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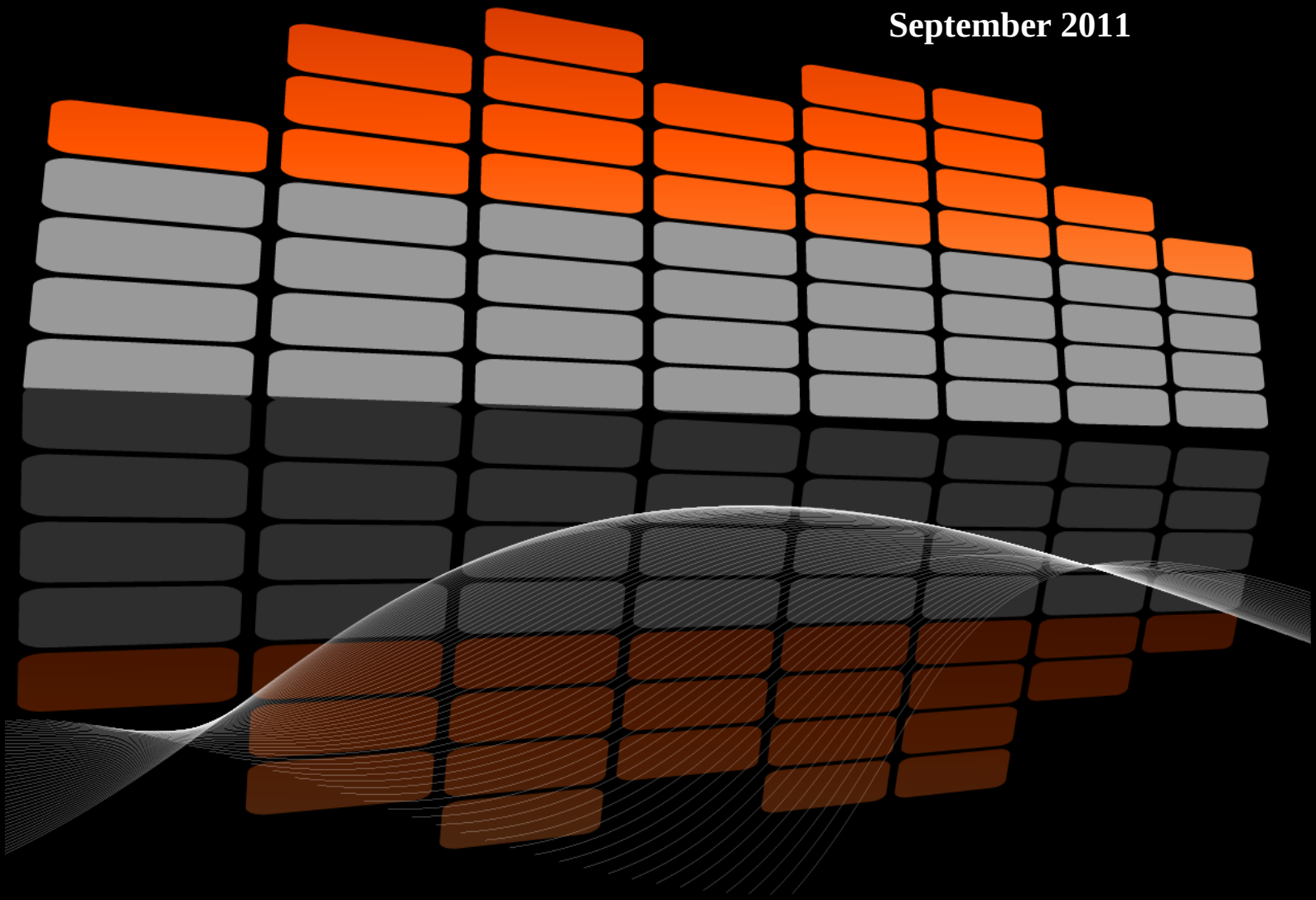

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Factors Affecting Inward Foreign Direct Investment Flows into the United States: Evidence from State-Level Data

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***Abstract* - This paper investigates factors affecting the inward foreign direct investment (FDI) flows among fifty states of the United States. The analysis uses annual data for the period from 1997 to 2007. The study identifies several state-specific determinants of FDI and investigates the changes in their importance during the study period. Our results show that among the major determinants, the real per capita income, real per capita expenditure on education, FDI related employment, real research and development expenditure, and capital expenditure are found to have a significant positive impact on FDI inflows. There is also evidence that the share of scientists and engineers in the workforce exerts a small positive impact on inward FDI flows. In addition, per capita state taxes, unit labor cost, manufacturing density, unionization, and unemployment rate exert a negative impact on FDI inflows.**

1. Introduction

During the past three decades, foreign direct investment (FDI) undertaken by transnational corporations has become one of the leading factors promoting the process of globalization. Foreign direct investment in the United States in particular has grown significantly during this period. For example, according to the United Nations Conference on Trade and Development (UNCTAD)'s *World Investment Report 2010*, the stock of FDI in the U.S. grew from $83.0 billion in 1980 to $539.6 billion in 1990 and to $2,783.2 billion in 2000 and to $3,120.6 billion in 2009 (see Table 1). Though there has been a significant increase in the FDI to the developing countries in recent years, the majority of these inflows still goes to developed countries, with developed countries accounting for 50.8% of FDI in 2009. Of these total worldwide FDI inflows, the U.S. received 11.7% in 2009. The FDI inflows to the U.S. increased from $48.4 billion in 1990 to $324.6 billion in 2008 but dropped to $129.9 billion in 2009 (see Table 2).

While the FDI inflows to the U.S. has grown significantly over the past two decades, the largest part of these flows went to four states, namely, Texas, California, New York, and Illinois (see Table 3). These four states have been the top recipient states of FDI since 1990. A significant research effort has been directed at establishing the determinants of foreign direct investment (FDI). However, only a very limited of studies have focused on state-specific locational determinants. However, the empirical literature has been limited in several respects, with most work focused exclusively on host country tax regimes. This paper investigates locational determinants of the inward foreign direct investment (FDI) among fifty states of the United States. The analysis uses annual data for the period from 1997 to 2007.

The paper is structured as follows: The next section presents a survey of literature, whereas Section 3 presents the specification of the econometric model. Section 4 discusses the variables and data sources. The empirical results are presented and discussed in Section 5 and finally, Section 6 summarizes the main results and concludes with some policy implications.

2. Literature Review

In this section we present a brief overview of some related work. Although there has been considerable research concerning the locational determinants of foreign direct investment, we only present findings of studies that analyze the locational determinants of foreign investment in the U.S.

Axarloglou and Pournarakis (2007) investigate the impact of FDI inflows on the local economies of the US states that receive most of the FDI inflows in the country. It appears that FDI inflows in manufacturing have rather weak effects on local employment and wages in most of the states in the sample. However, these results are primarily due to the industry composition of the FDI. FDI inflows in Printing and Publishing, Transportation Equipment

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and Instruments have positive effects on local employment and wages, while FDI inflows in Leather and Stone/Clay/Glass have detrimental effects on local labor markets in most of the states in the sample. These findings indicate the importance of industry characteristics in evaluating the effects of FDI inflows on local communities. Also, they emphasize the need for US states to selectively target and attract FDI inflows in specific industries.

are corporate income tax rates an important determinant of FDI in the US? and do investors from tax credit countries differ significantly in their tax response relative to those from tax exemption countries?

A study by Axarloglou (2005) evaluates the relative impact of industry and state specific economic factors on inward FDI in several U.S. states that compete for the same inward FDI. The

Table 1(a). Inward Foreign Direct Investment Stock, 1980-2009
(Billions of Current US Dollars)

Economy	1980	1990	2000	2009
Developed economies	401.6	1,555.6	5,653.2	12,352.5
of which: United States	83.0	539.6	2,783.2	3,120.6
Developing economies	298.6	524.5	1,728.5	4,893.5
Developing economies: Africa	41.1	60.7	154.2	514.8
Developing economies: America	41.8	111.4	502.1	1,472.7
Developing economies: Asia	214.2	349.6	1,067.7	2,893.8
Developing economies: Oceania	1.5	2.8	4.4	12.2
Developed economies: America	137.2	652.4	2,996.2	3,648.6
Developed economies: Asia	6.4	14.3	72.9	271.4
Developed economies: Europe	230.8	807.3	2,440.3	8,037.8
Developed economies: Oceania	27.1	81.6	143.8	394.7
World	**700.3**	**2,081.8**	**7,442.5**	**17,743.4**

Table 1(b). Share of Inward Foreign Direct Investment Stock, 1980-2009
(Percent)

Economy	1980	1990	2000	2009
Developed economies	57.4	74.7	76.0	69.6
of which: United States	11.9	25.9	37.4	17.6
Developing economies	42.6	25.2	23.2	27.6
Developing economies: Africa	5.9	2.9	2.1	2.9
Developing economies: America	6.0	5.4	6.7	8.3
Developing economies: Asia	30.6	16.8	14.3	16.3
Developing economies: Oceania	0.2	0.1	0.1	0.1
Developed economies: America	19.6	31.3	40.3	20.6
Developed economies: Asia	0.9	0.7	1.0	1.5
Developed economies: Europe	33.0	38.8	32.8	45.3
Developed economies: Oceania	3.9	3.9	1.9	2.2
World	**100.0**	**100.0**	**100.0**	**100.0**

Source: The United Nations Conference on Trade and Development (UNCTAD), *World Investment Report 2010* .

A study by Wijeweera, Dollery, and Clark (2007) analyzes the relationship between the corporate tax rates and foreign direct investment in the United States. The study uses a panel of nine investing tax exemption and tax credit countries over the period 1982-2000 to find answers to two questions, namely,

study find evidence that relative labor productivity, relative spending on education, and relative crime rate are important in inter-state competition for the same inward FDI. The findings of the study also suggest that relative tax incentives also become

important in attracting FDI inflows when the contest in attracting inward FDI comes down to two states.

In another study Axarloglou (2004) evaluates the impact of industry and state specific economic conditions on inward FDI in several U.S. states. The study uses annual data for the 1974-1991 period. The results of the study suggest that FDI inflows in the U.S. are strongly influenced by both industry and state-specific labor productivity and state spending on education. The findings of the study also suggest that the quality of the local labor force, along with the efforts to improve this quality, is pivotal in attracting FDI inflows.

Chung and Alcácer (2002) examine whether and when state technical capabilities attract foreign investment in manufacturing from 1987-1993. The study finds that on average state R&D intensity does not attract foreign direct investment. Most investing firms are in lower-tech industries and locate in low R&D intensity states, suggesting little interest in state technical capabilities. In contrast, the study finds that firms in research-intensive industries are more likely to locate in states with high R&D intensity. Foreign firms in the pharmaceutical industry value state R&D intensity the most, at a level twice that of firms in the semiconductor industry, and four times that of electronics firms. Interestingly, not only firms from technically lagging nations, but also some firms from

Table 2(a). Inward Foreign Direct Investment Inflows, 1980-2009
(Billions of Current US Dollars)

Economy	1980	1990	2000	2009
Developed economies	46.6	172.5	1,138.0	565.9
of which: United States	16.9	48.4	314.0	129.9
Developing economies	7.5	35.1	256.5	478.3
Developing economies: Africa	0.4	2.8	9.8	58.6
Developing economies: America	6.4	8.9	97.7	116.6
Developing economies: Asia	0.5	22.6	148.7	301.4
Developing economies: Oceania	0.1	0.7	0.2	1.9
Developed economies: America	22.7	56.0	380.9	148.8
Developed economies: Asia	0.3	1.9	15.3	15.8
Developed economies: Europe	21.4	104.4	724.9	378.4
Developed economies: Oceania	2.2	10.2	17.0	22.9
World	**54.1**	**207.7**	**1,401.5**	**1,114.2**

Table 2(b). Share of Inward Foreign Direct Investment Inflows, 1980-2009
(Percent)

Economy	1980	1990	2000	2009
Developed economies	86.1	83.1	81.2	50.8
of which: United States	31.3	23.3	22.4	11.7
Developing economies	13.8	16.9	18.3	42.9
Developing economies: Africa	0.7	1.4	0.7	5.3
Developing economies: America	11.9	4.3	7.0	10.5
Developing economies: Asia	1.0	10.9	10.6	27.0
Developing economies: Oceania	0.2	0.3	0.0	0.2
Developed economies: America	42.0	27.0	27.2	13.4
Developed economies: Asia	0.5	0.9	1.1	1.4
Developed economies: Europe	39.5	50.3	51.7	34.0
Developed economies: Oceania	4.1	4.9	1.2	2.1
World	**100.0**	**100.0**	**100.0**	**100.0**

Source: The United Nations Conference on Trade and Development (UNCTAD), *World Investment Report 2010* .

technically leading nations are attracted to R&D intensive states.

A study by Keller and Levinson (2002) estimates the effect of changing environmental standards on patterns of international investment. The study employs an 18-year panel of relative abatement costs covering the period from 1977 to 1994 and controls for unobserved state characteristics. The study finds robust evidence that abatement costs have had moderate deterrent effects on foreign direct investment.

Hines (1996) compares the distribution between U.S. states of investment from countries that grant foreign tax credits with investment from all other countries. The ability to apply foreign tax credits against home-country tax liabilities reduces an investor's incentive to avoid high-tax foreign locations. The study uses data for 1987 and finds evidence to suggest that state taxes significantly influence the pattern of foreign direct investment in the United States.

Japanese firm's R&D expenditures, the greater the probability it will manufacture in the U.S., but this is not the case for advertising expenditures. Some strategic factors are also important: Japanese firms with medium domestic market shares have the highest propensity to invest in the U.S. There is evidence of follow-the-leader behavior between firms of rival enterprise groups, but none of 'exchange-of-threat' between American and Japanese firms. Japanese investors are also attracted by concentrated and high-growth U.S. industries.

Coughlin, Terza, and Arromdee (1991) use a conditional logit model of the location decision of foreign firms investing in manufacturing facilities in the United States using annual data for the 1981-1983 period. The study find evidence to suggest that states with higher per capita incomes, higher densities of manufacturing activity, higher unemployment rates, higher unionization rates, more extensive transportation infrastructures, larger promotional expenditures attracted relatively more foreign direct investment. In addition, higher wages and higher

Table 3. Top 10 States with Largest Stock of Foreign Direct Investment, 1990-2007
(Millions of Current US Dollars)

1990		2000		2007	
State	FDI Stock	State	FDI Stock	State	FDI Stock
California	75,768	California	121,040	Texas	128,424
Texas	57,079	Texas	110,032	California	108,572
New York	36,424	New York	68,522	New York	80,474
Illinois	23,420	Illinois	48,425	Illinois	48,626
Ohio	20,549	Michigan	39,238	Ohio	43,438
Alaska	19,435	Florida	38,755	Pennsylvania	39,824
Florida	18,659	Ohio	37,530	New Jersey	38,425
New Jersey	18,608	New Jersey	35,115	Indiana	38,145
Louisiana	17,432	Pennsylvania	34,106	Florida	35,052
Georgia	16,729	Louisiana	31,160	Alaska	34,473

Source: U.S. Department of Commerce, *Bureau of Economic Analysis* .

A study by Friedman, et al. (1996) examines the aggregation bias in Coughlin, Terza, and Arromdee's (1991) study. The study finds evidence to show that marked differences exist between the locational preferences of those investing in new manufacturing plants and those investing in mergers and acquisitions.

A study by Hennart and Park (1994) examines the impact of location and governance factors, and of four types of strategic interactions, on a Japanese firm's propensity to manufacture in the U.S. The results support the view that foreign direct investment is explained by location, governance, and strategic variables. Economies of scale and trade barriers encourage Japanese FDI in the U.S. The larger a

taxes deterred foreign direct investment.

The current study uses annual data on state-level foreign direct investment covering all 50 states over the 11-year period from 1997 to 2007. The study tests the importance of several state-specific determinants of foreign direct investment.

3. Model Specification

Drawing on the existing empirical literature in this area, we specify the following model:

$$FDI_{it} = \beta_0 + \beta_1 PCI_{it} + \beta_2 TAX_{it} + \beta_3 EDU_{it} + \beta_4 SE_{it} + \beta_5 FDIEMP_{it} + \beta_6 RD_{it} + \beta_7 CAP_{it} + \beta_8 LCOST_{it} + \beta_9 MANDEN_{it} + \beta_{10} UNION_{it} + \beta_{11} UNEMP_{it} + u_t \quad (1)$$

where FDI_{it} is the real foreign direct investment (FDI) inflows in state i in year t (i = 1, 2, ..., 50 and t = 1, 2, ..., 11); PCI_{it} is the per capita real disposable income of state i in year t; TAX_{it} is the per capita state taxes of state i in year t; EDU_{it} is the real per capita expenditure on education in state i in year t; SE_{it} is an indicator of labor quality as measured by the share of scientists and engineers in the workforce in state i in year t; $FDIEMP_{it}$ is the FDI related employment in state i in year t; RD_{it} is the real research and development (R&D) expenditure in state i in year t; CAP_{it} is the real capital expenditure in state i in year t; $LCOST_{it}$ is the unit labor cost in state i in year t; $MANDEN_{it}$ is the manufacturing density in state i in year t; $UNION_{it}$ is the share of the workforce that is unionized state i in year t; and $UNEMP_{it}$ is the unemployment rate in state i in year t.

The first variable, real state per capita income is a measure of market demand in a state and is expected to be related to foreign direct investment. Therefore, *a priori*, we would expect that $\beta_1 > 0$. The real per capita state taxes usually deter FDI flows and, therefore, is expected to be negatively related to foreign direct investment; thus, we would expect that $\beta_2 < 0$. Our third variable, the real per capita expenditure on education is expected to have a positive effect on foreign direct investment. Therefore, we would expect that $\beta_3 > 0$.

The next variable, the share of scientists and engineers in the workforce is expected to have a positive effect on foreign direct investment. Therefore, we would expect that $\beta_4 > 0$. Our fifth variable, the FDI related employment as a share of state total employment is expected to have a positive effect on foreign direct investment. Therefore, we would expect that $\beta_5 > 0$. Our sixth variable, the real research and development expenditure is expected to have a positive effect on foreign direct investment. Therefore, we would expect that $\beta_6 > 0$. Our seventh variable, the real capital expenditure is expected to have a positive effect on foreign direct investment. Therefore, we would expect that $\beta_7 > 0$. Our eighth variable, the unit labor cost is expected to have a negative effect on foreign direct investment. Therefore, we would expect that $\beta_8 < 0$.

