani

and Ramírez (2003, p. 471) state: "...achieving better outcomes requires institutional and organizational reforms that are more fundamental than simply designing infrastructure projects and spending money on them".

#### **4. Conclusion**

Our comparative analysis provides some insights regarding the development of railway infrastructure in Brazil and India. Past studies have highlighted two possible patterns of railway development. In the context of United States, Fishlow has rejected the hypothesis that railways were built ahead of demand while Fogel, Mercer and more recently Atack et al. provide some evidence to the contrary. Based on these approaches this paper draws out major differences between railway development in Brazil and India. In the case of Brazil railway infrastructure *followed* pre-existing demand. The reluctance of investments in Social Overhead Capital (infrastructure) due to its lumpiness, and thus cost, could explain Brazil's historical experience in waiting until there is an urgent need for such investments. Here the social and political organization of the society was an important determinant of the Brazilian pattern. In the 19<sup>th</sup> century, when railway construction began, Brazil did not have a centralized state nor did it have a strong, nationwide governance structure. As a result the incentives for constructing a vast railway network were weak. On the other hand, India followed a different path. Here railways were built even in areas where there was no immediate economic demand. Due to Britain's colonial ambitions in India, it was willing to pay the price of its lumpiness and thus provide the country with a huge railroad infrastructure prior to its economic justification.

From a policy perspective our analysis of railways in Brazil and India suggest that the ability of infrastructural sector to stimulate growth depends on the larger institutional, organizational framework of economies. More specifically, unless infrastructural investments are complemented by appropriate economic policies -including social and institutional reforms- its impact on economic growth is likely to be weak.

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Nicola Casolani\*

## **SUSTAINABILITY OF SHORT FOOD SUPPLY CHAIN SYSTEM IN EUROPE: A SWOT ANALYSIS**

### **Abstract**

Direct food sales and, in general, the short food supply chain system in Europe, is a growing business. In the modern economic environment, where conditions of farm profitability are poor, this type of system can be effective as a tool, especially to support small and medium producers. This paper provides an overview of the benefits and limits of the short food chain through a general SWOT analysis of it in Europe. From this analysis emerges some strong benefits of the short channel, like the possibility of promoting rural development by redistributing value along the food supply chain and the sales of designation of origin, geographical indication and organic products, an important heritage of Europe. Excessive bureaucracy and inconsistent legislation are limitations that create difficulties for farmers to be competitive. The lack of robust data on the economic impact of the short food chain system in Europe and the difficulty in collecting comparable data, especially for small enterprises, emerge as a limit in the scientific literature. The short food supply chain is an important system to promote a new food culture and sensitize European citizens to the theme of local and fresher food and to favour environmental sustainability.

**JEL CLASSIFICATION:** Q1, O13, L23.

**KEYWORDS:** DIRECT SELLING, SHORT FOOD CHAIN, FOOD SYSTEM, LOCAL FOOD, FARM DIVERSIFICATION.

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## **1. Introduction**

### ***1.1. Brief introduction to Short Food Supply Chain System***

The context in which farmers operate is going to mean substantial changes, both managerial and organisational. Globalization has led to a mixture of cultures and enrichment, opening the markets to many products, including food. In this socio-economic situation, the short chain could be an alternative to a system that penalizes, in particular, the farmers, with strong repercussions for the entire agricultural production system. The rise in prices of some raw materials and agricultural products creates a public food debate; the attention of the EU Parliament has focused on the imbalance of power and possible speculation along food supply chains as the main causes of the increasing gap between farm gate and retail prices (Aguglia *et al.* 2009).

According to Parker (2005), the Short Food Supply Chains System (SFSCs) are chains in which the geographical distance and/or the number of intermediaries is reduced. This system of production/distribution is characterized by a lesser number of steps, to encourage direct contact between the producer and consumer, and eliminate the intermediaries who generally favour an increase in food prices. The term "short chain" encompasses different operating models, ranging from direct sales on the farm by the farmer, to real forms of alliance between consumer groups and farmers who are together in partnership, to meet the common need (and have the advantage) of shortening the distance between production and consumption (Goodman *et al.* 2011). Reducing the number of intermediaries is often described as strategies of rural development by redistributing value along the agri-food supply chain (Bloom and Hinrichs 2011).

Direct sales is a marketing strategy that may allow farmers to contrast the adverse effects of productivism and the imbalance of power in the international agro-industrial food supply chain (Aguglia *et al.* 2009).

The SFSCs, to the converse of traditional distribution techniques, switches from primary production to sale, bypassing the transactions that generally decrease the profit margins of the manufacturers. Moreover, in a situation of generally poor profitability in the agricultural sector, it is crucial to study new models of entrepreneurship with alternative forms of marketing products, that transform the farmer into an active protagonist. Direct sales is

a form of commercialisation that allows farmers to obtain a higher share of the final value of their products and emphasises the concept of local foods; the gap between producers' prices and the prices paid by consumers creates a great debate in Europe.