States with higher densities of manufacturing activity is expected to attract more foreign direct investment because the foreign investors might be serving existing manufacturers. As Coughlin, Terza, and Arromdee (1991) and Head, Ries and Swenson (1995, 1999) point out, manufacturing density could also be used as a proxy for agglomeration economies. The manufacturing density is expected to be related positively to foreign direct investment. Therefore, we would expect that $\beta_9 > 0$. The next variable, unionization of the workforce is considered to be a deterrent and therefore expected to be related negatively to foreign direct investment. Thus we would expect that $\beta_{10} < 0$. The effect of unemployment on foreign direct investment could either be positive or negative. On one hand, unemployment rate reflects a pool of potential workers, thus higher unemployment rates across states will likely be related positively to foreign direct investment. On the other hand, as Coughlin, Terza, and Arromdee (1991) argue, higher unemployment rates could increase the amount that a firm must pay in unemployment insurance premiums. This would deter foreign firms with low labor turnover from investing in a state because they would be required to subsidize the unemployed workers who were released by other firms. Thus the expected sign of β_{11} could either be positive or negative.

4. Data Sources and Variables

In order to test the implications of our models, we collected a panel of aggregate data on foreign direct investment on all U.S. states, excluding the District of Columbia. The entire data set includes 50 states for which foreign direct investment and all other relevant variables are reported over the 1997–2007 period.

The real stock of FDI is measured in this study as the nominal stock of FDI deflated by the GDP deflator in constant (2000) U.S. dollars. The data on nominal stock of FDI are from the U.S. Department of Commerce, *Bureau of Economic Analysis* (BEA). The GDP deflators for states are derived by dividing the nominal gross state product by the real gross state product (base year = 100), both of which are obtained from the *Bureau of Economic Analysis*. The real per capita disposable income is measured as the nominal per capita disposable income deflated by the GDP deflator in constant (2000) U.S. dollars.

The real per capita taxes is measured by dividing the real state tax revenue by the state population. The nominal tax revenue for states are from various issues of the *Annual Survey of State Government Finances* published by the U.S. Department of Commerce. The nominal tax revenue was deflated by the GDP deflator to derive the real state tax revenue. The data on state population are from the *U.S. Census Bureau*. The real per capita expenditure on education is measured by dividing the real state education expenditure by the state population. The nominal education expenditure for states are from various issues of the *Annual Survey of State Government Finances* published by the U.S. Department of Commerce. The nominal education expenditure was deflated by the GDP deflator to derive the real state education expenditure.

The share of scientists and engineers in the workforce, a proxy for labor quality, is collected from the National Science Foundation, Division of Science Resources Statistics, *Science and Engineering Indicators 2010*. The FDI related employment variable is measured as the ratio of FDI related employment to total state employment. The data on FDI related employment are collected from the *Bureau of Economic Analysis* while the data on state employment are collected from the U.S. Department of Labor, *Bureau of Labor Statistics*. The information on real research and development expenditure is collected from the National Science Foundation, Division of Science Resources Statistics, *Science and Engineering Indicators 2010*. Data on real capital expenditure at the state level is not readily available. Therefore, the capital expenditure on manufacturing is used as a proxy. The information on capital expenditure on manufacturing is collected from the U.S. Census Bureau, *Annual Survey of Manufactures: Geographic Area Statistics* series.

The unit cost variable is measured following the procedure used by Axarloglou (2004). The unit labor cost is defined as:

$$LCOST_{it} = \frac{w_{it}}{APL_{it}} \qquad (2)$$

where w_{it} is the average wage rate in state i in year t and APL_{it} is the average product of labor in state i in year t. The average product of labor is calculated as:

$$APL_{it} = \frac{RGSP_{it}}{EMP_{it}} \qquad (3)$$

where $RGSP_{it}$ is the real gross state product of state i in year t and EMP_{it} is the total employment in state i in year t. The data on the average wage and total state employment are collected from the U.S. Department of Labor, *Bureau of Labor Statistics*. Following Coughlin, Terza, and Arromdee (1991), the manufacturing density variable is measured as the manufacturing employment per square mile of state land excluding federal land. The data on manufacturing employment are collected from the U.S. Department of Labor, *Bureau of Labor Statistics*. The information on union membership is collected from http://www.unionstats.com/ maintained by Barry Hirsch (Georgia State University) and David Macpherson (Trinity University). The data on state unemployment rate are collected from the U.S. Department of Labor, *Bureau of Labor Statistics*.

5. Empirical Results

The results of our empirical analysis are presented in Table 4. In addition to the eleven independent variables included in Equation (1), we experimented with several other variables including the growth rate of real GSP, highway mileage, land area, number of airports, railway mileage, labor productivity, average hourly wage rate, real per capita exports, and right-to-work regulation. However, they were dropped from the model to minimize the problems of multicolinearity and incorrect signs. All the variables presented in Table 4 are expressed in logarithm and the coefficient of each variable can be interpreted as elasticities.

Table 4: Determinants of FDI in the United States
Panel Least Squares Estimates
(Dependent variable: Real FDI Inflows)

Variable	Coefficient	t-statistic
Constant	33.2684***	3.25
Real Per Capita Income	0.8839	0.92
Real Per Capita Taxes	- 3.3844**	-2.41
Real Education Expenditure	0.5549*	1.80
Scientists and Engineers	0.0558	0.29
FDI Related Employment	2.2268***	8.49
Research and Development	0.2373***	4.31
Real Capital Expenditure	0.5568***	7.68
Unit Labor Cost	- 2.5333	-1.00
Manufacturing Density	- 0.1328***	-3.53
Unionization	- 0.7159*	-1.83
Unemployment	- 3.5858***	- 13.60
Adjusted R^2	0.3669	
Number of Observations	376	

Note: ***, **, and * indicate the statistical significant at the 1%, 5%, and 10% level, respectively.

Real per capita disposable income variable has the expected positive sign but it is not statistically significant. This result is similar to the findings of studies by Coughlin, Terza, and Arromdee (1991) and Axarloglou (2004). The real per capita taxes also has the expected negative and it is statistically significant at the 5% level of significance. This finding is also consistent with the findings of previous studies.

The results of the study suggest that the real inflow of FDI in the U.S. is influenced by the state spending on education. The coefficient of this variable is positive and statistically significant at the 10% level of significance. This result is consistent with the findings of the study by Axarloglou (2004). The share of scientists and engineers in the workforce

has the expected positive sign but it is not statistically significant.

The FDI related employment variable has a positive and highly statistically significant effect on the real inflow of FDI. This variable is statistically significant at the 1% level of significance. This could be due to the fact that the states with high level of FDI inflows also have larger FDI related employment. The state's expenditure on research and development is also found to have a positive effect on the real stock of FDI. This variable is statistically significant at the 1% level of significance. The real capital expenditure variable also has the expected positive sign and it is statistically significant at the 1% level of significance. This could be due to the fact that capital expenditure on manufacturing larger part of FDI flows is in the manufacturing sector.

The unit labor cost variable has the expected negative sign. However, this variable is not statistically significant. Manufacturing density variable has an unexpected negative sign but it is statistically significant at the 1% level of significance. This variable is also expected to capture the agglomeration economies. Unionization variable has the expected negative sign and it is statistically significant at the 10% level of significance. This result is not consistent with the findings of Coughlin, Terza, and Arromdee (1990, 1991), Beeson and Husted (1989) and Bartik (1985). Finally, the results show that the unemployment rate is a negative, statistically significant determinant of foreign direct investment. This result is not consistent with our prior expectations. Generally, the unemployment rate is a signal of the availability of labor that affects investors.

6. Summary and Conclusions

This paper investigates locational determinants of the inward foreign direct investment (FDI) flows among fifty states of the United States. In order to test the implications of our models, we collected a panel of aggregate data on foreign direct investment on all U.S. states, excluding the District of Columbia. The entire data set includes 50 states for which foreign direct investment and all other relevant variables are reported over the 1997–2007 period.

Findings of our results show that real per capita disposable income variable has the expected positive sign but it is not statistically significant. The real per capita taxes also has the expected negative sign it is statistically significant at the 5% level of significance. These findings are consistent with the findings of previous studies.

The results of the study also suggest that the real inflow of FDI in the U.S. is influenced by the state spending on education. The coefficient of this variable is positive and statistically significant at the 10% level of significance. As expected, the share of scientists and engineers in the workforce has the expected positive sign. However, it is not statistically significant.

The FDI related employment variable has a positive and highly statistically significant effect on the real inflow of FDI. This could be due to the fact that the states with high level of FDI inflows also have larger FDI related employment. The state's expenditure on research and development is also fond to have a positive and significant effect on the real stock of FDI. This variable is statistically significant at the 1% level of significance. The real capital expenditure variable also has the expected positive sign and it is statistically significant at the 1% level of significance. This could be due to the fact that capital expenditure on manufacturing larger part of FDI flows is in the manufacturing sector.

Among other findings, the unit labor cost variable has the expected negative sign; manufacturing density variable has an unexpected negative sign but it is statistically significant at the 1% level fo significance; unionization variable also has the expected negative sign and it is statistically significant at the 10% level of significance; and the unemployment rate is a negative, statistically significant determinant of foreign direct investment. Some of these findings are consistent with findings of previous studies.

Given that the current results suggest that state government taxation negatively affect foreign direct investment inflows, state governments may consider providing more fiscal incentives to foreign investors in order to attract more foreign direct invest to their states. Another way for states to attract more investment is to spend more on educations, improvements in labor quality, research and development activities and capital expenditure. This could, however, be a long term goal. While the present study used the aggregate data, another avenue of future research could be to investigate the possibility that the location determinants vary across both countries and industries.

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On the Electoral Dimension of International Policy Coordination

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***Abstract* - The paper formalizes some of the interactions between inter-national and inter-temporal problems of policy coordination through the analysis of the implications of the synchronization (or not) of election dates on international policy cooperation. This makes it possible the determination of the gains and losses of international policy coordination and to an analysis of how the synchronization of election dates may help (electoral) international policy coordination.**

Keywords: *Electoral Business Cycles, International Policy Coordination, Elections Synchronization.*

1. Introduction

The recent worldwide economic crisis has caused economic agents to be concerned with the design of institutions that, by their nature, will help overcome the problems that have affected many countries. In particular, the focus has been placed on how different countries can cooperate in putting into practice economic policies coordinated at international level in order to overcome the economic crisis.

As a matter of fact, despite some interest in the design of international institutions (Morales & Padilla, 1995; Schubert & von Wangenheim, 2006) and a considerable interest in the international coordination of economic policies (Miller & Salmon, 1990; Miller et al., 1991), the fact is that the electoral dimension in these matters was always an issue to which the literature has devoted little attention (Easaw & Garratt, 1996; Lohmann, 1993; Tabellini, 1990). This is a disconcerting fact as it corresponds to an ignorance of an issue, i.e. the time horizons of governments (Caleiro, 2009), which is obviously relevant in the international coordination of economic policies within the framework of participation in some kind of economic institution.

For instance, concerning the third stage of the Economic and Monetary Union, the European Commission (1997: 26) acknowledged at the time that giving up national monetary policy could involve costs if countries experienced de-synchronized business cycles. Despite this concern about the importance of business cycle synchronization, little research has been done on the importance of temporal horizons for business cycles synchronization and, to the best of our knowledge, almost none has been done on the impact of the synchronization of election dates on the synchronization of business cycles between economies. Some exceptions are Breuss (2008), Caleiro (2010), Kayser (2006), and Sapir & Sekkat (1999).[1]

In order to fill part of the gap in the literature, the paper formalizes some of the interactions between inter-national and inter-temporal problems of policy coordination through the analysis of the implications of the synchronization (or not) of election dates on international policy cooperation. In doing so, it is our objective also to help answering the following question: "Does international cooperation or coordination of economic policies become easier or harder when domestic elections across countries are synchronized?" (Caleiro, 1996: 11). Specifically, the paper adds to the literature by computing the cooperative and non-cooperative solutions in a model where governments face elections at possibly distinct moments of time. This leads us to the determination of the gains and losses of international policy coordination and to an analysis of how the synchronization of election dates may help (electoral) international policy coordination.

That said, the rest of the paper is structured as follows. Section 2 presents the two-country model that will be used throughout the paper. Section 3 presents the non-cooperative solution for the synchronized and non-synchronized elections cases. Section 4 presents the cooperative solutions for these two cases. Section 5 concludes by showing the circumstances under which is it better to have synchronized elections.

[1] Also, in Caleiro (2000) a difference games case was considered to study how distinct electoral period lengths may influence the benefits from international policy coordination.

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2. The Two-Country Model

In order to analyze the possible consequences on international policy coordination of electorally-motivated governments, let us consider that voters take into account the evolution of output, which is controllable only in part by the domestic government. Formally,

$$y_t = am_t + bm_t^* + z, \quad (1)$$

where y_t is the output growth rate, m_t and m_t^* are, respectively, the domestic and foreign money growth rates, and z is a supply shock.[2] As a faster expansion of the domestic money supply is supposed to increase domestic output, the domestic monetary multiplier, a, is assumed to be positive (but less than 1). Also, due to the ambiguity of the monetary spillover effects, no sign will be imposed on the foreign monetary multiplier, b, though it will be assumed that, in absolute terms, it is less powerful than its domestic counterpart. To sum up, $0 \leq |b| < a < 1$.

We also consider that the government cannot freely manipulate its policy instruments without costs, which we assume are taken into account by the electorate, and, thus, will be viewed as popularity costs. In fact, as considered in Dolado et al. (1994), if $m_t = \pi_t$, it is reasonable to assume the following voters' period t utility stream:

$$v_t = -\frac{1}{2}\left(\beta y_t^2 + \pi_t^2\right),$$

where β is a positive constant measuring the relative importance of both variables in the voters' welfare.[3]

The economy of the foreign country has an identical framework, so that:[4]

$$y_t^* = am_t^* + bm_t + z, \quad (2)$$

and

$$v_t^* = -\frac{1}{2}\left(\beta^* y_t^{*^2} + \pi_t^{*^2}\right).$$

Following the definition of Cooper & John (1988), the strategic effects are then:[5]

$$\frac{\partial^2 v_t}{\partial m_t \partial m_t^*} = -a\beta b,$$

$$\frac{\partial^2 v_t^*}{\partial m_t^* \partial m_t} = -a\beta^* b.$$

This means that, when $b > 0$ (resp. $b < 0$), the monetary policies are strategic substitutes (resp. complements), since an increase in the foreign money supply growth rate decreases (resp. increases) the marginal payoff of domestic money supply growth rate and therefore weakens (resp. reinforces) the effect of the domestic monetary policy. [6]

In accordance to Gärtner (1994; 2000), let us assume that election periods (E) and non-election periods (N) alternate such that, when t = E, $t - 1$ = N, $t - 1$ = E, *etc.*, and that election results depend on the present and previous voter utility streams as follows:

$$V_t = v_t + \mu v_{t-1} \quad (3)$$

$$V_t^* = v_t^* + \mu^* v_{t-1}^*, \quad (4)$$

where V_t is the government vote share, and μ can be associated with the rate of decay of voters' memory.

Given this set-up, it is obvious that a perfect synchronization of elections will occur when election periods (E) correspond to the same value of t for both economies; otherwise non-synchronized elections will occur. This issue plays no special role in the non-cooperative solutions as will be shown in the following section.

3. The Nash solutions

As is well known, in the non-cooperative solution, each player optimizes her/his own objective function taking as given the reaction of the other player, *i.e.* both maximize their objective functions (3), (4), subject to equations (1), (2) but without considering the other government's instrument as

[2] Relation (1) is borrowed from Dolado et al. (1994). Another possible formulation could be $y_t = am_t + bm_t^* + \theta\bar{y}$, where $\bar{y}$ is the rate of growth of natural output (Canzonery & Gray, 1985).

[3] For simplicity, it will be assumed that y_t and π_t are measured from the most desirable values.

[4] Both economies are to be structurally identical, except in what concerns voters' output-inflation preferences and voters' memory. Straightforwardly, an asymmetric and/or a n-country version of the model can be considered.

[5] Strategic complementarity (resp. substitutability) corresponds to the case where an increase in the actions of all players except player i increases (resp. decreases) the marginal return to player i's action.

[6] Taking into account (1) and (2), this also means that, in case of a positive (resp. negative) monetary spillover effect, monetary policies can be substitutes (resp. complements) since an increase in the foreign money growth rate will induce, by itself, an increase (resp. decrease) in domestic output growth, which will be compensated by a decrease (resp. increase) in the domestic money growth rate (Bulow et al., 1985).

either under its own control or independent of its own policy. Hence, if we assume that both governments want to maximize their vote share at the election period by a non-cooperative procedure, the optimal reaction functions can be derived as follows.

Let us consider that, for the domestic economy, t = E. In this case, the two-period monetary policy that maximizes popularity at t = E is given by:[7]

$$m_{t-1} = -\frac{\beta ab}{1+\beta a^2} m^*_{t-1} - \frac{\beta a}{1+\beta a^2} z, \qquad (5)$$

and

$$m_t = -\frac{\beta ab}{1+\beta a^2} m^*_t - \frac{\beta a}{1+\beta a^2} z. \qquad (6)$$

In a similar way we can derive the reaction functions for the foreign government as:

$$m^*_{t-1} = -\frac{\beta^* ab}{1+\beta^* a^2} m_{t-1} - \frac{\beta^* a}{1+\beta^* a^2} z, \qquad (7)$$

and

$$m^*_t = -\frac{\beta^* ab}{1+\beta^* a^2} m_t - \frac{\beta^* a}{1+\beta^* a^2} z. \qquad (8)$$

Given the particular form of (5), (6), (7), and (8), the Nash solution for any period t, regardless of whether it is an election period for either of the countries, will be as follows:

$$\begin{bmatrix} m_{\mathbf{E}} \\ m^*_{\mathbf{E}} \end{bmatrix} = \begin{bmatrix} m_{\mathbf{N}} \\ m^*_{\mathbf{N}} \end{bmatrix} = \begin{bmatrix} -\frac{1+a\beta^*(a-b)}{1+a^2\left(\beta\beta^*\left(a^2-b^2\right)+\beta+\beta^*\right)} a\beta z \\ -\frac{1+a\beta(a-b)}{1+a^2\left(\beta\beta^*\left(a^2-b^2\right)+\beta+\beta^*\right)} a\beta^* z \end{bmatrix}. \qquad (9)$$

Clearly, non-cooperative monetary policies, (9), will be such that the existence of negative (resp. positive) supply shocks induces monetary expansions (resp. depressions).

The combination of the spillover and strategic effects clearly identifies the usual non-internalization of those effects when governments assume non-cooperative behavior. In fact, for negative (resp. positive) monetary spillover effects – which correspond also to strategic complementarity (resp. substitutability) – the non-cooperative policies will over (resp. under)-react to negative (resp. positive) supply shocks.