The problem of production-consumption price polarization is extremely important, because it is a cause of the impoverishment of farmers, especially in countries in the developing world (Sini 2014).

Some authors may associate production methods as part of what defines local food; in this light, geographic proximity is only one component of the definition of "local foods" (Thompson et. al. 2008).

The importance of neighbourhood food markets has rapidly diminished because of the evolution of the food industry, the beginning of large scale distribution, the change in life styles and consumption, and the role of the woman within the family (Aguglia 2009).

There are a number of candidate criteria that may be used in order to clarify a definition of SFSCs (Kebin and Torre 2012):

- Geographical proximity: the distance between producers and consumers.
- Social proximity: solidarity between producers and consumers, civic engagement in local food system, (re)connection with local food traditions and identities and trustful relations between a producer and consumer.
- Economic proximity: money circulates within a community or a certain locality.

Thanks to this great diversity of forms and practices, the SFSCs can be defined as alternative food networks (Holloway and Kneafsey 2004), or an alternative strategy to conventional marketing channels. The development of the short chain can make a useful contribution to the development of rural areas (Knickel and Renting 2000).

In Europe, a marked interest in the various forms of SFSCs has been highlighted by the media both local and national, which have further enhanced the positive image of this form of trade.

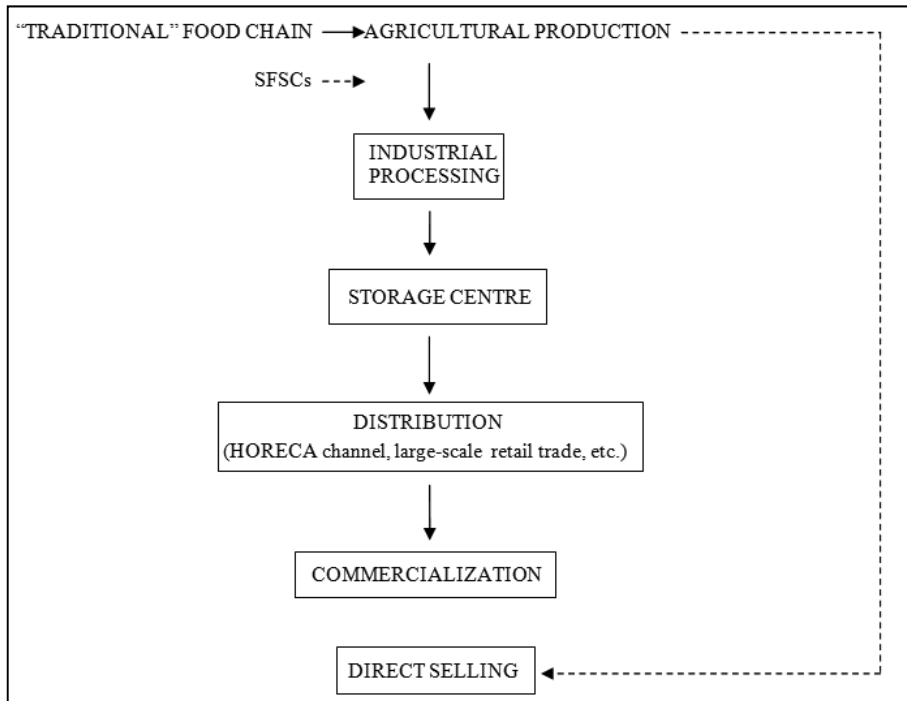
The evidence suggests that direct sales can help to support small, low intensity farms in landscapes of high conservation value (Battershill and Gilg 1998).

The local short food chain benefits are not limited solely to a reduction in purchase prices for consumers and satisfactory sale prices for producers, which in times of trouble can be a driving factor, but are also from a new relationship between producers and consumers, based on trust and communication. Communication between consumers can lead to more radical changes to production-consumption relationships (Cox *et al.* 2008).

Shortening the supply chain can contribute to the revitalization of rural areas, partly through synergies, and stimulate a new model of rural development (De Roest and Menghi 2000). Actually, the negotiating power of suppliers in relation to large retailers is small (Bunte *et al.* 2011).

The differences between the long and short food circuit are shown in figure 1.

**Figure 1. A “traditional” food system and SFSCs.**



Source: Author

## 1.2. Different forms of SFSCs

There are various classifications of SFSCs that depend on the variables chosen to be classified. SFSCs is, in fact, a term that defines a large number of types of sales. Kneafsey *et al.*, (2013) divided the SFSCs, based on proximity; on sales in proximity and sales at a distance. Sales in proximity is referred to in the form of SFSCs in which farmers act individually or collectively, but produce has to be traceable back to a named farmer (e.g. farm shops, farmers' markets and other markets, etc.). Sales at a distance is referred to as the other form of SFSCs.