Straightforwardly, the non-cooperative monetary policies (9) lead to:

$$\begin{bmatrix} y_{\mathbf{E}} \\ y^*_{\mathbf{E}} \end{bmatrix} = \begin{bmatrix} y_{\mathbf{N}} \\ y^*_{\mathbf{N}} \end{bmatrix} = \begin{bmatrix} \frac{1+a\beta^*(a-b)}{1+a^2\left(\beta\beta^*\left(a^2-b^2\right)+\beta+\beta^*\right)} z \\ \frac{1+a\beta(a-b)}{1+a^2\left(\beta\beta^*\left(a^2-b^2\right)+\beta+\beta^*\right)} z \end{bmatrix}, \qquad (10)$$

which means that non-cooperative monetary policies will never fully sterilize output growth from supply shocks.[8]

Concerning the non-cooperative solutions (9) and (10), it should be noted that:

1) If z = 0, i.e. in case of no conflict between domestic objectives, π_t, π^*_t, and international ones, y_t, y^*_t, this solution should coincide with the cooperative solution characterized by $m_t = m^*_t = 0$. No gains from cooperation would arise. This would be the case because: (a) if each government only cares about its own domestic objectives, π_t, π^*_t, they would establish $m_t = m^*_t = 0$ and this, in turn, would also be the most convenient policy for international objectives, y_t, y^*_t; and (b) if each government would only care about y_t, y^*_t they would establish $m_t = m^*_t = 0$ and this, in turn, would also be the most convenient policy for domestic objectives π_t, π^*_t.
2) If $\beta = \beta^* = 0$, i.e. when both governments would have only domestic objectives, in the sense that voters only take into account π_t and π^*_t, then, once again, no gains from cooperation are to be obtained.

[7] Note that in the reaction functions (5) and (6), m_t and m_{t-1} are, by construction, the values corresponding to the election and to the non-election periods, respectively; each depending on the monetary policy that the foreign government will implement during t and t – 1, i.e. m^*_t and m^*_{t-1}, which, in turn, correspond to the other country's election and non-election policies *only if* elections are synchronized. In other words, while $m_t = m_{\mathbf{E}}$ and $m_{t-1} = m_{\mathbf{N}}$, the same does not happen necessarily for m^*_t and m^*_{t-1} appearing in equations (6) and (5). In the case of election periods synchronization, $m^*_t = m^*_{\mathbf{E}}$ and $m^*_{t-1} = m^*_{\mathbf{N}}$; otherwise, $m^*_t = m^*_{\mathbf{N}}$ and $m^*_{t-1} = m^*_{\mathbf{E}}$.

[8] In fact, the following relations are valid: $m_{t=\mathbf{E},\mathbf{N}} = -a\beta y_{t=\mathbf{E},\mathbf{N}}$ and $m^*_{t=\mathbf{E},\mathbf{N}} = -a\beta^* y^*_{t=\mathbf{E},\mathbf{N}}$. Hence, sign y_t = sign $y^*_t \neq$ sign m^*_t = sign m_t.

3) Obviously, the inexistence of monetary spillover effects, i.e. $b = 0$, will make non-cooperative solutions equivalent to possible cooperative ones.
4) In any other situation, there is a potential for gains from cooperation. In particular, acting non-cooperatively, governments do not even explore the strategic dynamics resulting from both periods. As $V_{\mathbf{E}} = V_{\mathbf{N}}$ and $V_{\mathbf{E}}^* = V_{\mathbf{N}}^*$, there is no distinction between election and non-election periods. More precisely, one should expect (electoral) gains from cooperation if governments internalize the spillover and strategic effects, whether the distinction between election and non-election periods is exploited or not. This leads us to the analysis of cooperative solutions which, due to the dynamic structure of the situation, assume an interesting form.

4. The Cooperative Solutions

It is in the cooperative solutions that the synchronization of election periods becomes important. In fact, as it will be shown below, the difference in the dynamic behavior of the economies resulting from a coincidence (or not) of election periods can be decisive in the determination of those solutions and in their specific form according to the two possible situations: synchronized and staggered elections (Cahuc & Kempf, 1997). We first consider the synchronized elections case.

4.1. The Synchronized Elections Case

In this case, at some moment *t*, both governments face the same kind of period. Assuming that the maximization of votes at t = E continues to be the objective, the cooperative solutions for the optimal policy for t and $t - 1$ are derived from the maximization of a weighted global vote share function as follows:

$$V_t^{CS} = wV_t + (1-w)V_t^*.$$

If we assume that t = E, the optimal cooperative policies are given by the solutions of the following systems of two equations:

$$\begin{aligned} -w(\beta a y_{\mathbf{E}} + m_{\mathbf{E}}) - (1-w)\beta^* b y_{\mathbf{E}}^* = 0, \\ -w\beta b y_{\mathbf{E}} - (1-w)(\beta^* a y_{\mathbf{E}}^* + m_{\mathbf{E}}^*) = 0; \end{aligned} \quad (11)$$

and

$$\begin{aligned} -w\mu(\beta a y_{\mathbf{N}} + m_{\mathbf{N}}) - (1-w)\mu^*\beta^* b y_{\mathbf{N}}^* = 0, \\ w\mu\beta b y_{\mathbf{N}} - (1-w)\mu^*(\beta^* a y_{\mathbf{N}}^* + m_{\mathbf{N}}^*) = 0. \end{aligned} \quad (12)$$

Given these solutions, it is straightforward to see that in the case where the domestic government's objectives were ignored, i.e. when $w = 0$, the solution would be:

$$\begin{bmatrix} m_{\mathbf{E}} \\ m_{\mathbf{E}}^* \end{bmatrix} = \begin{bmatrix} m_{\mathbf{N}} \\ m_{\mathbf{N}}^* \end{bmatrix} = \begin{bmatrix} -\frac{1}{b}z \\ 0 \end{bmatrix} \Rightarrow \begin{bmatrix} y_{\mathbf{E}} \\ y_{\mathbf{E}}^* \end{bmatrix} = \begin{bmatrix} y_{\mathbf{N}} \\ y_{\mathbf{N}}^* \end{bmatrix} = \begin{bmatrix} \frac{b-a}{b}z \\ 0 \end{bmatrix},$$

which corresponds to the use of the domestic control variable, m_t, in order to obtain the other government's objective for y_t^*, while this also would be compatible with the best possible policy for the other government, i.e. $m_t^* = 0$. At the other extremity, i.e. $w = 1$, the solution would be:

$$\begin{bmatrix} m_{\mathbf{E}} \\ m_{\mathbf{E}}^* \end{bmatrix} = \begin{bmatrix} m_{\mathbf{N}} \\ m_{\mathbf{N}}^* \end{bmatrix} = \begin{bmatrix} 0 \\ -\frac{1}{b}z \end{bmatrix} \Rightarrow \begin{bmatrix} y_{\mathbf{E}} \\ y_{\mathbf{E}}^* \end{bmatrix} = \begin{bmatrix} y_{\mathbf{N}} \\ y_{\mathbf{N}}^* \end{bmatrix} = \begin{bmatrix} 0 \\ \frac{b-a}{b}z \end{bmatrix},$$

which now would be the best possible situation for the domestic country.[9] This just serves to demonstrate that cooperation will always be refused by one of the players if the weight w is not intermediate enough. In fact, unless one assumes extreme cases like $\beta = 0$, $\beta^* = 0$, or $z = 0$, it is always possible to obtain sustainable cooperative solutions given that there exists an intermediate weight leading to welfare gains to both governments.

Given the above-discussion it is possible to precisely determine what cooperative solutions superiority over non-cooperative solutions will mean for monetary policy. Let us consider the cooperative first-order conditions given by (11) and (12) evaluated at the Nash solutions given by (9) and (10):

$$\begin{aligned} \left.\frac{\partial V_{\mathbf{E}}^{CS}}{\partial m_{\mathbf{E}}}\right|_{Nashsolutions} &= -(1-w)\beta^* b\underbrace{(am_{\mathbf{E}}^* + bm_{\mathbf{E}} + z)}_{y_{\mathbf{E}}^*} \\ \left.\frac{\partial V_{\mathbf{E}}^{CS}}{\partial m_{\mathbf{E}}^*}\right|_{Nashsolutions} &= -w\beta b\underbrace{(am_{\mathbf{E}} + bm_{\mathbf{E}}^* + z)}_{y_{\mathbf{E}}} \\ \left.\frac{\partial V_{\mathbf{E}}^{CS}}{\partial m_{\mathbf{N}}}\right|_{Nashsolutions} &= -(1-w)\mu^*\beta^* b\underbrace{(am_{\mathbf{N}}^* + bm_{\mathbf{N}} + z)}_{y_{\mathbf{N}}^*} \\ \left.\frac{\partial V_{\mathbf{E}}^{CS}}{\partial m_{\mathbf{N}}^*}\right|_{Nashsolutions} &= -w\mu\beta b\underbrace{(am_{\mathbf{N}} + bm_{\mathbf{N}}^* + z)}_{y_{\mathbf{N}}} \end{aligned} \quad (13)$$

[9] Note that, contrary to the non-cooperative solution, the *sign* of the monetary spillover effects would matter for the *signs* of the (domestic) monetary policy and domestic output growth.

Given that the existence of positive (resp. negative) supply shocks, *z*, imply monetary depressions (resp. expansions) accompanied by positive (*resp*. negative) output growth, (13) makes it possible to confirm that:

For the case where positive monetary spillovers, $b > 0$, are associated with positive supply shocks, $z > 0$, governments acting non-cooperatively would decrease money supply less than if they cooperate, this resulting in an over-expansion of output.

1. For the case where positive monetary spillovers, $b > 0$, are associated with negative supply shocks, $z < 0$, governments acting non-cooperatively would increase money supply less than if they cooperate, this resulting in an over-depression of output.
2. For the case where negative monetary spillovers, $b < 0$, are associated with positive supply shocks, $z > 0$, governments acting non-cooperatively would decrease money supply more than if they cooperate, this resulting in an under-expansion of output.
3. For the case where negative monetary spillovers, $b < 0$, are associated with negative supply shocks, $z < 0$, governments acting non-cooperatively would increase money supply more than if they cooperate, this resulting in an under-depression of output.

Plainly, the previous conclusions were taken assuming non-zero parameter values.[10] Note, however, that from (13) one can confirm what was said before about the $b = 0$, $\beta = \beta^* = 0$, $w = 0$, and $w = 1$ cases. Concerning the parameters μ and μ^* the following discussion is relevant.

As we know from the non-election periods cooperative solutions (12), one should note that it is precisely through these solutions that the parameters concerning voters' memory, μ and μ^*, exert their influence, which does not happen in the non-cooperative solution. This result is, by itself, important, given that it highlights the decisive role of voters' memory in the determination of the possible gains from cooperation and, therefore, in the sustainability of cooperative solutions. To shed more light on this issue, note that, if voters in the domestic economy have no memory, i.e. when $\mu = 0$, it is optimal to implement, in the non-election periods, the following policy:

$$\begin{bmatrix} m_{\mathbf{N}} \\ \\ m^*_{\mathbf{N}} \end{bmatrix} = \begin{bmatrix} -\frac{1}{b} z \\ \\ 0 \end{bmatrix},$$

which is quantitatively the same determined for the election periods when $w = 0$ – *mutatis mutandis* for $w = 1$ and $\mu^* = 0$ – but qualitatively different given that, because domestic voters only take into account what happens in $t = \mathrm{E}$, the domestic government will not be, in principle, worse off.[11] It is thus apparent that voters' memory can be used to benefit (more) a particular government at a particular moment in time and *both* governments agree on that cooperative exploitation of voters' memory. This is certainly true if elections are synchronized, but much more explicit if elections are non-synchronized, as will be shown in the following section.

4.2. The Non-Synchronized Elections Case

It is probably illuminating if we start the study of this situation by pointing out that, although election periods in one country overlap non-election periods in the other country, their non-synchronized position in time can be irrelevant if voters possess perfect memory. In fact, if $\mu = \mu^* = 1$, each government will have to consider non-election periods as equally important as election periods, if maximizing the number of votes is the economic policy objective.[12] In this case, the sustainable non-synchronized elections cooperative solution coincides with the synchronized elections solution and, as we have seen, this can be welfare-improving for both governments.

To continue emphasizing the importance of voters' memory, let us assume the other extreme

[10] If, on the contrary, for example $b = 0$, then (13) would all be zero, that obviously meaning that the Nash solutions would be as good as the cooperative ones.

[11] Note that if $\mu = 0$ then $v^*_{\mathbf{N}} = 0$. This means that the foreign government achieves the best possible result in all non-election periods. Thus, on the one hand, this government would want its own voters not to forget its performance easily and, on the other hand, the foreign government can use that high(est) level of popularity to relax during the election periods and deliberately induce an electoral defeat of the domestic government if a change in the other player of the game is seen to be a better alternative. In this case, in the election periods, there would be an increased probability of non-cooperative solutions. Also note that by proceeding in this manner the foreign government would be using a *satisficing approach* – to ensure the re-election but not necessarily maximizing votes – in order to maximize the expected length in power (Frey & Ramser, 1976).

[12] From (11) and (12) it is obvious that the optimal policies for moment $t = \mathrm{E}$ would be the same as for the previous moment $t = \mathrm{N}$.

point, i.e. μ = μ* = 0, which we can associate with the zero memory situation. In this case, both governments would prefer to have non-synchronized rather than synchronized elections because, through policy coordination, one government can use the other country's policy to win its own elections. In a sense, one can say that this would be the most favorable case for electorally-induced international policy coordination between governments that, at a domestic level, implement electorally-induced national policies. To confirm this line of reasoning let us derive the corresponding cooperative solution analytically.

Assume that, for the domestic economy, t = E, while for the other economy, t = N. In this period, both instruments m_t and m_t^* can be used to achieve the two objectives for inflation and output growth of the domestic government. Thus, electorally-induced policy cooperation between the two governments can be expressed by the following assignment of instruments to targets:

$$m_t \overset{\text{assigned to}}{\rightarrow} \hat{\pi} = 0$$
$$m_t^* \overset{\text{assigned to}}{\rightarrow} \hat{y} = 0,$$

given that

$$\left.\begin{array}{l} \frac{\partial V_{\mathbf{E}}}{\partial m_t} = 0 \\ \frac{\partial V_{\mathbf{E}}}{\partial m_t^*} = 0 \end{array}\right| \begin{array}{l} m_t = 0 \\ m_t^* = -\frac{1}{b} z \end{array}.$$

Obviously, this solution would be the same as in the synchronized elections case if only the interests of the domestic government were taken into account but now will be acceptable by the other country's government if there is a commitment that in the next period – when elections take place in the other country – the situation is reversed,[13] i.e.,

$$m_t^* \overset{\text{assigned to}}{\rightarrow} \hat{\pi}^* = 0$$
$$m_t \overset{\text{assigned to}}{\rightarrow} \hat{y}^* = 0,$$

given that

$$\left.\begin{array}{l} \frac{\partial V_{\mathbf{E}}^*}{\partial m_t} = 0 \\ \frac{\partial V_{\mathbf{E}}^*}{\partial m_t^*} = 0 \end{array}\right| \begin{array}{l} m_t = -\frac{1}{b} z \\ m_t^* = 0 \end{array}.$$

Clearly, those solutions are (extreme) cases of the general solution that follows. The cooperative solution for the non-synchronized case will thus result from the following program:

$$\max V^{CN} = wV + (1-w)V^*,$$

where

$$V_{\mathbf{E}} = v_{\mathbf{E}} + \mu v_{\mathbf{N}},$$
$$V_{\mathbf{E}}^* = v_{\mathbf{E}}^* + \mu^* v_{\mathbf{N}}^*,$$

and[14]

$$v_{\mathbf{E}} = -\frac{1}{2}\left(\beta y_{\mathbf{E}}^2 + \pi_{\mathbf{E}}^2\right) = -\frac{1}{2}\left(\beta\left(am_{\mathbf{E}} + bm_{\mathbf{N}}^* + z\right)^2 + m_{\mathbf{E}}^2\right)$$
$$v_{\mathbf{N}} = -\frac{1}{2}\left(\beta y_{\mathbf{N}}^2 + \pi_{\mathbf{N}}^2\right) = -\frac{1}{2}\left(\beta\left(am_{\mathbf{N}} + bm_{\mathbf{E}}^* + z\right)^2 + m_{\mathbf{N}}^2\right)$$

and

$$v_{\mathbf{E}}^* = -\frac{1}{2}\left(\beta^* y_{\mathbf{E}}^{*^2} + \pi_{\mathbf{E}}^{*^2}\right) = -\frac{1}{2}\left(\beta^*\left(am_{\mathbf{E}}^* + bm_{\mathbf{N}} + z\right)^2 + m_{\mathbf{E}}^{*^2}\right)$$
$$v_{\mathbf{N}}^* = -\frac{1}{2}\left(\beta^* y_{\mathbf{N}}^{*^2} + \pi_{\mathbf{N}}^{*^2}\right) = -\frac{1}{2}\left(\beta^*\left(am_{\mathbf{N}}^* + bm_{\mathbf{E}} + z\right)^2 + m_{\mathbf{N}}^{*^2}\right).$$

The first-order conditions are:

$$\begin{aligned} &-w\mu\left(\beta a y_{\mathbf{N}} + m_{\mathbf{N}}\right) - (1-w)\beta^* b y_{\mathbf{E}}^* = 0, \\ &-w\mu\beta b y_{\mathbf{N}} - (1-w)\left(\beta^* a y_{\mathbf{E}}^* + m_{\mathbf{E}}^*\right) = 0, \end{aligned} \tag{14}$$

$$\begin{aligned} &-w\left(\beta a y_{\mathbf{E}} + m_{\mathbf{E}}\right) - (1-w)\mu^*\beta^* b y_{\mathbf{N}}^* = 0, \\ &-w\beta b y_{\mathbf{E}} - (1-w)\mu^*\left(\beta^* a y_{\mathbf{N}}^* + m_{\mathbf{N}}^*\right) = 0. \end{aligned} \tag{15}$$

The cooperative solution is, then, the solution $\left\{m_{\mathbf{N}}, m_{\mathbf{E}}, m_{\mathbf{N}}^*, m_{\mathbf{E}}^*\right\}$ of the above system. Clearly, the extreme cases for the solution will not be possible to implement since:

[13] A possible solution to the temptation to defeat, hence non-credible commitments, can be obtained using the infinitely repeated interaction argument. If (infinite) non-cooperation follows after some defeat this will certainly constitute enough reason for governments to respect the commitment and always choose to cooperate.

[14] Note that, because the non-synchronized elections case is being analysed, when one economy is facing a period of type E (resp. N) the other will be facing a period of type N (resp. E); therefore, for example $m_{\mathbf{E}}$ and $m_{\mathbf{N}}^*$ are monetary policies implemented at the same time.

1) When w = 0, i.e. when the objectives of the domestic government would be completely ignored, we would have $m_{\mathbf{N}} = m_{\mathbf{E}} = -\frac{1}{b} z$ and $m^*_{\mathbf{N}} = m^*_{\mathbf{E}} = 0$. In this case, the domestic government would not, in general, accept this solution.
2) When w = 1, i.e. when the objectives of the foreign government would be completely ignored, we would have $m_{\mathbf{N}} = m_{\mathbf{E}} = 0$ and $m^*_{\mathbf{N}} = m^*_{\mathbf{E}} = -\frac{1}{b} z$. In this case, the foreign government would not, in general, accept this solution.

5. Conclusion

As we have seen, from the comparisons between non-cooperative solutions and synchronized elections cooperative solutions, it results in the importance of monetary spillover, *b*, and of supply shocks, *z*, effects. Naturally, in the comparison of cooperative solutions between the synchronized and non-synchronized elections cases, voters' memory plays the major role. In fact, as above mentioned, in the case of perfect memory, μ = μ* = 1, the synchronized elections solutions are equivalent to the non-synchronized elections case.[15] At the other extremity, when μ = μ* = 0, having non-synchronized elections is always better for electorally-motivated governments.

That said, one then can question the possibility of an absolute preference to have synchronized elections. To clarify this issue, let us consider the first-order conditions corresponding to the two cases, i.e. (11), (12) and (14), (15). Putting in pairs the adequate first-order conditions, one can easily conclude that:

$$m_{\mathbf{E}} = \mu m_{\mathbf{N}}$$
$$y_{\mathbf{E}} = \mu y_{\mathbf{N}}$$
$$m^*_{\mathbf{E}} = \mu^* m^*_{\mathbf{N}}$$
$$y^*_{\mathbf{E}} = \mu^* y^*_{\mathbf{N}}$$

are the sufficient conditions for the equivalence between the two set of solutions. Using these conditions as thresholds in a reasoning similar to the one used above to compare the Nash solutions with the synchronized elections counterparts, one can infer, after some algebra, that:[16]

1) If, for one or both of the economies, voters remember election periods as well as non-election periods, governments will be indifferent between the decision to synchronize or stagger elections.
2) If, in both economies, voters forget the past, then both governments will be better off in the case of non-synchronized elections.
3) If, in both economies, voters happen to consider non-election periods more important than election periods for their voting decisions then, once again, both governments will prefer to have non-synchronized elections.
4) If, in one of the economies, voters consider non-election periods more important than election periods, whereas, in the other economy, the opposite is true, then both governments will prefer to have synchronized elections.

To sum up, there are, in general, gains from cooperation, no matter the degree of synchronization between elections. Moreover, and more important, if elections are non-synchronized, there may be scope for both governments to cooperate neglecting their domestic interests at non-election periods in order to benefit electorally the other country which is facing an election period. This may be viewed as a strategic use/evolution of the welfare weights (Caleiro, 1996: 12).

Among possible refinements of the model under consideration, one can reconsider voters' behavior, i.e. assume some prospectiveness and/or strategic voting by an experienced electorate, and/or even assume asymmetries concerning supply shocks, *z*, and/or spillover effects, *b*, or even in what concerns the size of the economies.[17] These may constitute interesting avenues for future research.

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[15] And, in particular, if β = β* = 0, and/or *b* = 0, and/or *z* = 0, there is coincidence also with the non-cooperative solutions.

[16] Note that the following conclusions can easily be accommodated to various other cases, for example the study of benevolent governments which attribute (possibly distinct) importance weights to the realization of two economic periods.

[17] As clearly recognized in Jensen (1994), almost all the literature on international policy coordination adopted models representing two equally-sized economies (or even symmetric ones). There are, nevertheless, a few exceptions which consider two economies with different sizes (Caleiro, 1997; 2010).

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Socio-Economics of Portuguese Cod Fisheries: Past, Present and Perspectives for the Future

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***Abstract* - Property rights are in the center of fisheries management difficulties. Portuguese cod fisheries give good examples of this kind of management problems. This paper studies the socio-economic impacts of the institutional change of cod fisheries framework in Portugal and asks for the perspectives of future development of this segment of Portuguese fisheries.**

In one decade (from 1976 to 1986) this segment of the Portuguese fisheries had to face two essential restrictions to the development of fishing activities: the new regime of the 200 miles and the adhesion to European Community with the consequent integration in the Common Fisheries Policy.

After a profound downsizing process we are still confronted with an overcapacity problem. The possible enlargement of Economic Exclusive Zones and the rehabilitation of the Continental Platform statute constitute the main change that severely can affect the future of these fisheries.

1. Introduction

Property rights are in the center of fisheries management difficulties and Portuguese cod fisheries give good examples of this kind of management problems (Coelho et al, 2011a); Coelho, 1999; Coelho e Lopes, 1999).

Consideration of the effect of changes in the rules of access to resources has normally been undertaken from the standpoint of coastal states. However it is obvious that these changes can have much more dramatic effect upon countries which undertake long distance fishing.

The "creeping jurisdiction" process that we've been attending in the international scene, that is, the slowly side to the coastal states jurisdiction of areas and resources that used to be *res-nullius* /open access, generate a lot of problems.

Many maritime potencies whose fleets worked in several areas where rules of access allowed from fishing without restrictions are progressively confronted with the impossibility of accessing the resources. In many cases, that traditional use created genuine "historical rights", but now what rests is a tremendous overcapacity problem. In fact, the dimension of those fleets and its high economic and technological efficiency in capturing the resources seems to be over-balanced by the disposable resources. The institutional change and the new forms of ocean governance that we've been assisting since the 50s, suggest new game rules and a new operation-code.

The stagnation of long distance fisheries and the associated problems of some coastal areas are not peculiar to Portugal. It happened worldwide as a result of far-reaching alterations in the juridical and bio-economic framework of fisheries (Leal, 1984). However, in Portugal, given the important contribution of fishing to GDP, the high consumption of fish of Portuguese population and the dependence of some coastal fishing populations on this type of fisheries, this situation is more acute.

In global terms, in the 90s, Portuguese national fishing fleet lost more than 35% of the tonnage, a third of the fishermen and almost 30% of the production. From 1990 to 2010 the number of embarkations went from 16.244 to 8492, that is, a reduction of about 48%. From 1992 to 2010, the production of the sector reduced in 32% going from about 265.000 tonnes to 178.000 tonnes. In the same period the number of fishermen went from 36.337 to 16.920, a reduction of about 53%.

At the same time, the population maintained a high level of fish consumption (25/26 Kg per person); so, the commercial fisheries deficit almost duplicated only in the first half of the nineties.

The segment of distant water fisheries, especially of the cod, it is accompanying this crisis in the fisheries sector as a whole. In one decade (from 1976 to 1986) this segment of the Portuguese fisheries had to face two essential restrictions to the development of fishing activities: the new regime of the 200 miles and the adhesion of Portugal to European Community with the consequent integration in the Common Fisheries Policy. The purpose of this paper is to study the socio-economic and impacts of the institutional change of cod fisheries framework in Portugal and to ask for the perspectives of future development of this segment of Portuguese fisheries.

1.1 *"Cod Campaign" and Corporativism*

The cod fisheries segment grew (in the 30s and 40s) in the logic of "corporativism", with strong

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intervention and State protection. It had, underlying, the condition of open access to the resources.

In the thirties, a new organization model inspired in the corporate principles of the so called Estado Novo was implemented. Between 1934 and 1939, Ship-owners Guilds/ Associations were created in each of the main fishing segments (cod included), as well as Fishing Houses and the respective Central Board, Guilds of trade, of exporters/importers, of canned fish, and the bodies of economic co-ordination. In the case of cod the most important regulation body would be the CRCB – the Cod Business Regulating Board.

The New Fishing Policy was marked by the state interventionism throughout all economic activity:

- At the level of corporate initiative: it was introduced a conditioning process where the necessary official approval for investments and integration in the Government Plans strongly determinate the evolution of cod fleet and trawling industries,
- In the state organization of fishing corporate associations (capital or labor),
- In the system of commerce, through price control at production level and customs protection against fishing imports.

A regulation from 1934 (DL 23968) instituted the co-ordination board and defined the guidelines of the so called "Cod Campaign". The purposes of this campaign were:

- the increase in national production,
- currency retention through the reduction of imports
- the protection of the industries downstream (naval construction) and upstream (especially the drying industry).

This campaign would follow a strategy of benefiting consumption in order to bring back traditional ways of consuming cod[1].

In fact, the analysis of the "all" economic policy framework of Estado Novo indicates that the final purpose was to keep food cheap to create a situation of social "equilibrium", without great reaction from workers. Cheap food permitted the setting of low wages and that was essential to the industrialization process. Low wages were essential in the first phase of the industrial development with a model of imports' substitution. The creation of new industries required competitive conditions: less labor costs and a defensive repertory of trade-fees with third countries. But, also, after a period of protection of nascent industries, when Portugal enter the EFTA (in the final 50s), the low wages were a fundamental competitive factor in the development of a new model of economic growth with the accent in the exports. Of course, the main Portuguese exportation products were assented in the low unit costs of labor (textiles, shoes, wine, etc)

In this strategy, the role of the cited CRBR was fundamental in the setting of prices on the domestic market and in the regulation of the tensions between producers and importers. This implied the obligatory purchase by the importers of percentages of national cod at an officially fixed minimum price.

From a sociological point of view, an interesting thing to highlight is that all this new policy was integrated in the usual ingredients of the Regime's ideological propaganda "in a form that had no parallel in other countries" (Garrido, 1977). The cod was called the "Faithful Friend". Every year, the "take off" of the fleets to the Newfoundland was a real spectacular theater session with holy missal and the Government attending departure. Government, Church, Army, all the significant powers, were involved in a passionate ceremony of grandiosity. And, of course, all the poor people of coastal communities. The "romantic character" of the fishermen that went to the long distance waters of Newfoundland and Greenland ("brave men fighting against nature") was celebrated. At the same time, the Regime was also imposing his propagandistic vision of one Government (really confounded with the spirit of the Nation) that was putting (again) Portugal in the direction of those glory days of the "Navigation discoveries" (sec. XV/XVI).

The fact is that the results were significant:

Up to the mid-sixties, when the sector was partially liberalized, the changes were notable. 1964 was the year of largest national catch of cod (near 97300 tonnes). While, in 1934, the percentage of domestic production was 16% of the consumption level (the other 84% were imported), in 1966 the situation was reversed, more than 82% of the domestic consumption was covered by national production.

The fleet grew in number and tonnage. From 1938 to 1961, the renewal of the fleet took for 66 vessels in the end, equivalent to more than 69000 gauging tones. Fishing capacity rose by 700% (Moutinho, 1985). State supported this reorganization with subsidies and credits for construction and modernization of vessels.

The numbers of workers in cod fisheries reached near 4200 in 1965. More than 10% of those fishermen were aged less than 21 years.

[1] Since the Medieval era it was usual to eat cod in "1000 ways". This is explained with the fact that Portugal was a Catholic country and in the Lent, before Easter, people of Faith should not eat meat, so cod was a very good alternative.
Cod, after being dried, can be consumed after a long period because of its high capacity of conservation. This put also the cod as an important food product for our navigators along the important period of navigation and worldwide discoveries (XV to XVI centuries).

2. Facing Extended Fisheries Jurisdiction

There was an underlying condition to that productive and organizational system: the free access to the resources. That was ending in the near times…

By the end of the seventies, the overall sector of world cod fisheries was threatened by two problems: overfishing and overcapacity. The pressure put on the cod stocks, the catch of immature fish and the difficult renewal of the species were giving signals of biological overfishing in the traditional bancs of Newfoundland and other areas of North Atlantic. An immense fleet from several maritime potencies, strongly equipped, turn the cod fisheries into a "race for fish", revealing the overcapacity problem.

Since the end of the Second World War, a real process of institutional change was also arriving.

The first step was the Truman Proclamations reclaiming the property rights over the Continental Platform (and its resources) for coastal states. It then turn, step-by-step, to the coastal states exigency of introducing new rules of access and of the creation of exclusive fishing rights in the coastal areas.

Portugal strongly defensive position of the "historic rights" for Portuguese long distance fleet in Newfoundland in the first and second CNUDM – United Nations Conferences on the Law of the Sea, were significant and revealed the concern of Portuguese Government with the new international attitude.

In what concerns with Portuguese cod fisheries at those turbulent times, production still increase between 1965 and 1967 and the modernization process continued.

But some signs of stagnation and crisis were emerging:

- only 75% of the potential capacity was used,
- the profitability began to decline,
- catches included now less "adult" fish (revealing the pressure over the stocks and its difficult recovery).

The liberalization of commerce imposed in 1967 by our relation with EFTA and the Revolution of 1974 (with the extinction of Fishing Houses and the creation of democratic Associations of Ship-owners and Trade Unions from Fishermen) also introduced special changes in this segment.

An interesting element of the analysis is that the number of vessels began to decline, from 91 vessels in 1965 to only 55 in 1973, but the investment, at constant prices, increased between 1966 to 1973 at an average rate of 6,25 %. This means that the modernization of the fleet continued: more tonnage, more technology of catch and so on. Curiously, the overcapitalization process was also a sign of those stagnation times.

This situation is not unusual. This means that the development of cod fisheries and its results have been achieved at a high price in terms of the long-term viability of the sector and with inefficiencies in the allocation of resources that, perhaps, could have been more profitable if they were addicted to other sectors in the global economy.

This is a situation that persists in many fisheries worldwide. The critical problem is that the fleet profitability is jeopardised by the under-utilisation of investments. The excess capacity and a more-or-less constant value of landings to be shared between a large numbers of actors, reduces the capacity of each vessel to earn an adequate income. In this context, the subsidies policy, artificially reducing the costs and risks of investment, in an already over-capitalised industry, promoted over-supply of capital.

The introduction of more capital intensive technology resulted in the reduction in employment in the segment. Between 1960 and 1976 employment reduced by half in spite of the increase in the wages.

Following the general practice of the extension of jurisdiction to 200 miles, in 1977, Portugal and Canada adopted the new regime that became to be legally defined in the new Law of the Sea of 1982 (UNCLOS, 1982).

The introduction of the regime of the 200 miles altered the rules of the game deeply, creating new property rights and putting the traditional fishing zones (most of them in the area of Newfoundland) under Canada's jurisdiction.

In the first phase, Portugal tried to cross this restriction through the accomplishment of bilateral agreements that, maintaining substantial quotas, minimized the negative effects of the new economic and juridical context in international fisheries. It was not, however, enough to hide the problems of overcapacity of cod segment and to avoid the current social difficulties of the adjustment process.

Foreseeing the difficulties, already in 1976, Portugal signed a deal with Canada. It was a 10 years agreement that could be extended for further 6 years. In exchange of the access to the Canadian waters, the Portuguese economy opened to the importation of fish products from Canada. Other agreements with USA, South Africa and Norway followed. Through these agreements it was possible to maintain acceptable quotas for long-range fishing. Between 1982 and 1986, quotas attributed in the waters of Canada, Norway and in the area of NAFO jurisdiction were around 77.000 tonnes, for the main species: cod, redfish and squid.

An interesting management scheme was the so called "Co-operative Agreement" developed with Canada, through which Portuguese vessels were authorized to fish from Canadian quotas for delivery to local processing factories, or to purchase fish from the local fishing fleet to be processed on board of the Portuguese fleet for sale in Portuguese market.

Catches in 1984 rounded 11.680 tonnes (curiously less than the quotas attributed - more than 20.000).

The fall of overall catches were evident: from 40.000 tonnes in 1977, to 14.667 tonnes in 1984, considering all the NAFO area (according to FAO).

The problem of overcapacity was clear. Let's look at some OECD data on the development of the fleets of several countries. According to this Organization, considering the evolution of the gross annual tonnage Index with a fixed basis in 1976 (1976 =100), in 1982, the indexes of Portugal, Norway and Iceland were, respectively, 94, 90 and 115. Those were the countries that persisted with high indexes of fleet dimension and modernization. At the same time the same index for France was 33. Note that this last value reflects a process of adaptation of fleet size much more drastic. In the cases of Norway, or Iceland, given the large existence of disposable resources in their own waters, the problem does not seem so serious. But, in the case of Portugal, given the evolution of Ocean governance and fish rules of access it seems much more preoccupant.

3. The Integration in the Common Fisheries Policy

With the adhesion to EEC (European Economic Community), the situation of the sector became worse. In the origin of this aggravation we can find:

- the transposition of the bilateral agreements for the supra-national management of European Commission; Portugal could not have a bilateral agreement with Canada but only to have access of a defined proportion of the European quota in Canadian waters;
- the mid 80s bad fishing relationships between EEC and Canada affecting the disposable quotas
- overfishing and severe decrease of the cod stocks in the 90s; most of the stocks in Newfoundland were put in a situation of fishing "moratoria".
- subsidies evil-guided through the Policy of Structures of CFP (Common Fisheries Policy), reinforcing the problems of over-investment.

Some insecurity in the definition of the Fisheries Policy to proceed, for this segment, on the part of the national public powers, was also a significant part of the problem.

In its multilateral relations, Portugal was replaced by the Community. Portugal found itself in a potentially more serious position as, from that time on, it ceased to have its privileged access which the previous agreements had guaranteed, enjoying only a part of the community quota. The "Principle of Relative Stability", in force in the Commons Fisheries Policy, guaranteed a privileged position for Portugal in the context of the division of quotas for such species, given the historic of catches and the great dependence of some coastal areas from this kind of fisheries (as it was the case of Aveiro). In terms of access to waters under NAFO jurisdiction available quotas reduced from 110 thousand tonnes in 1988 to only 39 thousand in 1990, to the Community States. The part attributed to Portugal, in this last year, was of 14.530 tonnes.

Already in 1995, the quotas attributed in the NAFO meeting to Portugal were of 2.155 tonnes of cod which represented a reduction of 30% on the quota of 1994. That made the ADAPI (the Confederation of Portuguese sheep-owners of industrial fishing) to considered that was clearly insufficient and put in evidence the form that the European Commission was not considering the interests of long range fishing.

In 1996, the fishing production went on 234.357 tonnes. From this, the fish production in foreign waters was 41.313. In 1992, the same statistics were, respectively, 402.914 and 159.796. That was an indicator of the perfect crisis that was rolling in the fisheries sector and the more significant "fall-down" of long distance fisheries.

The essential conclusion of the analysis was that, in 1986, when Portugal adhered to the European Community, in spite of the 200 mile regime was already in force, about 40% in quantity, and more than a half in value, was fished outside Portuguese waters. Ten years later, this has reduced to around 20%. In relation to cod, for a domestic consumption of 300.000 tonnes, the quota represented no more than 3%. The overcapacity of the fleet was evident.

The difficult situation of many cod stocks in the Newfoundland area (many of those stocks were in a so bad capacity of renewal, that the fisheries were closed in 1992) doubled the problem.

Also, given the vertical integration which is typical in this segment of the fleet, the problems grew in dimension and complexity. The less availability of fish is not important only in terms of Portuguese catches. Even the possibility of buying fresh cod to the Canadians to transform it on board was closed because they also did not have sufficient catches.

So, finally, a process of reduction in the capacity went through using the Funds that were disposable from the Community to retire vessels from activity. From Dec. 1989 to Dec. 1996, the Gross Annual Tonnage of the fleet operating in the open Sea reduced more than 52%. At the same time, the introduction, in the context of the Commons Fisheries Policy, of the so-called Pluri-Annual Orientation Plans for the Community Fleet, aiming to diminish the problem of overcapacity and determining goals for the reduction in the installed capacity by country, went in the same direction. In million of Escudos, in 1996, the approved awards to definitive immobilization were of 1.570. In 1992 this value attended the incredible number of 5.228 million Escudos.