Direct sales are the simplest form of the short supply chain; the producer is usually within the same company and sells his own products, but can also organize selling outside of the company.

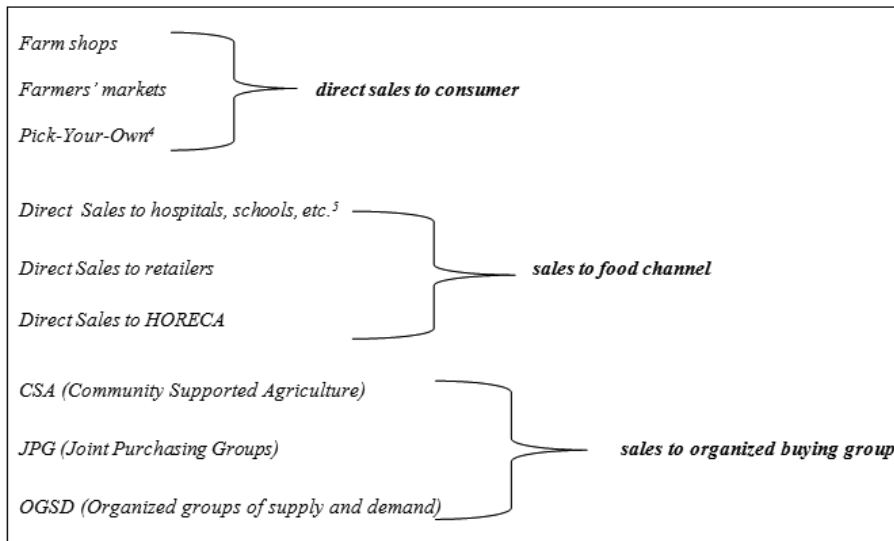
The Buying Groups and Supplier Groups are groups organised by consumers who decide to buy products directly from the producer or from groups of producers, organised without intermediaries.

Renting *et al.* (2003), divide SFSCs into three main types, on the basis of the number of intermediaries, physical distance and organisational arrangements:

- *Face-to-face SFSCs*, characterized by personal interaction (consumer purchases a product directly in farm shops or farmers' markets).
- *Proximate SFSCs*, extended beyond direct interaction and delivery of products produced and retailed within the specific region (or place) of production (e.g. consumers' cooperatives, community supported agriculture).
- *Spatially extended SFSCs*, where laden information, as for example, the place of production and producers, were transferred to consumers who are outside of the region of production itself (e.g. certification labels, restaurants, etc.).

We propose a classification based on the type of purchase; in this case, it is possible to distinguish three main categories: “*direct sales to consumer*”, “*sales to food channel*” and “*sales to organized buying group*” (Figure 2).

**Figure 2. Examples of typology of SFSCs.**



Source: Author'

The potential benefit of SFSCs is strongly linked to location, and the structural and production characteristics of farms. At present, farmers' markets show some different characteristics from the traditional neighbourhood market; for example, it offers added value from a social and cultural point of view, and provides an occasion to share and exchange information and events, organised to supply information for the consumers and encourage their knowledge and communication (Aguglia 2007).

A local food network could be possible through quantitative penetration (Heer and Mann 2010), through a large number of participating enterprises; in this case, it is possible that a large number of enterprises can solve the problem of large-size, single enterprises and increase the area of distribution. Instead, Dev *et al.* (1996) highlight that it is not the total number of participants that counts, but the representation of all, or at least many, parts of the food chain.

Direct marketing strategies of different kinds are often central to so-called "alternative food networks", which tend to be underpinned by a central



principle of somehow “reconnecting” food producers and consumers (Cox *et al.* 2008).

### **1.3. Sustainability of SFSCs**

The sustainability of SFSCs (Bullock *et al.* 2000) favours three different areas:

- Environment: reduction in the so-called offer "zero kilometers", energy consumption and pollution.
- Economy: lower food prices for consumers and more profit for producers.
- Social: direct control of price and quality by consumers, freshness and healthiness of perishable products, the relationship of trust and exchange of information without intermediaries between producers and consumers.

The environmental sustainability of SFSCs linked to a reduction in ‘food miles’ is today the object of scientific research; the environmental efficiency is linked to a decrease in the emission of substances impacting upon the environment, as a result of shorter transport distances, but also the reduction of packaging use (Belletti and Marescotti 2012). The food miles concept, first coined in 1992 by Tim Lang, explains comparisons between food items in terms of the carbon emitted in the transportation from producer to retailer or consumer (Edwards-Jones *et al.* 2008; Seyfang 2008). Today, an approach to evaluating the environmental impact of food is the Life Cycle Analysis (LCA), (Cowell and Parkinson 2003; Edwards-Jones 2010; Milà i Canals *et al.* 2007; Van Hauwermeiren *et al.* 2007).

The economic sustainability not only links to lower food prices for consumers and more profitability for producers but also in the re-circulation of community income and creates new jobs in the current difficult situation, in which the consumption of food and products in general has declined (Sini 2014).

The direct relationship between producers and consumers in some form of SFSCs favour more social inclusion of people and so is efficient from a social point of view. SFSCs can help to revitalize local communities.

The degree of sustainability varies among different types of SFSCs.

## **2. SFSCs in Europe**

The supply performance of food manufacturers has increased over the last years, largely driven by the restructuring of the food sector (Duffy *et al.* 2003; Hendrickson *et al.* 2001). In the same way, in recent years in the European Union, but also in the rest of the world, there has been a proliferation of initiatives to develop local food systems, such as direct sales' markets, organized by the producers.

The agri-food legislation of the European Union is increasingly aimed, primarily, at improving standards of health and hygiene in the entire chain, "from farm to fork".

The countries of Northern Europe, Continental Europe and the Mediterranean are at the centre of a rediscovery of the importance of the territorial dimension of the production and consumption of food. Products mainly commercialised through SFSCs are fruit and vegetables (Kneafsey *et al.* 2013).

A study of SFSCs and Local Food Systems in the EU was conducted by Kneafsey *et al.* (2013); from this study, it emerged that:

- there is a large variety of types of SFSCs throughout the EU;
- each type of SFSCs is present in every part of the EU.

Farmers' markets are dominant in Mediterranean countries and in New Member States. In a recent European survey (Eurobarometer 2011), over half of 26,713 EU citizens interviewed (55%), agreed that the EU should encourage local markets, and over half (54%), maintain that there are benefits to buying directly from a farm.

In Germany, local food networks that commercialise their products have emerged recently.

In France, regional foods exist in a wide variety, and are now being promoted by a great diversity of short supply chains (Marechal 2008). The Local Food Systems are more developed in the northern and south-eastern parts of France. 107,000 enterprises (corresponding to 21% of farm business) sell some of their produce using some form of SFSCs; circuit courts in France are actually more concentrated in the less productive agricultural regions. In Italy, the phenomenon of SFSCs is not homogeneous along the country: data from the last agricultural census (2010), show that in the north of Italy, the number of companies are 22.2% (60,144); in the

centre, are 16.8% (45,539); in the south and the islands are 60.9% (164,896); the best five regions, in terms of the number of companies, are located in the south of Italy.

In England, since the late 1990s, the agricultural sector in the United Kingdom modified this assessment, with greater opportunities for Local Food Systems; consumers and producers have increased the pressure for food re-localization, which means making it locally grown. This process has been favoured by increased food prices, environmental awareness and by a popular desire to reconnect with food quality and food production (Karner *et al.* 2010).

In Austria, agriculture has always been dominated by the small-scale, but in recent years, dependence upon complex food regulations implies the need for extra investment, so the phenomenon of direct sales and farmers' markets declined (Karner *et al.* 2010).

Recent research (Eurobarometer 2012) shows that 71% of EU citizens maintain that the origin of food is important; in the SFSCs, thanks to a fiduciary relationship with the producer, the consumer is able to perceive with greater clarity the information about the origin and method of production of the products (Renting *et al.* 2003). In the European food system, localism is a way to sustain rural livelihoods (DuPuis and Goodman 2005). Morris and Buller (2003) maintain that local food development is of public interest.

The European Union has two categories of agri-food product for promoting and protecting the names of foods that are linked to specific geographical areas, expressed in Council Regulation (EC) No 510/2006 of 20 March 2006:

- '*Designation of origin*' means the name of a region, a specific place or, in exceptional cases, a country, used to describe an agricultural product or a foodstuff, originating in that region, specific to a place or country, the quality or characteristics of which are essentially or exclusively due to a particular geographical environment, with its inherent natural and human factors, and the production, processing and preparation of which takes place in the defined geographical area.
- '*Geographical indication*' means the name of a region, a specific place or, in exceptional cases, a country, used to describe an agricultural product or a foodstuff, originating in that region, specific

place or country, and which possesses a specific quality, reputation or other characteristics attributable to that geographical origin, and the production and/or processing and/or preparation of which take place in the defined geographical area.

The European report Eurobarometer (2011) shows that around half of all EU respondents (52%) agree that agri-food coming directly from a local farm is easy to identify, especially in Italy, (where 70% say it is easy to know when a product is local), in Portugal (67%) and Austria (62%).