Of course, this situation had strong impacts in the coastal areas. The number of fishermen registered

for cod fishing was reduced by more than a half in the first decade of CFP integration (from 1470 fishermen in 1986 to only 633 in 1996).

In the last decade, the situation seems not to show a great difference in terms of evolution. The difficult situation of cod stocks in the North-west Atlantic, where we had tradition of fishing, did not permit a special change in the path-standard of our long distance fisheries. There were some efforts to introduce a reorientation to the waters of East North Atlantic but the quotas in the Iceland area or in the Norway area were insufficient. Even, the key of repartition of the quotas between the member states of the EU, given the Stability principle, are not particularly advantageous to Portuguese fleet. So, the process of downsizing of the fleet continued and the reduction of the employment persisted.

In 2007, the Portuguese fishing fleet consisted of 4806 licensed vessels accounting for a total of around 85.600 GT and 304.300kW. The total number of vessels decreased 9,3% between 2003 and 2007, while kW and GT followed a broadly similar trend (5% and 7% of decrease, respectively). Employment in the overall sector went from 20454, in 2003, to 17021 fishermen, in 2003. According to the Scientific, Technical and Economic Committee for Fisheries, that meant a positive evolution in the economic performance of the overall sector of Portuguese fisheries.

Anyway, while the stocks rebuild, and given that the time of the nature is very different from human time, the Public managers cannot stop defining and executing, social and cultural support policies for the affected populations and try to maintain the memory and the important traditions/ ways of living associated. Knowing the national importance of this traditional product and its related activities, it is not a surprise if we find a lot of persistent effects (social and economic, but also cultural) in the coastal areas, especially in those that have a special link with cod fisheries.

One special example of an area mostly affected is Ílhavo/Aveiro (see Coelho et al., 2011a)). "The Sea for Tradition" is the slogan of the City Hall to present Ílhavo to the visitors that attests very well the strong connection of the municipality to the sea. The guidelines for public management highlight the role of fisheries in the local development (anchored in reasons of geographical and historical nature) and the continuous exaltation of the maritime culture, with its maximum expression in the Maritime Museum and in other cultural manifestations of cod-oriented traditions (as religious festivities).

In the municipality, fisheries have been developing according to the guidelines designed in the Common Fisheries Policy. In fact, after a strong reduction of the population utilized in the distant fishing (in the decades of 1970/80), Ílhavo has, nowadays, in his Port, all of the big units of industrial fishing of Portugal; now, in a situation of stabilization. Identical situation seems to be verified with the coastal fishing and the artisanal fishing.

In relation to cod fisheries, this activity has, nowadays, a small importance when compared to the glory passed days. By the contrary, the industrial activity of cod transformation, with about 20 companies, has a great importance, for the job and for the wealth that generates. Most of the cod that is processed comes from imports of frozen cod or salty green of Norway, Iceland and Russia. This business represents a financial volume of more than 500 million euros/ year.

A Report, recently made (see Ministério da Agricultura, do Desenvolvimento Rural e das Pescas, 2010), about the Internationalization of the Agro-Food and Forest sector, put in evidence the potentialities of the fisheries sector which attended a value of 419 million Euros of Exports in 2006. From this total value, the exports of dried or salted fish (most of it is cod) represented 20% of the total of exports from fish products. So it seems that Portuguese are re-orientating this activity mostly to the product transformation.

4. Perspectives for the Future

The perspectives, in the short/medium period, are not smiling.

The cod stocks in the Newfoundland bancs don't show clear signs of recovery. The shares in the area of NAFO jurisdiction are insufficient and the scientific information about the stocks in the Northeast Atlantic is also a motive of preoccupation. So, this segment of long range fishing will pass therefore a period of great difficulties, unless someone opens up new perspectives of activities reorientation for new areas and new products.

What is depressing, in this case, is that this segment is, perhaps, the most efficient in the Portuguese fisheries. After a profound downsizing process (from a large fleet of almost hundred units we are now reduced to no more than a dozen of big vessels) we are still confronted with an overcapacity problem.

Meanwhile, another interesting situation of institutional change is now putting this segment under discussion. In fact, the enlargement of Economic Exclusive Zones and the rehabilitation of the economic and juridical statute of the Continental Platform have been proposed in several occasions.

Extended Fisheries Jurisdiction gave the coastal states property-rights and the potential of a sustainable management of fisheries. However, the general evolution towards more coastal exclusive rights didn't mean the exclusion of open access regimes in international fisheries. The Law of the Sea (1982) doesn't exclude the principle of the "freedom of the seas" which remains in force in the High Sea, besides the limits of 200 miles of Economic Exclusive Zones.

One of the most penetrating subjects that emerged as a consequence of this particular statute was the management of the straddling stocks. Given that the fish are endowed with mobility, it was inevitable that the coastal states, after the establishment of Economic Exclusive Zones, verified that they were sharing some of those resources with neighbouring countries. Many coastal countries also verified that some of the acquired stocks passed the border of EEZ to the High Seas, where they were subject to the exploitation of distant water fishing fleets from other countries. There is no rigorous typology: we can designate this last category of fishing resources as straddling stocks. Cod in the Newfoundland area is an example.

The High Sea remains with a statute where the regime of Open Access still persists. Then, potentially, we are able to find a "Commons Tragedy"- overexploitation of the resources and overcapacity of the fleets, besides the 200 miles limits. And that's what we've been observing.

The problems of "unfinished business" in the New Law of the Sea (UNCLOS, 1982) - namely, the imprecise definition of use rights in the areas of High Seas adjacent to the EEZs and the consequent difficulties in the management of the straddling stocks, were in the roots of many "fish wars", in the 90s. We remember, for example, the so-called "turbot-war" between Spain and Canada, in the mid nineties. The dispute went about a straddling stock (the turbot) usually captured in the "Nose" of the Newfoundland banc, in the area adjacent to the Canadian EEZ.

This war went on an interesting period when, in the United Nations, a solution for these problems of transboundary species management was discussed. The call for such a discussion came from the Rio de Janeiro Summit of 1992 and put in evidence the preoccupation of the international community about this complex situation.

The proposed solution was the cooperation between interested countries, in the context of a Regional Fisheries Organization, as NAFO. This answer could be seen as an approach of *"res-communes"* type-solution. The members of the organization would agree in the rules of resource access, use and management. In the sense of Bromley, "property of all, managed by all". However, note that the question of access (especially the question of the possibility of a new-entrant in the Organization) is still unsolved.

The U. N. Agreement (1995) on Transboundary Stocks and Highly Migratory Species pretended to be this formula of cooperation among interested states. Curiously, in the European Union, USA and Canada it was well received, but in Portugal it was seen with reserves.

Despite some interesting results, this Agreement continues to be the motive of discussion, especially in the context of NAFO. The debate is now turning to the problematic of the enlargement of EEZs.

Facing the weak results obtained in the recovery of the cod stocks, the leaders of the organizations of fishing of the Newfoundland have been proposing the enlargement of the EEZ to the limit of the 350 miles making it to coincide with the limits of the Continental Platform. For some policy makers a new extension of EEZ would be a logical step in the process that took to the establishment of EEZs, recognising that it was not enough to assure the necessary conservation of the stocks. To extend EEZ for the waters above the continental platform would be in agreement with the rules that govern the bed of the Platform. These rights belong to the coastal State of whose terrestrial mass the Platform is the natural extension.

The United Nations recognise that the limit of the 200 miles doesn't make any biological sense. As a matter of fact, the statute of EEZ is much more of functional type. On the contrary, the Continental Platform has a geomorphologic unquestionable existence. The coastal countries consider it an extension of their territory.

Does Portugal have advantages to align in this process of "creeping jurisdiction" so wanted by Canada or Norway?

In the context of Portuguese fisheries, extension of EEZs would have undesirable effects. Portugal would loose fishing opportunities for long distance fleet, without granting additional benefits or resources, given the closeness of our Platform. Is it possible that other advantageous impacts over-balance these effects? It's an issue for further research.

5. Conclusions

Property rights are in the centre of fisheries management difficulties. In the 90s only, Portuguese national fishing fleet lost more than 35% of the tonnage, a third of the fishermen and almost 30% of the production. The segment of distant water fisheries, especially of the cod, is accompanying this crisis. This segment had to face two restrictions to the development of fisheries: Extended Fisheries Jurisdiction and the integration in the Common Fisheries Policy.

The cod segment grew (in the 30s and 40s) in a corporative logic of strong intervention and State protection. It had, underlying, the condition of open access to the resources. The introduction of the 200 miles Regime changed the rules of the game deeply, putting the traditional fishing zones under Canada's jurisdiction. With the EU adhesion, the situation worsened. The transposition of the bilateral agreements for the supra-national management of European Commission, the problems of overfishing and severe decrease of cod stocks, the evil-guided policy of subsidies; all were factors of aggravation.

After a profound downsizing process we are still confronted with an overcapacity problem, face to the disposable quotas.

The possible enlargement of Economic Exclusive Zones and the impacts on Portuguese fisheries is already a fundamental topic for further discussion and research in this domain.

Another interesting issue for further developments in this area came from the process of discussion of Common Fisheries Policy Reform (2012). In the discussions of the Green Paper on the Reform and of the proposal of Regulation presented by the Commission, an innovative instrument was proposed: the introduction of fees for the utilization of stocks in the area of Regional Fisheries Organizations. That means that an organization (as NAFO) not only should have the capacity to introduce TACs and quotas and the capacity of enforcement of other conservation measures (as it is contemplate in the UN Agreement of 1995), but should have also the capacity of introducing fees-payments-for-the-access of the stocks. That means that we are trying to surmount the problems derived from the common property nature of international fisheries besides the limits of EEZs. In fact, if that was accepted, we were creating tools that introduce a form of internalizing the effects of externalities. It's an effort that almost every fisheries economist will receive in an enthusiastic manner. In this case, it seems that the proposal has a fundament in the Pigouvian approaches that deserves a further discussion. It also introduces a new dimension in the discussion about the problem of the "New Entrant" in the Regional Fisheries Organizations. The introduction of fees can be understood as a form of property right. The effects of such a proposal of Institutional change, in the way those organizations are constructed and the rules of game introduced in their operational development, is an issue to be discussed at an international level (UN).

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Are Economic Profit and the Internal Rate of Return Merely Accounting Measures?

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***Abstract*—This paper explores the proposition that economic profit and the internal rate of return are merely accounting concepts. They share a number of common aspects. These include an allocation of capital that is unrelated to market forces and a treatment in the literature that focuses on the mathematics rather than the economics. We show that the two measures have limited, if any, economic content. Therefore we conclude that they are devoid of compelling theoretical interest in the domain of wealth maximization.**

***Keywords*—** *Economic Profit, Internal Rate of Return, Net Present Value, Accounting, Economics*

1. Introduction

EVA®, an acronym for economic value added, is a proprietary trademark of Stern Stewart and Company. The origins of economic value added are found in Stewart's (1991) book "The Quest For Value". Since that time, economic value added has achieved considerable popularity in the business world as a measure of financial performance. As a consequence, it is often an ingredient of executive performance plans. Stern Stewart's economic value added, although the most popular, is but one of a number of variants of a theoretical construct we shall term "economic profit". In the commercial world, the cognate performance measures marketed by other consulting firms are Cash Flow Return on Investment and Cash Value Added by the Boston Consulting Group and Holt Associates, Shareholder Value Added by LEK-Alcar Consulting Group, Economic Profit by McKinsey and Economic Earnings by AT Kearney (Chari, 2009). In the academic world, there is residual income which is discussed in most management accounting texts and earned economic income (Grinyer, 1995; Peasnell, 1995a, 1995b). Magni (2009, Table 2, p. 4) presents a list of the names used by other researchers. An improved version of EVA®, called "EVA momentum" has been recently suggested by Stewart (2009).

Market value added is the present value of the stream of future economic profits. Hartman (2000), Sullivan & Needy (2000) and Shrieves & Wachowicz (2001) examine the equivalence of market value added and net present value. These three studies establish the mathematical equivalence, but are essentially silent on the necessary assumptions to establish the relation. We detail these assumptions, which are generally known as 'clean surplus'. An explicit examination of these assumptions allows a clearer insight into the underlying economic content of economic profit.

Hartman (2000) argues that the conceptual difference between market value added and net present value lies in the allocation of capital over the life of the investment. Citing Lohmann (1988), Hartman (2000, p. 159) states "*... the net present value decision criterion assumes that the capital that remains invested in an opportunity grows at the internal rate of return (IRR), and the cash released by the project grows at the external rate of return ...*". Kierulff (2008) expresses similar sentiments. This statement links economic profit and the internal rate of return. We explore the validity of this statement, which pervades the literature. We show that neither the capital invested nor the internal rate of return on that capital nor economic profit are economically interesting. They are merely accounting concepts with questionable economic content.

The distinction between accounting numbers and economic numbers is an important theme of this paper. Examples of accounting numbers are profits and book values (see, for example, Shrieves & Wachowicz, 2001). Typical examples of economic numbers are cash flows and market values. Economic numbers are superior to accounting numbers when assessing the economic attractiveness of a proposed investment. In stark contrast, accounting numbers are superior to economic numbers when reporting to the stake holders of the entity within the constraints of generally accepted accounting practices. A vital point to acknowledge is

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that, in general, accounting numbers differ from their economic counterparts. Twenty five years ago, the perception could be summarized as "never the twain shall meet" (Rudyard Kipling's The Ballad of East and West). Today, so it would appear, they meet in economic profit and market value added.

As our analysis will show, economic profit and the internal rate of return share a number of common features. First, there is a voluminous literature on these two measures. Second, they can, with varying degrees of efficiency and success, be used to assess the economic attractiveness of proposed investments. We say little more about these aspects. Third, they implore the property of zero net present value. Fourth, their focus is on an allocation of capital that shares no sensible relation to market forces. Fifth, they both exhibit symptoms of what we call a 'put it in' then 'take it out' syndrome. Furthermore, our analysis supports the proposition that the treatment of both metrics in the literature has suffered from the problem where the mathematical process dominates the economic logic. Herbst (1982, p. 92) levies this criticism at the treatment of the internal rate of return. We show that the very same criticism applies to economic profit.

The remainder of the paper is structured as follows. Section 2 seeks to clarify the economic rationale of a project's net present value. Section 3 discusses the importance of the internal rate of return on capital. Section 4 examines the theoretical construct of economic profit. The paper ends with brief conclusions in Section 5.

2. Net present Value and the Market

In this section we seek to explain the economic meaning of a project. The net present value method is the gold standard for assessing the economic content of a project. In order to develop the arguments it is necessary to invoke some simplifying assumptions and to carefully define the terms employed. For convenience we focus on an all equity firm formed to operate a single project in a world without taxation. The arguments naturally extend to the general case with appropriate adjustments that are orthogonal to the themes we explore. For convenience, we implore a market determined interest rate that is constant over time. We maintain homogeneous and perfect expectations as to the future cash flows and the discount rate. That is to say, the future unfolds exactly as was expected. There is little to be gained from the relaxation of this latter assumption.

2.1. Net Present Value

The net present value NPV_0 of a project is normally conceived as the present value of the expected cash flows $E(CF_t)$ less the initial investment, that is to say,

$$NPV_0 = \frac{E(CF_1)}{1+r} + \frac{E(CF_2)}{(1+r)^2} + \cdots + \frac{E(CF_n)}{(1+r)^n} - Cost_0 \quad , \tag{1}$$

where $Cost_0$ is the cash outflow that occurs at time zero and r is the market determined, risk adjusted discount rate. For pedagogic convenience we use the shorthand notation $PV_0(E[\Phi_t])$ to represent the present value of the series denoted by Φ_t. Thus the net present value represented in equation (1) can be specified as

$$NPV_0 = PV_0(E[CF_t]) - Cost_0 \ . \tag{2}$$

The economic content of the net present value of a project has an inexorable link with the market. The market is a theoretical construct. It is predicated on the economist's perfect market dream. In the real world, a semi-strong form efficient market is a practical surrogate. It is well recognized that investments in stock and bond markets in developed economies have an expected net present value of zero for both parties to the transaction. In the context of the market, NPV_0 represents the change in wealth accruing to the owner of the project at the time the project is instigated. This is time zero. The essence of the argument is that the project's cash flows could be sold in the market to reap the NPV_0 and the $Cost_0$.

It is a tautology to say that the cash flows invested in the market earn the market's rate of return. However, in the context of net present value, it is not compulsory to assume that the future cash flows generated by the project will be invested at the market's rate of return. Following the tutorial assignment set by Herbst (1982, p. 92), it is clear that the calculated net present value of a project is truly independent of the uses to which the future cash flows are deployed. A simple illustration will suffice to illustrate the point. Consider a single cash flow to be released by the project sometime in the future. There are myriad ways that this cash flow can be deployed. Let us focus on two. The cash flow could be invested wisely in the market or it could be squandered. No matter the destiny of this future cash flow, the net present value of the project remains unchanged. The argument naturally extends to the internal rate of return (see Karathanassis, 2004; Lohmann, 1988). The reinvestment assumption, pertaining to future cash flows being reinvested at the calculated IRR, is truly fallacious with the internal rate of return method.

3. IRR and Capital Invested

This brings us onto the concept of "capital". The word needs careful definition. In the context of this paper there are two definitions that are appropriate. A financial accounting definition of capital is the

money invested in the project $Cost_0$. A strict economic definition of capital is the wealth currently invested in the market, that is to say, the market value.

There can be no doubt that Hartman's statement "*... the capital that remains invested in an opportunity grows at the internal rate of return (IRR) ...*" is true under the maintained assumption that the market's discount rate does not change. We show that it applies to both of the definitions of capital. We arrive at the conclusion that the statement is a tautology. The process of discounting (or compounding) leads unerringly to the fact that the capital invested in the project earns the rate of return used as the discounting (or compounding) rate if the resulting net present value is zero. This link is merely a mathematical fact. It is an alternative statement of the internal rate of return. Therefore it is not an assumption.

The proof is straightforward. Consider a simple bank loan. The sum initially borrowed is equal to the present value of the expected repayments when discounted at the interest rate of the loan, that is

$$\begin{aligned} \text{Sum Borrowed}_0 &= PV_0\left(E\left[Repayment_t\right]\right) \\ &= PV_0\left(E\left[CF_t\right]\right) \end{aligned} . \qquad (3)$$

It is a well known fact that the repayments for each period can be separated into the components of interest and principal (or 'capital'). The mathematics of this process need not concern us at this time. Thus equation (3) can be written as

$$\begin{aligned} \text{Sum Borrowed}_0 &= PV_0\left(E\left[Prin_t + Int_t\right]\right) \\ &= PV_0\left(E\left[\Delta BV_t + r_{Loan}BV_{t-1}\right]\right), \end{aligned} \qquad (4)$$

where the change in principal has been labelled ΔBV_t, and the accrued interest has been labelled $r_{Loan}BV_{t-1}$ with r_{Loan} being the interest rate. We use the term *BV*, which represents book value, for the very reason that it acknowledges the bank's accounting records. As we shall show later, the right hand side of equation (4) is an integral component of economic profit. The elements ΔBV_t and rBV_{t-1} represent the difference between the cash flow and the resulting economic profit (see equation 14). Alternatively put, the reduction in the loan principal implicit in a given repayment is mathematically akin to an economic profit, that is,

$$\Delta BV_t = Repayment_t - r_{Loan}BV_{t-1} \quad . \qquad (5)$$

A similar insight is used in the analysis of the internal rate of return (Magni, 2010).