Organic farming in the EU is regulated by (EEC) N° 2092/91.

With regards to the impact upon small farmers and the food supply chain, EU hygiene rules can be summarized as follows (European Commission 2012):

- General hygiene provisions for primary production.
- General hygiene requirements for all other food business operators;
- The application of procedures based on the HACCP (Hazard Analysis and Critical Control Points) principles.
- The obligation of approval of the establishment.
- Specific hygiene rules for food of animal origin.
- Fees for the organisation of official controls on specific rules for products of animal origin.

HACCP systems, used to guarantee food safety, could be tailored to the size of production and the risks involved. In some countries, as for example in Italy, there's special legislation that regulates the direct selling of food.

### **3. An analysis of European SFSCs**

#### **3.1. SWOT analysis of SFSCs**

A SWOT analysis is used to identify the positives and negatives inside an organisation or system and outside of it, in the external environment; it is useful for strategic planning and decision-making. A general SWOT analysis, based upon scientific literature, was created to explain internal factors, (the *strengths* and *weaknesses*), and external, (the *opportunities* and *threats*), of SFSCs in Europe (table 1). It's important to point out that some information that emerged from SWOT analysis will be more prevalent in some regions of Europe than in others, depending upon many factors,

such as the type of SFSCs, the economic conditions, the rural infrastructure, local bureaucracy, etc. Issues highlighted by the SWOT analysis are not exhaustive due to the complexity of SFSCs.

**Table 1. General SWOT analysis based on scientific literature was made to explain the benefit and limit SFSCs.**

<b>Strengths</b>	<b>Weaknesses</b>
<p>To avoid fossil fuel use, reduce food miles and non-industrially processed foods (Holt 2007).            Biodiversity encouraged through extensive/organic production.            Lower prices for consumers.            Ability to reduce costs of production and distribution, so as to increase the overall economic benefit of the players involved in the trade (Belletti and Marescotti 2012).            Short food chains encourage the relocation of agricultural activities in suburban areas, supporting local economies.            Fresher fruit and vegetable products.            The local scale of direct marketing helps farmers first of all to minimize transport costs (Aguglia 2009).            Consumer demand for local food is strong (Eurobarometer 2012).            Transparency of product origin and production method.            Good connection with “food-tourism”.</p>	<p>Consumers do not always know where to access these products.            Sometimes, limited range of products.            The products are in danger of being perceived as socially exclusive or a middle class ‘niche’ (Kneafsey <i>et al.</i> 2013).            Some consumers have the problem of time or transport to get to the outlets.            Limited resources for marketing and communication.            Difficulty of the short chain in setting up external commercial relations (Sini 2014).            Limited capacity to grow for some small enterprises.            High costs of transportation when compared with other circuits.            Aspects of organisational and coordination difficulties and logistics-commercial organisation.            Sometimes, limited preparation of agricultural entrepreneurs for commercial roles.            Less environmentally sustainable linked to scale ecology (Schlich and</p>

<p>SFSCs often have autonomy from corporate food chains (Kneafsey <i>et al.</i> 2013).          Appropriate release for organic and typical products.          Greater appreciation of the food's cultural and historical links the territory of origin.          Possibility to increase the consumption of fruit and vegetables.          Discrete-horticultural specialisation of certain areas in Europe.</p>	<p>Fleissner 2005) which can be better achieved elsewhere.          Difficulties in participating in public food procurement by local authorities as, for example, for schools or hospitals.</p>
<p style="text-align: center;"><b>Opportunities</b></p> <p>Increase the percentage of designation of origin and/or geographical indication and/or organic food, important for the heritage of European economics.          May increase the availability of healthy food.          Growing interest in buying « local » through more diffusion of SFSCs.          Opening of new marketing channels in the local economy.          Member states and regional authorities more ready to support.          Supermarkets offering space to local small-scale producers and that can open up access to bigger markets (Kneafsey <i>et al.</i> 2013).          Encouraging marketing of the territory linked to its products to attract tourists.</p>	<p style="text-align: center;"><b>Threats</b></p> <p>Competitiveness of the business model.          Supermarkets developing own SFSCs and offering local produce or produce of clear origin with greater transparency to consumers could eventually squeeze small suppliers out of the market (Kneafsey <i>et al.</i> 2013).          Difficulties for consumers to recognize "local" food          Long working hours, stress.          Difficult to identify and achieve the best volume sizes of exchange to exit from the niche (Sini 2014).          Meteorological difficulty in some European Region to support farmer market.          Small enterprises unable to supply public institutions with consistent quality and enough quantity.</p>

<p>Growing consumer interest in food origins, environmental sustainability and health.</p> <p>Possibilities to make connections with cultural food movements.</p> <p>Survival of small farms and/or farms in disadvantaged areas.</p> <p>Rural development in general, and particularly in disadvantaged areas.</p> <p>Possibility of creating single outlets in individual farms or aggregates in given points in rural areas.</p> <p>Educating consumers on diet asking direct information on food.</p> <p>National and/or regional institutional strategies could provide very good support to develop SFSCs.</p> <p>Possibilities to create collective brands.</p>	<p>Climate change in some regions will threaten production.</p> <p>In some cases, it is difficult to integrate food and farming with tourism strategies.</p> <p>Absence of a European normative that can discipline and protect the SFSCs.</p> <p>Competition and adversity of powerful financial interests (Sini 2014).</p> <p>Excess of bureaucracy.</p>
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It's possible to categorize the benefit emerged from SWOT in four main principal areas, as show in table 2, such as:

- *health and well-being*;
- *environmental*;
- *social and cultural*;
- *economic*.

*Health and well-being benefits* with regard to aspects of “healthy” being connected to food consumption; for example, the possibilities of consuming fresher fruit and vegetable products, seasonal products, with good nutritional characteristics.

The *environmental benefits* are principally linked to reducing food miles; the question of sustainability in food production and distribution is obviously far wider than emissions from fossil fuel use and includes questions of water

pollution, rural economics, landscape amenity and a host of others (Pretty *et al.* 2005). A combination of the descriptors ‘organic’ and ‘local’ does not guarantee that consumers would be making best decisions from an environmental point of view. In fact, if organic local products are stored and purchased out of season, these products may have a greater carbon footprint than non-local goods (Cowell and Parkinson 2003; Edwards-Jones *et al.* 2008; Van Hauwermeiren *et al.* 2007). Compared to non-local foods, a number of LCA research studies provide evidence that ‘local food’ can be beneficial to the environment in terms of reduced greenhouse gas emissions (Pelletier *et al.* 2011; Van Hauwermeiren *et al.* 2007). In contrast, Coley *et al.* (2009), suggest that some of the ideas of localism in the food sector need to be revisited; in his study conducted on local food and its carbon emissions, he find that if a customer drives a round-trip distance of more than 6.7 km to purchase organic vegetables, the carbon emissions produced are greater than the emissions from the system of cold storage, packing, transport, etc.

*Social and cultural benefits* regards the food’s cultural and historical links to the territory of origin. It is important to link with tourism activities of the SFSCs; the social benefits could be regarded as educational for consumers on diets asking direct information about food. This is a very important activity, because it can stimulate the consumer to ask for various information from the seller; for example, related to nutritional information about a different variety of fruit or vegetable. Increasingly, consumers’ awareness about the social dimension of food (Goodman and DuPuis 2002) has led to new types of food networks.

*Economic benefits* of SFSCs are multiple and with regard to various aspects, not only to lower prices for consumers. In general, SFSCs support local economies in suburban areas and sanction the survival of small farms and/or farms. The main aspects of *economic benefits* are due to Rural Development, especially of disadvantaged areas.



**Table 2. Main Benefits of SFSCs.**

<b>Main Benefits</b>	<b>Examples emerged from SWOT analysis</b>
<b>Health and well-being</b>	-Fresher fruit and vegetable products.
<b>Environmental</b>	-To avoid fossil fuel use, reduced food miles and non-industrially processed foods.
<b>Social and cultural</b>	-Greater appreciation of the food's cultural and historical links to the territory of origin. -Possibilities for connections to cultural food movements. -Encouraging marketing of the territory linked to its products to attract tourists. -Educating consumers on diets when asking for direct information on food.
<b>Economics</b>	-Opening of new marketing channels in the local economy. -Lower prices for consumers. -Supporting local economies in suburban areas. -Survival of small farms and/or farms in disadvantaged areas. -Rural development in general, and particularly in disadvantaged areas.

From this report, it emerges that the main limit of SFSCs from the SWOT analysis are classifiable as follows (table 3):

- problems connected with the *structure of enterprises*;
- *commercial*;
- *communication and advertising*;
- *logistics*;
- *legislation and bureaucracy*.

The problems connected with the structure of enterprises are relative to limited capacity for growth for some small enterprises, due to the competitiveness of the business model, to competition and adversity from powerful financial interests and to some operating difficulties; for example, small enterprises that are unable to supply public institutions with enough quantity.

The *commercial* limits are principally due to the difficulty of the short chain in setting up external commercial relations; for example, the difficulty of entering into an organized distribution for the farmers to play an important role in the choice of SFSCs.

The *communication and advertising* limits are relative to limited resources for marketing and communication.