The insight is that for the project's cash flows, these being the sum borrowed and the series of repayments, the property of zero net present value and the interest rate are necessary to determine the principal and interest component for each repayment. From the banker's point of view, the loan earns r_{Loan}. This is (obviously) the rate of interest on the outstanding principal BV_{t-1}. Since the loan has a net present value of zero, this interest rate r_{Loan} is also the internal rate of return of the loan. The fundamental definition of the internal rate of return is the interest rate that sets the net present value to zero. We are unable to isolate the presence of an assumption in these purely mathematical relationships.

At this stage there are two things we can say about $Cost_0$. First, it is a sunk cost at the instant the project is instigated. It has, in a general context, no systematic bearing on the market value. Second, $Cost_0$ is of vital importance in the context of financial reporting. It is also, so it would appear, the crux of the internal rate of return. This latter perception casts a shadow of suspicion on the internal rate of return since $Cost_0$ is just one of the many cash flows of the project. That is to say, a focus on just one cash flow has the potential to be myopic and misleading. The market value $Cost_0 + NPV_0$ is the true economic wealth invested by the owner. It is the cash that could be immediately extracted by selling the project in the market. The net present value of the economic investment in the market is now zero - market value is equal to the present value of future cash flows. So this internal rate of return is the market's required rate of return. To say that the investment earns the internal rate of return of the market is the same as saying that the investment earns the market's rate of return. The tautology should not escape us.

Thus, we have two ways of looking at the internal rate of return. First, as clearly shown by Lohmann (1988), the project earns the internal rate of return on the original cost IRR^{Cost}. Second, we have shown that it also earns the internal rate of return on the current wealth invested by shareholders IRR^{Market}. So a project has two distinct internal rates of return! Surely, they both cannot be the fundamental truth? The answer as to which internal rate of return is the truth depends solely on whether one takes an accounting view or an economic view.

3.1. Capital Allocation

A common criticism levelled at the internal rate of return on accounting cost it that there is no rationale for the discount rate it employs to calculate a net present value of zero. Theory is clear that the risk adjusted discount rate in the net present value method is determined exogenously from the market. Hartman's (2000) statement which we cited earlier alludes to this important point. As its name implies, the calculated internal rate of return is internal to the cash flows of the project. Unlike the corresponding net present value, which is a function of the market rate of interest, IRR^{Cost} is unique to and a constant for each project. Thus, it cannot share a systematic relation to an exogenously determined interest rate.

IRR^{Cost} may characterize a particular financial facet of a project. However, this facet has well known defects in comparison to the net present value method. We are aware of two valid criticisms that can be leveled against internal rate of return on market value. First, it is just the market's required rate of return masquerading under a different name. Second, IRR^{Market}, in itself, does not say anything useful about the project. The latter criticism, of course, applies to all variants of the internal rate of return.

A strict economic view is that a cash flow is just a cash flow. There is no harm in separating it into principal and interest, although one must admit that such a view has a strong accounting emphasis. For example, generally accepted accounting practices demand a careful and considered distinction between capital items and non-capital items. But, as we illustrate, such a separation serves no useful purpose in the economic assessment of the economic attractiveness of a project. Notwithstanding, the enigmatic question is why do we frequently make use of the separation in our paper? The explanation is simple. Allocation of accounting capital is an integral component of economic profit.

Consider two mortgages with the same initial sum borrowed of \$100,000. These mortgages command an interest rate of 1% per month and are repaid by uniform monthly repayments. This interest rate need not be the same as the market interest rate. The mortgages differ only in their maturity. The shorter term mortgage has a maturity of 11 years whereas the longer term mortgage has a maturity of 20 years. Recourse to a standard spreadsheet shows that the monthly repayments are \$1,368 and \$1,101, respectively. The sum of the un-discounted repayments is \$180,548 and \$264,261, respectively.

A strict accounting view would say that the principal returned to the bank over the life of each mortgage is \$100,000, that is, the initial sum borrowed. Thus, the total interest paid on each mortgage is the sum of the un-discounted repayments less the initial principal. The total interest paid over the life of each mortgage is \$80,548 and \$164,261, respectively. The difference in interest paid is quite substantial in our example. The un-discounted interest for the long loan is twice the size of the un-discounted interest for the short loan. However, what is the true economic import of this difference? Our conclusions are not encouraging.

We can separate the monthly repayments into their implied principal and interest components. Thus the two mortgages are defined by

$$\begin{aligned} \$100{,}000 &= Sum\ Borrowed_0 \\ &= PV_0\left(P_t^S\right) + PV_0\left(I_t^S\right) \\ &= PV_0\left(P_t^L\right) + PV_0\left(I_t^L\right) \end{aligned} \quad , \qquad (6)$$

where P_t and I_t represent the principal and interest components of the repayment and the superscripts S and L differentiate between the shorter term loan and the longer term loan. Simple rearrangement gives

$$PV_0\left(I_t^L\right) - PV_0\left(I_t^S\right) = PV_0\left(P_t^S\right) - PV_0\left(P_t^L\right) \quad . \quad (7)$$

In present value terms, the savings in interest associated with the shorter term loan are exactly offset by the savings in principal associated with the longer term loan.

It is impossible to escape the conclusion that interest, in this context, has no economic meaning. We can see little reason as to why the same perception should not hold in general for any other series of cash flows. Since the principal component is linked to the interest component through the equation $CF_t = P_t + I_t$ it is reasonable to conclude that, in isolation, principal also has no economic content. These arguments obviously apply to an economic view of the world, but would not sit easy in a financial accounting world.

3.2. The Assumptions -- Revisited

We believe we can explain how the statement (Hartman, 2000, p. 159) "*... the net present value decision criterion assumes that the capital that remains invested in an opportunity grows at the internal rate of return (IRR), and the cash released by the project grows at the external rate of return ...*" arose. Our reading of the economic engineering literature reveals a perverse propensity to focus on future wealth, sometimes called terminal value. This construct must, of necessity, introduce the notion of reinvestment into the final analysis. Herbst (1982, p. 89) illustrates the concerns that can arise from such an approach. In contrast, the finance literature exhibits a far stronger emphasis on present value. We surmise that the reason for this latter view is found in the belief that markets, in the real world, value securities and projects using the net present value method.

Lohmann (1988, p. 309, equation 8) explicitly defines the net present value of the project as the present value of the net future wealth, that is,

$$NPV_0 = \frac{Future\,Value_n}{(1+r)^n} \quad , \qquad (8)$$

where $Future\ Value_n$ represents the net terminal value at time n. Although the mathematical precision is unquestionable, it raises the question of whether this is tantamount to being an inefficient process of '*putting in by compounding*' followed by a '*taking out by discounting*'. To illustrate, consider the present value of a single cash flow expected to occur at time t, namely,

$$PV_0 \text{ of } E[CF_t] = \frac{E[CF_t](1+r)^{n-t}}{(1+r)^n} = \frac{E[CF_t]}{(1+r)^t} \times \frac{(1+r)^{n-t}}{(1+r)^{n-t}} = E[CF_t](1+r)^{-t} \quad . \qquad (9)$$

The discounting counterbalances the compounding by bringing the terminal value back to its original value at time t and then discounts further to a value at time zero. We believe that the emphasis on terminal wealth led initially to the fallacious reinvestment assumption.

4. Economic Profit

In this section, we examine the proposition that the Herbst (1982) criticism can be levelled at economic profit. The manifest outcome of our analysis is that the literature exhibits an unwarranted focus on capital allocation, from an accounting perspective, combined with an unnecessary focus on the mathematics. As a result, we contend, insufficient attention has been paid to the economics.

Economic profit EP_t is conventionally viewed as the profit for the period less the opportunity cost of the assets employed to generate that profit. It is defined as

$$EP_t \equiv P_t - rBV_{t-1} \quad , \qquad (10)$$

where P_t is the profit for the period ending at time t and BV_{t-1} represents accounting book value at time t-1. The theoretical construct we call economic profit is also known as residual income and economic value added. As illustrated by equation (10), the concept is intuitively appealing and relatively straightforward, but the devil is in the detail (Keys, Azamhuzjaev & Mackey, 2001; Young, 1999).

In order to establish the mathematical equivalence between net present value and market value added, it is necessary to explicate a robust link between each of the cash flows and the concomitant profit figures. Our reading of Hartman (2000), Sullivan & Needy (2000) and Shrieves & Wachowicz (2001) is that they implicitly use the relation

$$P_t = CF_t - Dep_t \quad , \qquad (11)$$

where Dep_t is the depreciation for period. However, depreciation is but one of a host of accruals and deferrals used in financial reporting. It is fair to say that these three studies implicitly assume the clean surplus relation. If they did not employ this relation, then the mathematical equivalence just would not hold. Thus, an explicit and comprehensive statement of clean surplus serves a valuable purpose.

We assume, for simplicity, that surplus cash flows are immediately paid out as dividends. This acknowledges that the dividend decision, which is a part of the funding decision, is orthogonal to the investment decision. For pedagogic convenience, clean surplus can be perceived as having two features. The first feature is that changes to book value are taken through the profit statement. This can be represented as

$$P_t \equiv CF_t - (BV_{t-1} - BV_t) \, . \qquad (12)$$

The identity in equation (12) serves a valuable purpose. It establishes the only formal, yet generalized, link between accounting profit and the concomitant cash flow. The difference between cash flow and profit $BV_{t-1} - BV_t$ is known as an accounting accrual or deferral. Following the matching concept, revenue is recognized when a good or service is provided to the customer and an expense is recognized when the firm receives the service or uses the good. Such accounting recognition will invariably differ from the cash flows of the transaction (see equation 12). We define an 'accounting accrual' as an accounting entry that does not directly involve a cash flow. Two examples that come immediately to mind are an increase to Accounts Receivables when a good or service is sold on credit and an accrued interest expense associated with borrowing from a bank.

The point to appreciate is the underlying economic phenomenon is the period's cash flow. Profit is a reflection of the cash flow to the degree of the accounting accrual. It is fair to comment that this is the only plausible causal relationship. It is just not possible that the profit can be a determinant of the cash flow. That is to say, it is impossible, in general, for a change in accounting policy to result in a change in the cash flow. The only exception is where taxation is levied on accounting numbers. Even so, legislators are fully aware of this and thus exhibit a propensity to carefully specify the accounting rules for taxation purposes. We could muse upon the myriad reasons as to why accountants adjust cash flows to achieve profit. The answer lies in the mores underpinning accounting concepts and conventions and is thus well beyond the scope of our paper.

The second feature of clean surplus is that the book value is zero $BV_0 = 0$ before the first transaction is recorded and the book value at the end of the venture is zero $BV_n = 0$. Consider an investment in a depreciable asset with a finite economic life of n years. The first entry in the book value of the asset is the cost, that is, $BV_{0+\lambda} = Cost_0$ where the notation $+\lambda$ signals the first entry in an empty account. The cost of the asset is fully depreciated over its life -- the terminal book value is zero. That is to say, $BV_n = 0$. This leads to the statement that

$$\sum_{t=1}^{n} \Delta BV_t = Cost_0 \quad , \qquad (13)$$

where $\Delta BV_t = BV_{t-1} - BV_t$, that is, the change in book value for period t. A simple loan, see equation (4), obeys the rules of clean surplus.

The combination of equations (10) and (12) leads to the definition of economic profit EP_t frequently adopted in comparisons with the net present value method (Egginton, 1995; Peasnell, 1982). This is given by

$$EP_t = CF_t - \Delta BV_t - rBV_{t-1} \ . \qquad (14)$$

The elements ΔBV_t and rBV_{t-1} are analogs of the allocation of capital and opportunity cost as found in the internal rate of return (see equation 4).

4.1. Properties of Economic Profit

There are three insights associated with the mathematical properties of economic profit. The first insight, as ably detailed by Hartman (2000) and Shrieves & Wachowicz (2001) in a mathematical context and Sullivan & Needy (2000) by worked example, is the net present value of the project NPV_0 is mathematically identical to the present value of future economic profit $PV_0\left(E\left[EP_t\right]\right)$, that is to say,

$$NPV_0 = PV_0\left(E\left[EP_t\right]\right) = MVA_0 \ , \qquad (15)$$

where MVA_0 represents market value added. Hartman (2000, pp. 163-164) raises the important question of whether the series of expected economic profits are truly cash flows, although at one stage he actually uses the enigmatic words "EVA cash flows". However, he does not develop this idea to its full capacity. If the stream of future economic profits does not fully consist of cash flows, then there is prima facie evidence that the mathematics of the process is driving the economic logic (Herbst, 1982, p. 92). The next two insights that we offer explore the validity of this proposition.

The second insight is that expected economic profit is zero for all future periods if the inputs to equation (14) are based on market values. Market based economic profit is denoted by EP_t^{Market}. Consider an investment which commands the market's rate of interest denoted by r_m. Using the corresponding analog of equations (3 and 4), we obtain

$$\begin{aligned} Wealth_0 &= MV_0 \\ &= PV_0\left(\mathrm{E}\left[\mathrm{CF_t}\right]\right) \\ &= PV_0\left(\mathrm{E}\left[\mathrm{principal_t} + \mathrm{interest_t}\right]\right) \\ &= PV_0\left(E\left[\Delta MV_t + r_m MV_{t-1}\right]\right) \end{aligned} \ , \qquad (16)$$

where ΔMV_t represents 'true economic depreciation' (Shrieves & Wachowicz, 2001, p. 49), which is defined as the change in the market (or present) value of the future cash flows, and $r_m MV_{t-1}$ is the opportunity cost. Noting from equation (16) that

$$\mathrm{E}\left[\mathrm{CF_t}\right] = \mathrm{E}\left[\Delta MV_t\right] + \mathrm{E}\left[r_m MV_{t-1}\right] \ , \qquad (17)$$

it is apparent, using equation (14) for $E\left[EP_t^{Market}\right]$, that

$$\begin{aligned} E\left[EP_t^{Market}\right] &= E\left[CF_t - \Delta MV_t - r_m MV_{t-1}\right] \\ &= 0 \end{aligned} \ . \qquad (18)$$

Equation (18) holds for all $t > 0$ and for all projects fairly priced in the market. In our example EP_0^{Market} (the expectation sign is unnecessary as there is no uncertainty) is zero since the project is zero net present value when valued at market price. In general $EP_0^{Market} = NPV_0$. If the project is assumed to be unexpected by the market, then NPV_0 or EP_0^{Market} can be viewed as an (unexpected) abnormal return expressed as a dollar value.

Equation (18) is derived from a simple conceptualization of an investment which is fairly priced in the market. The elements in the squared brackets on the right hand side of the equation, namely,

$$CF_t - \Delta MV_t - r_m MV_{t-1} \qquad (19)$$

are the market's analogs of the accounting counterparts found in the conventional definition of economic profit, see equation (14). So, what role does the translation from market values to accounting values play? If we maintain that the project proceeds according to unbiased expectations, as would be expected in a semi-strong form efficient market, then the observation that $E\left[EP_t^{Market}\right] = 0$ for all $t > 0$ indicates any ex-post EP_t^{Market} is nothing but a random error. This follows from the definition of unbiased expectations, that is $x = E(x) + random\ error$. The implication is that any ex-post economic profit, based on accounting numbers, is quintessentially a function of the difference between market values and accounting values. We cannot conceive of any alternative rational explanation.

A cynic would be tempted to suggest that economic profit is just a reflection of the accountant's inability, either by choice or by prescription, to record market prices. This view is a little unfair since the accounting numbers must, of necessity, reflect generally accepted accounting principles. However, it is clear that accountants cannot have their cake and eat it too. If they follow accounting conventions, then they must accept that reported economic profit does not measure true economic performance for the period in question. If we are right in this view, then the vexing question is: "What does ex-post economic profit actually measure?" Sullivan and Needy's (2000, p. 167) review of the economic value added literature indicates that the orthodox view is that "... *a positive EVA indicates that shareholder wealth is created* ..." and vice versa. Our analysis casts

considerable doubt over the veracity of this business world view. Indeed, additional support for this view is found in the numerical examples provided by Hartman (2000, p. 161) and Sullivan & Needy (2000, p. 171). In each case the economic value added for the first accounting period is negative even though the project has a positive net present value. Does this mean that all profitable projects make an economic loss in their first year of operation?

The third insight seeks to develop upon the theme that expected economic profit, based on market values, is zero. Let us now distinguish between accounting adjustments based on the depreciation schedule and other accounting accruals, denoted by the superscripts *Dep* and *AA*, respectively. Examples of the latter are adjustments to Accounts Receivables. Thus expected economic profit is specified as

$$\begin{aligned} E[EP_t] &= E[CF_t] \\ &\quad - E\left[\Delta BV_t^{Dep} + rBV_{t-1}^{Dep}\right] \\ &\quad - E\left[\Delta BV_t^{AA} + rBV_{t-1}^{AA}\right] \end{aligned} \quad , \qquad (20)$$

where $BV_t = BV_t^{Dep} + BV_t^{AA}$ acknowledges that book values are additive. Thus, the mathematical mechanics of the discounting process can be individually applied to each element of equation (20) to give

$$\begin{aligned} PV_0\left(E[EP_t]\right) &= PV_0\left(E[CF_t]\right) \\ &\quad - PV_0\left(E\left[\Delta BV_t^{Dep} + rBV_{t-1}^{Dep}\right]\right) \\ &\quad - PV_0\left(E\left[\Delta BV_t^{AA} + rBV_{t-1}^{AA}\right]\right) \end{aligned} \quad . \qquad (21)$$

Now take the net present value versus market value added equivalence, namely,

$$\begin{aligned} MVA_0 &= PV_0\left(E[EP_t]\right) \\ &= NPV_0 \\ &= PV_0\left(E[CF_t]\right) - Cost_0 \end{aligned} \quad , \qquad (22)$$

and substitute the right hand side of equation (22) into the left hand side of equation (21) to give

$$\begin{aligned} PV_0\left(E[CF_t]\right) - Cost_0 &= \\ &\quad PV_0\left(E[CF_t]\right) \\ &\quad - PV_0\left(E\left[\Delta BV_t^{Dep} + rBV_{t-1}^{Dep}\right]\right) \\ &\quad - PV_0\left(E\left[\Delta BV_t^{AA} + rBV_{t-1}^{AA}\right]\right) \end{aligned} , \qquad (23)$$

which upon the canceling of the two $PV_0\left(E[CF_t]\right)$ terms results in

$$\begin{aligned} Cost_0 &= PV_0\left(E\left[\Delta BV_t^{Dep} + rBV_{t-1}^{Dep}\right]\right) \\ &\quad + PV_0\left(E\left[\Delta BV_t^{AA} + rBV_{t-1}^{AA}\right]\right) \end{aligned} \quad . \qquad (24)$$

Hartman (2000) and Shrieves & Wachowicz (2001) show that

$$Cost_0 = PV_0\left(E\left[\Delta BV_t^{Dep} + rBV_{t-1}^{Dep}\right]\right) \quad . \qquad (25)$$

That is to say, any depreciation schedule, however conservative or outrageous, that meets the requirements of clean surplus, conforms to equation (25). Our second insight, see equation (18), shows that expected economic profit is zero if the change in market value is used as the depreciation schedule. We again arrive at the conclusion that ex-post economic profit is a function of the differences between accounting numbers and market values.