The *logistical* limits are due to difficulties of logistics-commercial organisation. For example, it is sometimes difficult for some farmers to participate in farmers' markets that are distant from the place where they have their agricultural production.

The *legislation and bureaucracy* limits are relative to the absence of a European normative that can discipline and protect the short supply chain. These will be very important as an EU objective for the future.

**Table 3. Main limitation of SFSCs.**

<b>Main Limitation</b>	<b>Examples emerged from SWOT analysis</b>
<b>Structure of enterprises</b>	<ul style="list-style-type: none"><li>-Competitiveness of the business model.</li><li>-Competition and adversity from powerful financial interests.</li><li>-Small enterprises unable to supply public institutions with consistent quality and enough quantity.</li></ul>
<b>Communication and advertising</b>	<ul style="list-style-type: none"><li>-Difficulties for consumers to recognize "local" food.</li><li>-Limited resources for marketing and communication.</li><li>-Consumers do not always know where to</li></ul>

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	access these products.
<b>Organisation and logistics</b>	-Aspects of organisation and coordination are difficult to organise. -Difficulties of logistics-commercial organisation.
<b>Legislation and bureaucracy</b>	-Absence of a European normative that can discipline and protect the short supply chain. -Excess of bureaucracy.

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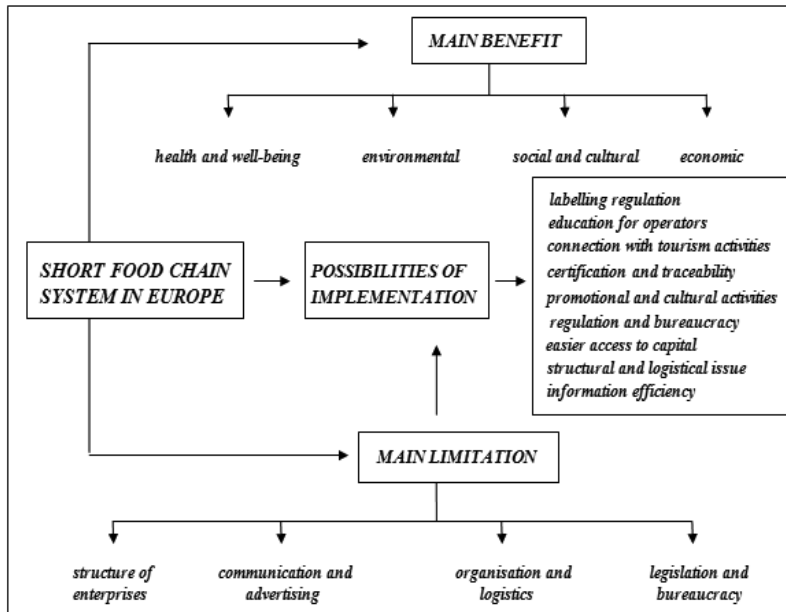
### 3.2. Implementation of SFSCs

The possibilities of the implementation of SFSCs can be relative to different aspects, as represented in figure 3. In particular, in general SFSCs, it is possible to implement:

- **Labelling regulation**; some exceptions to SFSCs in terms of labelling are possible, but some minimum information could be required (in particular, nutritional information). Most information, for example, the price on the label or in the box, is important for many people who don't want to ask for information in farmers' markets or shops.
- **Education for operators**; the selling of products requires knowledge and skills different to those required for agricultural production, because a farmer becomes a merchant (European Commission 2012). It is very important to organize training to complete the competence of the operators and allow them to acquire new skills that can be used in a different context.
- **Better connection with tourism activities**; fundamental for the development of the European countries and for local economies.
- **Certification and traceability**; with a European programme to increase the number of companies with some form of certification, (e.g. organic, PDO and PGI), and implementation of traceability systems to assure the provenance of food.
- **Promotional and cultural activities**, because there is often insufficient visibility and knowledge about locally produced products; there's also the possibility to link SFSCs with cultural activities.

- **Regulation and bureaucracy** to be more sustainable for those who operate in SFSCs in Europe to avoid difficulties in carrying on this activity from the point of view of adaptation to regulation and bureaucracy.
- **Make easier access to capital**, especially for young people and small enterprises.
- **Structural and logistical issues**, to encourage the creation/strengthening of public spaces to dedicate to the direct selling of food products.
- **Information efficiency**, improving the perception of the consumer with information about the product; for example, with scientific congress and advertising.

**Figure 3. Implementation of SFSCs in Europe**



Source: Author'

Grunert *et al.* (2014) conducted a study on sustainability labels associated with food products through consumer motivation; the results show that sustainability labels currently do not play a major role in consumers' food choices. It is necessary to increase consumer awareness of the importance of SFSCs in the theme of environmental protection; in this way, consumers could give them greater weight in their purchase choices.