Thus, it must follow from equations (24) and (25) that

$$PV_0\left(E\left[\Delta BV_t^{AA} + rBV_{t-1}^{AA}\right]\right) = 0 \quad . \qquad (26)$$

We feel it is important to acknowledge that an essentially similar analysis is found in Shrieves & Wachowicz's (2001) treatment of working capital. However, our reading of their paper is that they conceive working capital as a cash flow. Our focus is on the accounting adjustments, other than depreciation (see equation 12), which are obviously not cash flows. Mathematically, equation (26) also applies to the depreciation schedule as portrayed in the financial accounts. This is evident from equation (25) when $Cost_0$ is replaced by ΔBV_0.

Equation (26) is both startling and banal. The mathematical and economic robustness of the statement is beyond question. The net present value of the series of accounting accruals and their associated opportunity costs must always be zero under the innocent clean surplus assumption. The relation has a number of interesting implications. First, if the net present value of the accounting accruals and their associated opportunity costs is zero, then it is patently clear that they have no economic content in present value aggregation. This conclusion, which is largely self evident, has been given little explicit attention by proponents of economic profit.

Second, since accounting accruals, by construction in this paper and as a matter of fact in real life, are not cash flows, then it is not unexpected that their present value is zero. It would indeed be ironic if the net present value of a stream of non-cash flow accounting items could be shown to contain economic content.

Third, it is clear that an accounting adjustment is added to (or subtracted from) the cash flow of one period to create the economic profit (see equations 10 and 14). The accounting adjustment is then reversed, in present value terms, at a later date. One has to question the fundamental rationale for this 'put it in' and then 'take it out' process. The potential arbitrariness of the initial step in the process indicates that the economic signal over and above that contained in the underlying cash flow is, at best,

questionable. As we say before, a singular cash flow does not tell us much, if anything, about the project.

4.2. A Worked Example

In this section we provide a worked example which illustrates the points alluded to above. Consider a transaction, agreed at time zero, that results in the provision of a service worth \$200. For simplicity we assume that there are no costs involved, thus the profit is \$200. The service will be supplied to the customer towards the end of the first year. The cash flows of the contract are \$150 at the end of the first year and \$50 at the end of the second year. All cash flows are immediately paid out as dividends. The appropriate discount rate is 10% per annum.

Table 1 presents the analysis of the economic profit. The elements of the transaction, denoted by superscripts, are as follows:

(a) The profit of \$200 is acknowledged upon the provision of the service to the customer;

(b) The cash received at the end of the first year is \$150;

(c) The accounts acknowledge that Accounts Receivable have increased by \$50. This is the only book value involved;

(d) The accounts acknowledge the receipt of the \$50 cash flow in the second year and the Accounts Receivable account is credited with this sum and this returns the book value to zero (clean surplus).

The net present value of the cash flows is

$$NPV_0^{Cash\ Flows} = \frac{CF_1}{1.1} + \frac{CF_2}{1.1^2} = \frac{\$150}{1.1} + \frac{\$50}{1.1^2} = \$177.69.$$

Economic profit is defined as

$$EP_t = CF_t - \Delta BV_t - rBV_{t-1}.$$

Application of the accounting data gives the economic profits as

$$EP_1 = \$150 + \$50 - 0 = \$200$$

and

$$EP_2 = \$50 - \$50 - \$5 = -\$5 \ .$$

Hence the present value of the economic profits is given by

$$PV_0^{Econ\ Profits} = \frac{EP_1}{1.1} + \frac{EP_2}{1.1^2} = \frac{\$200}{1.1} + \frac{-\$5}{1.1^2} = \$177.69 \ .$$

Thus, as is well documented in the literature, $NPV_0^{Cash\ Flows} = PV_0^{Economic\ Profits}$.

The example also illustrates the fact that the present value of the accounting accruals, when combined with the opportunity cost, is zero. That is to say,

$$PV_0^{Accnting\ Accruals} = \frac{[\Delta BV_1 + rBV_0]}{1.1} + \frac{[\Delta BV_2 + rBV_1]}{1.1^2}$$
$$= \frac{-\$50 + 0}{1.1} + \frac{+\$50 + \$5}{1.1^2} = 0$$

.

This result, as must be the case, is consistent with equation (26).

5. Conclusions

We have taken the stance that market price is the fundamental (economic) truth. We accept that an alternative position could be adopted. We leave it to others to show the errors that arise from our stance. Finance focuses on future cash flows and current market values. Accounting focuses on profits and book values. In general, there exists a difference between market value and book value as well as a difference between cash flow and profit for each period. The mathematical link between these two pairs of differences is economic profit. The present value of the latter is known as market value added. The observation that market value added is the net present value of the project would appear to be the answer to the dreams of some accountants. As a review of the literature will reveal, much has been made of this ex-ante mathematical equivalence.

A simple bank loan meets all the requirements of the clean surplus assumption. It has an additional property of having a net present value of zero at its specified interest rate. This raises the interesting question of whether clean surplus and opportunity cost (accrued interest) must, of necessity, have a net present value of zero. The mathematics shows that this must always be the case. This insight is an important aspect of our analysis of market value added.

We have shown that a "put it in" and then "take it out" syndrome occurs in two situations. The first is found in the use of future value as a device for assessing the economic attractiveness of a proposed investment. The second is found in the accounting accruals embedded in economic profit. The syndrome has two characteristics. First, it clearly represents inefficiency. Second, it is amenable to sophisticated mathematical processes. The risk here, as Herbst (1982, p. 92) recounts, is that "... *the superficial aspects of the mathematics* ..." may obscure *"... the economic interpretation ...*".

We have argued that the internal rate of return on capital cost is an accounting measure. Thus it is not a true economic measure. There can be little dispute that accounting numbers differ from economic numbers. As a consequence it should come as no surprise that IRR^{Cost} has a number of defects when

assessing the economic attractiveness of a proposed project. These defects, which are traversed to varying degrees in any current finance text, arise from an inappropriate allocation of capital. The allocation is based on an accounting conceptualization of capital. When calculated on market values, IRR^{Market} is merely the market's required rate of return. On its own, it clearly cannot be used to rank investment!

It is clear that economic profit, as conventionally portrayed in the literature, is also an accounting measure. There can be no doubt of this - before the metric was commercialized it was called residual income and was discussed, almost exclusively, in accounting texts. Like the internal rate of return, economic profit is based on an accounting conceptualization of capital. When economic profit is calculated on market values it is zero for all future periods provided the project progresses according to expectations. Economic profit is seductive. It has a number of attractive properties. We have shown that these properties are merely mathematical artifacts since they do not involve cash flows. They have no economic content. We are left with the impression that the mathematics process is driving the economic logic.

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Table 1: Economic Profit Analysis of the Transaction

	End of Year			
	0	1	2	$PV_0^{r=10\%}$
Cash flow, CF_t	0	\$150.00[(b)]	\$50.00[(d)]	\$177.69
Profit, P_t	0	\$200.00[(a)]	0.00	n/a
Accounting adjustment, ΔBV_t	0	-\$50.00[(c)]	+\$50.00[(d)]	-\$4.13
Opportunity cost, rBV_{t-1}	0	0.00	+\$5.00	+\$4.13
$\Delta BV_t + rBV_{t-1}$	0	-\$50.00	+\$55.00	\$0.00
$EP_t = CF_t - \Delta BV_t - rBV_{t-1}$	0	\$200.00	-\$5.00	\$177.69

Notes:

(a) The profit of \$200 is acknowledged upon the provision of the service to the customer;

(b) The cash received at the end of the first year is \$150;

(c) The accounts acknowledge that Accounts Receivable have increased by \$50. This is the only book value involved;

(d) The accounts acknowledge the receipt of the \$50 cash flow in the second year and the Accounts Receivable account is credited with this sum and this returns the book value to zero (clean surplus).

The ABC Method – Proposed Implementation in a Structural Steel Industry

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Abstract: **Nowadays there are a large variety of contributions in the area of costing systems describing a lot of different possibilities. The difficulty lies in choosing the best one for each company. As a matter of fact each company is different from another and it is necessary to "look inside" each one and understand very clearly how their costing structures function. Know where company's costs lie is the best way to reduce them and to determine the correct price of the product. It is thus essential that the company may have a good costing system that will allow it to possess the highest level of information and will be a support to the decision making process.**
From among all the new approaches, this paper will analyze the costing system based on Activities (ABC). Its objective is to understand the application of ABC as a costing system and to classify implementation methodologies. The ABC costing system was implemented in Martifer Construções, a Portuguese industrial company that manufactures metallic structures, as an alternative method. Work took place within company production facilities and a check has been carried out of costing problem details and the company's expenses system.
The purpose of this study is to validate the ABC method in this company, to provide a tool to support work and to reach a conclusion about the real advantages and disadvantages of implementing this method. This study will help leaders and managers of the company to make decisions about implementation of the method, as well as helping to increase knowledge of the matter, providing a useful tool to the company.

Keywords - Accounting, costs, costing systems, ABC.

1. Introduction

Consider Technology advances and the increasing complexity of production systems in many companies, change more and more the vision of management decision makers in organizations.

Costing systems are an important source of information and a supporting system for decision-making. However, inconsistency with traditional systems resulted in new emerging theories. Among them is activity based costing - ABC.

There are many ways to calculate costs. Traditional ways are concerned mainly with policies and legal regulations. The new ways are also concerned with efficiency and consequently with competitiveness that nowadays exist in the business environment (globalization).

2. Considerations about some methods of costing – general consideration

Methods of costing/expenses are ways of determining the entities: goods and services cost values. As in Martins (2001), the purpose of costing methods is to determine the way in which costs are allocated to products.

There are various methods to determine the costs of products and we can't say one is better than the other or can replace it because its application depends on the characteristics of the company, product line and management requirements.

On choosing a costing system management sets up a series of coordinated criteria satisfying the company mission, always respecting the cost/benefit relation. It is not worthwhile to implement very detailed costing where the information generated doesn't justify the amount spent to produce them.

2.1 *Traditional costing methods*

For the purpose of this work, five different types of costing were studied: variable costing, costing by absorbing, costing by customizing, costing by process and standard costing.

As mentioned before we can't say a costing system is better than another since it depends of the type of company and the mission of each one. But no matter the mission or type of company, all of them need information to make decisions and to provide management with orientation. However, for better understanding, before discussing costing methods, some accounting and costing/expenses concepts will be described. The table below summarizes the main characteristics of general accounting and management accounting.

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Table 1- Fundamental Characteristics of Financial Accounting and Management Accounting

	Financial Accounting	Management Accounting
Information Receivers	People and foreign entities with interest. The organization such as: partners/shareholders, creditors (suppliers, banks and others), fiscal authorities.	Organization's staff, namely: workers, managers, top corporate executives and, possibly consultants.
Information purposes	Inform the interested foreign entities in a summarized manner, the organization's past financial performance.	Provide feedback about the decisions made by the managers and in simultaneous supply data in order to carry out the operational performance control.
Type and scope of information	Only highly aggregated financial data are supplied, presenting the company's financial situation as a whole.	Financial, operational and physical data on the processes, technologies, suppliers and clients are supplied; the information is disaggregated to the product level and/or the sector allowing to obtain information on the individual actions.
Information Nature	The accounting is regulated, with specific rules defined by accounting principles and by the governmental authorities which make it objective, consistent and precise.	The accounting is not regulated: the information systems are internally defined in order to satisfy the organization's strategic and operational needs; it's more subjective and subject to different interpretations but it's simultaneously more relevant for the management.

The internal accounting has the costs as its bigger and most important tool and their management as their biggest goal. Industrial companies often create an industrial accounting, gathering information concerning the transformation of production factors and accompanying the value creation process.

However, Horgren's perspective (2003) says that costs accounting is the information basis for the management and financial accounting. As shown in the picture, the costs accounting is the information basis for management accounting as well as for Financial accounting.

In this context, Horgren (1994) defines as cost management the sets of measures undertaken by the managers with the purpose of maintaining the satisfaction of the consumers by developing a process of continuous cost reduction and control. Also here no distinction is made between the process of obtaining information on the costs and the subsequent stage in terms of analysis and treatment of such information.

2.1.1 *Variable costing*

At variable costing, only variable costs are considered product costs, and period costs are all the fixed costings. Only those costs varying with production are considered production costs.

The advantages conveyed by the variable costing system are related to the information level you may obtain production at the time of the decision making. However, though the variable costing presents advantages, it also has disadvantages. First of all, there is a difficulty to separate the variable costings from the fixed ones. The evaluation of existences considering only the variable costings may be too conservative. It analyses the costs for short term decisions, and ignores fixed costings, related to production capacity and long term planning, which may cause future problems.

2.1.2 *Absorption Costing*

In the absorption costing is considered as product costs the variable and the fixed costings, the latest on the whole or partially. Should all costs be included in the product cost, the costing system is defined as full absorption.

Horgren (2003), defines the absorption costs as a technique on which all costs, variable and fixed, are considered product costs. The products absorb all the costs.

Based on the Padoveze (2000) article, the biggest advantage of the absorption costs is that it is in accordance with the Portuguese Plano Oficial de Contabilidade (POC-Official Accounting Plan). The other advantage also mentioned by the same author is that the method is less expensive in implementation, as there is no separation of the production costs in the fixed and variable components.

As disadvantage one may consider the non-existence of the advantages which variable costing has in terms of decision making. It is not possible to extract the contribution margin, and fixed costs are not considered as expenses within the period. In valuing stocks it considers all costs (fixed and variable), originating values which are higher than in variable costing.

2.1.3 *Order Cost*

The costing method may be based on the orders (or production orders), being the costs established according to the direct method for each order or manufacturing batch.

The usage of this system allows, on the one hand, to know the profit margin of the several orders and, on

the other hand, allows for the calculation of the costs for future orders. The cost object is identified during the whole manufacturing process and in the long term.

2.1.4 *Process Cost*

In this costing method, the costs are accumulated on a periodical basis, after which the average costs are calculated taking into account the production of such period (indirect method).

In this case it's only possible to calculate the average cost of the products. Contrarily to the order costing, in the process costing it is fundamental to refer to the production centers, which previously determined costs should reflect upon the manufactured products. In that sense, one should first determine the amount of work units produced by each center in order to obtain a certain product and the cost of each of those units. This information allows for the calculation of the cost of the product.

2.1.5 *Standard Cost*

The standard cost system is a special costing system which allows essentially for the measurement of the productive efficiency. The standard costs are predetermined costs. However, not all predetermined costs are standard costs.

The standard costs are obtained based on results referring to previous periods and assume a set of conditions showing the normal efficiency of the factors.

3. The ABC Costing Method

The analysis of any company or institution depends on its critical factor. The strategy to be implemented depends on what the company wants to achieve.

The activities are the focus of the activity based costing. Before identifying the activities one should analyze the company's chain of value, which gives us relevant data for this strategy to be implemented or defined. Usually, the output is measured by each activity in order to better describe the necessary activities' rates, for the calculation of the products' cost.

3.1. *ABC Usages Goals*

A cost system based on activities has the purpose of improving costs quality, content, importance and information. With this information, the precision of costs attributions and the global quality and relevance of the information on all costs in an activity, from the raw materials to the final product. This system is capable of providing all costs information's, to support the management of any company, having a better planning of the activities, costs control and decision making.

3.2. *ABC Implementation*

The ABC implementation requires a careful analysis of the company's internal control system. For example, definition of functions and process flow. Without the procedure, its application will not be efficiently and effectively viable.

The ABC management system, can be implemented more or less rigorously, depending always on the need of management information, as it is intimately connected to the company's activity area.

3.3. *Advantages and Disadvantages*

For a better understanding it is presented the advantages and disadvantages of the ABC's application costing method.

As advantages may be enhanced: An ABC costing system generates more correct information on the products, most of all in the cases of great product diversity and when the indirect costs which are not related to the volume appear to be quite expressive.

ABC emphasizes the analysis contemplating several cost object, assuming it's role as a tool for decision making at a strategic level.

The ABC allows a more careful analysis on the costs behavior, identifying the various factors to which these are sensitive and provide information which can be used in the productive process control and management.

On the other hand, several disadvantages may be listed:

- High implementation costs;
- Constant need for revision;
- Takes too many data into account;
- Difficult extraction of information;
- Difficult involvement by the company's worker's;
- Need for company's reorganization before the implementation;
- Difficulty on information integration between departments;
- Lack of competent, qualified and experienced staff for implementation and follow-up;
- Greater concern to generate strategic information rather than for using it.

4. Example of ABC Usage at a Metallic Structures Industry

The industry where this example was carried out uses the order based costing system to calculate its costs. It therefore works on manufacturing order.

The company manufactures metallic structures for construction. As they work based on orders, hardly do they carry out equal constructions, therefore the work is carried out to the preference of the client.