A food label is used to communicate information to consumers. When consumers buy directly from producers, a label becomes less important, because the consumer can evaluate the product on the basis of their interaction with the producer (Kneafsey *et al.* 2013). The consumers are the most important players in the market; from this point of view, it could be important to give all information of the value behind the SFSCs as a point of force, because food's cultural and historical links to the territory of origin and the origin of food are values intrinsic in this system. Trust and relationships amongst SFSCs participants and other stakeholders are critical factors to developing a successful local food supply.

Some form of SFSCs can be considered an example of multifunctionality in agriculture; in particular, some form of farm sale is an activity that can sometimes be included among multifunctional activities (Jongeneel *et al.* 2009); multifunctional agriculture is considered to be the future of European agriculture. It's recognized that the future of agriculture production goes beyond solely food production; some aspects of the agricultural multifunctionality concept regards food security, environment and socio-cultural aspects and can be overlapping the philosophy of SFSCs.

#### **4. Conclusion**

SFSCs and local food systems represent a diversity and richness of the European economy. The EU has a large number of small farmers of social, economic and environmental significance. The SFSCs ranges from the more traditional to a more innovative system; some form of SFSCs represent a new model of entrepreneurship. In agreement with Marsden *et al.* (2000), in order to go beyond the classical definitions, the SFSCs have the capacity to re-socialize or re-spatialize food, to redefine the relationships between producers and consumers, showing clear signals for the origin of food. This is a very important aspect that allows for the promotion of local food, in

particular with a designation of its origin or a geographical indication. The majority of European citizens, in accordance with the Eurobarometer data (2011), in fact, agree to promoting local food. From this point of view, the short chain seem to be a form of marketing with strong positive effects for promoting the quality of local food and links that to its territory, rural development and sustainability.

It emerges from the literature that there is a lack of scientific economic data about SFSCs and the difficulty of collecting comparative data on microenterprises and initiatives across the EU (especially regarding their economic impact). From this point of view, it could be useful to create a European database, in order to estimate the evolution of different forms of short chains in the European Union through some common variables; the European Census of Agriculture could include a special section, dedicated to the study of SFSCs.

Another step in SFSCs' development could be the creation of "Food short chain certification", through the associations of producers; in this way, it could be possible to create a new quality standard for SFSCs or a new collective brand. This form could be useful to defend some producers that want to differentiate the quality of his/her products/services.

The limitations and advantages of SFSCs are strongly dependent upon the socio-cultural environment in which they are designed; wherefore, emerging from this study are some common lines of points of strength and points of weaknesses that are most common in some European areas as compared to others.

The agricultural production systems generate two categories of products/services:

- the traditional outputs (commodities), like food and feed;
- the non-traditional outputs (non-commodities), which include aspects related to the environment and territory, employment, human resources and work, etc. From the SWOT analysis emerge some aspects of SFSCs that can be considered as forms of multifunctional agriculture, whose operators are not only engaged in the production of agri-food products, but also in the provision of other services. In addition, support for the cooperation of industry, as well as promotional activities locally, should catalyze the development of

cost-effective short chains, local markets and distribution chains of food on a local scale.

Some forms of SFSCs are configured as a social innovation. Europe has a structure that can be favoured by the development of different forms of SFSCs for two main reasons:

- a great number of companies of small dimension, unable to serve industrial channels;
- a discrete-horticultural specialisation of certain areas of Europe;
- a great historical heritage of local food production;
- possibilities of linking SFSCs with tourism.

SFSCs develops an environment in which emerges positive social, cultural, economic and health aspects. The small size of most companies creates competitiveness problems associated with limited economic resources for marketing and communication, for investment in the structure for the sales and educational program. Simplifying the bureaucracy in some countries of Europe is fundamental for the progress of SFSCs; for example, a specific and simpler regime for services like food catering for schools and hospitals and other restaurant services.

The short chain is particularly well suited to solving the problems of smaller, multipurpose farms, offering niche products, local, typical and/or organic (Sini 2014). Another point to develop is to focus on the training of operators in SFSCs, organising training courses; in fact, many people who work in SFSCs, have not had adequate training to run a business of this type.

Some other actions which could be used to implement the SFSCs are labelling regulation, certification and traceability, making it easier to access capital, especially for young people and small enterprises, to encourage the creation/strengthening of public space to dedicate to the direct selling of food products and the promotion of connected cultural activities.

Sustainability labels currently do not play a major role in consumers' food choices. In this light, it's important to communicate the importance of environmental sustainability to stimulate the sensibility of European citizens in buying local food and in supporting SFSCs; this could be an important advertising and promotional activity.

Finally, the absence of a European normative that can protect the short supply chain is an aspect that European policies could revise in the future.

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