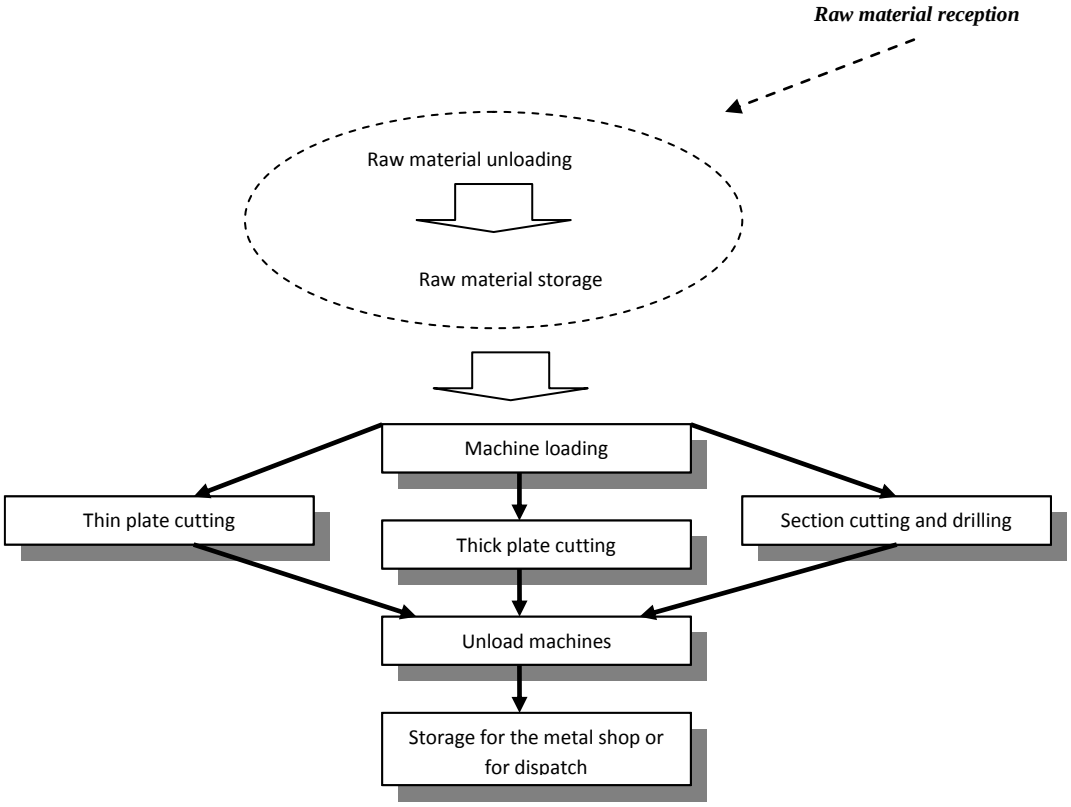
The data referring to the resources, the activities, the cost objects and the inducers are represented according to the work of Roztocki (1999), exemplified by Resource-Activity and Activity-Product Matrixex.

Source *– company internal report.*

Figure 1- Resource Identification Matrix

Raw-Material	826.000,00 €
Labour	206.402.56 €
Energy	25.400.28 €
Oxi-cut	3.468,00 €
Robot-Plasma	1.536,00 €
Robot-FP(1000)	2.938,00 €
Supervisor	13.224.84 €
Building	20.329.54 €
Scale	138,00 €
	,00 €
	,00 €

Figure 2 - Operations of the plate and section cutting process at industry



1*	M	M	E	O	PL	F	S	ED	B	P	E
R		0,					0,	0,8	0,	0	0,
PE		0,					0,			0	
CC		0,	0,		1		0,	0,0			
CC		0,	0,	1			0,	0,0			
CF		0,	0,			1	0,	0,0			
TS		0,					0,			0	0,
A		0,					0,		0,		
M	1										

1- The line represents Resources and the column represents Activities.*

Figure 3 - Activity-resource Matrix

2*	RMP	PEL	CCF	CCG	CFP	TSP	ARZ	MP
C.F. C	0,03	0,03	1			0,03	0,03	0,03
CGC	0,67	0,38		1		0,38	0,38	0,67
PFC	0,30	0,59			1	0,59	0,59	0,30

2- The line represents Activities and the column represents Products.*

Figure 4 – Activity-Product Matrix

4.1 *Cost Calculation*

Finally, the multiplication of matrixes shall be carried out in order to obtain the cost of each activity and the cost to manufacture each product.

The activity-product and resource-activity matrixes may multiply between themselves, making it possible to calculate the resource-product matrix, (figure 5), in which each element means the contribution of each resource for the several cost objects.

3*	MP	MOD	ENG	OXI	PLM	FP	SPR	EDF	BLÇ	PR	EMP
C.F C	0,03	0,21	0,59	0,00	1,00	0,00	0,21	0,06	0,03	0,03	0,03
C.G.C	0,67	0,38	0,04	1,00	0,00	0,00	0,4	0,63	0,53	0,53	0,53
P.C.F	0,30	0,41	0,37	0,00	0,00	1,00	0,39	0,31	0,44	0,53	0,44

3- The line represents Resources and the column represents Products*

Figure 5 - Resource product Matrix

From the result between the resource-activity matrix and the resource matrix, the activities matrix is obtained (Figure 6), showing the costs related to each activity.

Raw-Material Recp	40.614,87 €
Element Prep	22.696,00 €
Thin plate cutting	56.848,75 €
Thick plate cutting	48.991,43 €
Frame cutting and	54.615,57 €
Transportation	21.529,80 €
Storage	21.369,12 €
RM	826.000,00 €

Figure 6 – Activity Matrix

The products matrix (figure 7) may be calculated in two different ways:

a) using the resource-product matrix and the resource matrix, or,

b) multiplying the activity-product matrix and the activity matrix.

Cut thin plate	84.815,00 €
Cut thick plate	654.549,00 €
Cut and drilled frames	353.301,00 €

Figure 7 – Products Matrix (Production cost of each product)

The cost of the product using the MP quantity, therefore taking into account a waste factor of 2%, reaches a corrected cost.

$$Cost/Ton_{corrected} = \frac{Cost/Ton}{98\%}$$

The ABC corrected cost per sold ton is therefore the one in the table below.

Product	Cost year(€)	Ton/ year(Ton)	Cost/ton (€/ton)
Cut thin plate	84.815	40	2.120,38
Cut thick plate	654.549	790	828.54
Perfil cut and crummy	353.301	350	1009,43

Figure 8 – ABC corrected cost

With this table it is possible to calculate in greater detail the costs to manufacture the three products.

Through ABC costing, the unit price of thin plate and sections, 1.832,98 € and 1.062,65 € respectively, is higher than the sale price of 1018 €, originating a loss of (32.574,40 €) and (15.418,00 €) respectively, which is absorbed by the profit connected with thick plate and / or subsequent activities. With the ABC analysis it is possible to find out that the cost of thin plate is being undervalued by the company and in this context the price is much lower than it should be.

The absence of differentiation of indirect costs within products implies the adoption of sales prices not adjusted to the company, as well as the creation of mechanisms of interconnection of profits across products.

5. Conclusion

From this work several important conclusions come out, giving an idea of the set of possibilities for future research.

In the general cost theory, the accounting and cost engineering concepts undertake a very important role in what concerns the exact definition of the goals to outline their field of action which, in concept, will have to encompass aspects such as industrial costs and all other cost concepts, the distribution of indirect costs by the cost objects and the role of the costing systems in company management. The traditional costing systems were underdeveloped for the market requirements, given the globalization, generating the study of more efficient and effective approaches for resource usage.

The usage of new costing approaches is related to the technological development, granting the organizations an increase in price.

In between the few costing approaches, the ABC seems to be an alternative to the traditional costing systems.

The ABC assumes that companies do not manage costs, but instead, activities. It is assumed that products use activities and those, in turn, use company resources. And that usage may be explained with cost inducers.

The central elements of an ABC model are resources, activities, cost objects and cost inducers.

ABC is not a truly original concept, as its roots may be found in the last century.

However, there are many companies, mostly those of smaller size, which don't adopt this tool, facing difficulties to implement it.

In the practical case it was possible to prove that the usage of ABC may change the value attributed to the cost of each product.

On the other hand, the model shows the characteristics of the production process and techniques, and may therefore be very useful for those having to manage the production and manufacturing processes. By generating useful information for the management and most of all, for the analysis and optimization of the productive process, it allows for the classification of activities which may be reduced or eliminated for not adding any value. It also translates in a more visible way the cost construction process, showing the chain of value.

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Abreviations

ABC – Activity Based Costing

ARM - storage

BLÇ- scales

CAM – consortium for advanced management

CIMA – chartered institute of management accounting

CCF – thin plate cutting

CCG – thick plate cutting

CFC – cut thin plate

CGC – cut thick plate

CFP – cutting and drilling of sections

EMP - stacker

EN - energy

FP- cutting and drilling Robot

MP – raw material

OXI – Oxi-cutting

PCF – cut and drilled sections

PLM - Plasma

PR – rolling bridge

RMP – raw material reception

SPR - Supervisor

TSP – Transport

A Queue Model- Recycling and Dismantling Motor Vehicles

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***Abstract* – In this paper, a situation is studied in which, owing to the exhaustion of non-renewable energy sources, conventional motor vehicles will turn out of use. We consider two scenarios: recycling or dismantling these motor vehicles. M|G|∞ queue system is used to study the process. Through it, we conclude that if the rate of dismantling and recycling of motor vehicles is greater than the rate at which they become idle, the system will tend to get balanced. The model allows also performing a brief study about the recycling or dismantling economic interest.**

Keywords: M|G|∞, *Queue Model, Recycling*

1. Introduction

Earth is facing big challenges considering that many resources are overexploited. Oil, gas and coal exploitation posed many questions about the way humans use resources. The exploitation of non-renewable sources of energy and their use brought serious problems. We are now observing strong climatic changes, a fast extinction of species and many other critical problems that may have an end. Governments and institutions may change things. If not, very strong changes in our way of living and in the balances of the planet will happen soon.

The generalized access to all goods by the majority of populations around the world has created new needs to people and has created a global consumption economy. In general, a significant part of the countries' populations got access to the generality of industrial goods and it seems that people would not be prepared in the future to abdicate from it.

However, the non-renewable energy, as we know it today, may not be enough for many decades more, from now on. And even if it would be possible to keep the production of this kind of energy, the effective changes on Earth balances would establish that life would not be compatible with the existing way of life for people. Consequently, people need to adjust behaviors and governments need to prepare their economies for the new era of globalization.

New situations may occur very suddenly. The oil production has already got its peak and new oil productions will occur in the future with decreasing rents until its complete depletion. The other non-renewable sources of energy will have the same end.

Therefore we may have to reorder the priorities and to reorganize structures in societies. We have now to produce the new kind of energies (clean energies) at a major scale. The big problem that remains is to know if the transition period from non-renewable sources of energy to the renewable sources is enough to overcome the big problems related with the destruction of Earth. All the wastes that people have made for so many decades must be overcome, as well. Anyway many kinds of new problems will occur. However what is important now is to know how quickly changes may happen while we develop the new sources of energy in order to create a new economy and a reorganized society.

Too many motor vehicles will become idle if conventional energy misses or even when conventional energy becomes replaced by a renewable one. Motor vehicles dismantling or recycling will become very usual because there will not be a way to get them functional with conventional oil, since the moment it gets depleted.

Just before oil becomes really scarce, it will get very high prices. At that moment, many motor vehicles' owners must find out an alternative solution for energy. In our study we'll see how to model a situation in which motor vehicles become idle and then recycled or dismantled, depending on their specific situation and depending on the will of motor vehicles' owners. Our aim is to show that any kind of equipment's that work on the basis of oil may have an alternative use when this conventional energy collapses; or simply they may become dismantled. Then other uses for their materials and components will be made.

We apply our model to motor vehicles.

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2. A Motor Vehicles' Dismantling and Recycling Queue Mode

We consider the M|G|∞ queue system (Kelly, 1979) where customers arrive according to a Poisson process at rate λ (Ferreira, 1996). They receive a service whose length is a positive random variable with distribution function G(.) and mean α. Each customer as soon as it arrives at the system, immediately finds an available server. Each customer service is independent from the others customers' services and from the arrival process. The traffic intensity is given by $\rho = \lambda\alpha$.

With this model we intend to analyze a situation in which motor vehicles arrive at the system getting idle and leave the system as soon as they are recycled or dismantled. Both situations are modeled with the same purpose in the model. Our interest in studying this situation is precisely to see how the system may recover to a balanced situation in which motor vehicles get operational or get dismantled (in this situation materials would become employed as components in other applications).

Let $N(t)$ be the number of busy servers (or, what is the same, the number of customers being served) in the instant t, in a M|G|∞ system. If we consider $p_{0n}(t) = P[N(t) = n | N(0) = 0]$, $n = 0,1,2,\ldots$, we may have (Carrillo, 1991):

$$p_{0n}(t) = \frac{\left(\lambda\int_0^t [1-G(v)]dv\right)^n}{n!} e^{-\lambda\int_0^t [1-G(v)]dv}, \quad n = 0,1,2,\ldots \qquad (1).$$

So if the initial instant is a moment at which the system is empty, the transient distribution is Poisson with mean $\lambda\int_0^t [1-G(v)]dv$.

The stationary distribution is the limit one:

$$\lim_{t\to\infty} p_{0n}(t) = \frac{\rho^n}{n!} e^{-\rho}, \quad n = 1,2,\ldots \qquad (2).$$

This queue system, as any other, has a sequence of busy periods and empty periods. A busy period begins when a customer arrives at the system, finding it empty.

Let's see the distribution of the number of customers being served in the instant t in the M|G|∞ system, when the initial instant is the moment at which a busy period begins, that gets relevant for our purposes.

Be $p_{1'n} = P[N(t) = n | N(0) = 1']$, $n = 0,1,2,\ldots$, and $N(0) = 1'$ the initial instant at which a customer arrives at the system and the number of customers being served turns from 0 to 1. This means that a busy period has just begun (Ferreira, 1988).

So at the instant $t \geq 0$, we may have a situation that represents (Ferreira, 1998):

1. the customer that arrived at the system at the initial instant has left the system with a probability $G(t)$, or he remains in the system, with probability $1-G(t)$;
2. the other servers, which were empty at the beginning (initial instant), may be now empty or busy with 1, 2, ... customers, with probabilities given by $p_{0n}(t)$, $n = 0,1,2,\ldots$.

The two subsystems, the one of the initial customer and the one of servers initially empty, are independent. Consequently:

$$p_{1'0}(t) = p_{00}(t)G(t)$$
$$p_{1'n}(t) = p_{0n}(t)G(t) + p_{0n-1}(t)(1-G(t)), \quad n = 1,2,\ldots \qquad (3).$$

We also have for this situation:

$$\lim_{t\to\infty} p_{1'n}(t) = \frac{\rho^n}{n!} e^{-\rho}, \quad n = 0,1,2,\ldots \qquad (4).$$

For the M|M|∞ system (exponential service times), the equations 3 are applicable even when $N(0) = 1$ (when the initial instant is a moment at which there is a customer in the system; that does not enforce that this is the moment at which we are turning from 0 to 1 customer to be served). This results from the lack of memory of the exponential distribution.

If $g(t)$ is the probability density function related to $G(t)$, and if we call $h(t)$ the hazard rate function, we'll have (Ross, 1983):

$$h(t) = \frac{g(t)}{1-G(t)} \qquad (5).$$

The function $h(t)$ is the rate at which services end.

So,

Proposition 1:

If $G(t) < 1$, $t > 0$, continuous and differentiable and if

$$h(t) \geq \lambda G(t), \; t > 0 \qquad (6)$$

$p_{1'0}(t)$ is a non-decreasing function.

Dem:

It's enough to observe that $\frac{d}{dt} p_{1'0}(t) = p_{00}(t)(1-G(t))\left(\frac{g(t)}{1-G(t)} - \lambda G(t)\right)$.

Besides, we may note that

$$h(t) \geq \lambda, \quad t > 0 \qquad (7)$$

is a sufficient condition for the result in 6.
So, if the rate at which the services end is greater or equal than the rate of arrivals, we conclude that $p_{1'0}(t)$ does not decrease.

For the system M|M|∞, the equation 7 is equivalent to

$$\rho \leq 1 \qquad (8).$$

Considering $\mu(1',t)$ and $\mu(0,t)$ the mean values of the distributions given by 3 and 1, respectively, we'll have

$$\mu(1',t) = \sum_{n=1}^{\infty} np_{1'n}(t) = \sum_{n=1}^{\infty} nG(t)p_{00}(t) + \sum_{n=1}^{\infty} np_{0n-1}(t)(1-G(t)) =$$

$$= G(t)\mu(0,t) + (1-G(t))\sum_{j=0}^{\infty}(j+1)p_{0j}(t) = \mu(0,t) + (1-G(t)).$$

So,

$$\mu(1',t) = 1 - G(t) + \lambda\int_0^t [1-G(v)]dv \qquad (9).$$

Proposition 2:
If $G(t) < 1$, $t > 0$, continuous and differentiable and if

$$h(t) \leq \lambda, \quad t > 0 \qquad (10).$$

$\mu(1',t)$ is a non-decreasing function.

Dem:
It's enough to observe that, considering equation 9, $\frac{d}{dt}\mu(1',t) = (1-G(t))(\lambda - h(t))$.

Besides, if the rate at which services end is lesser or equal than the rate at which customers arrive $\mu(1',t)$ is a non-decreasing function. We can note additionally that, for the M|M|∞ system, the equation 10 is equivalent to

$$\rho \geq 1 \qquad (11).$$

3. Results and Comments

According to our study interests, the customers are the motor vehicles that become idle. The arrival rate is the rate at which the motor vehicles become idle. The service time for each one is the time that goes from the instant they get idle until the instant they become recycled or dismantled. The service time hazard rate function is the rate at which the motor vehicles become recycled or dismantled.

An idle period for our M|G|∞ system should be a one at which there were no motor vehicles idle. In a busy period there are always continuously idle motor vehicles.

The equation 6 shows that if the dismantling and recycling rate is greater or equal than the rate at which motor vehicles get idle, the probability that the system gets empty (that is, there are no idle motor vehicles) does not decrease with time. This means that the system has a tendency to become balanced as far as time goes on.

The equation 10 shows that if the dismantling and recycling rate is lesser or equal than the rate at which motor vehicles get idle, the mean number of motor vehicles in the system does not decrease with time. This means that the system has a tendency to become unbalanced as far as time goes on.

Consequently, we conclude that when the rate of dismantling and recycling of motor vehicles is greater than the rate at which they become idle, the system has a tendency to get balanced. In this situation, the motor vehicles that become unused with the conventional energy turn useful with another kind of energy or get included in other useful devices.

We must note that it is important the recycling or the dismantling of motor vehicles but, more than that, it is essentially relevant the cadence at which these actions are performed. Moreover, we give a reference for this cadence: λ, the rate at which motor vehicles get idle.

4. An Economic Analysis as a Complement to the Model

We have seen that rates λ and *h(t)* are determinant to monitor the way that the system of motor vehicles recycling and dismantling may be managed.

We consider now additionally p as the probability for the motor vehicles arrivals destined to recycling and (1-p) as the probability for the motor vehicles arrivals destined to dismantling. Let $h_i(t)$, $c_i(t)$ and $b_i(t)$, $i=1,2$ be the hazard rate function, the mean cost and the mean benefit, respectively for recycling when $i=1$ and dismantling when $i=2$.

With these new variables we can perform an economic analysis (beyond other considerations that may be posed) to evaluate about the interest of recycling and dismantling.

We will analyze this situation in a global approach and not in a selfish way, considering the individuals point of view.

So, we may consider the total cost per unit of time for motor vehicles recycling and dismantling as:

$$C(t) = pc_1(t)\lambda + (1-p)c_2(t)\lambda \qquad (12).$$

Furthermore, the benefit per unit of time resulting from recycling and dismantling is given by:

$$B(t) = b_1(t)h_1(t) + b_2(t)h_2(t) \quad (13).$$

From an economic point of view, it must be B(t)>C(t).

To conclude about the advantage of recycling, we have the following:

$$b_1(t) > \max\left[\frac{p\lambda c_1(t) + (1-p)\lambda c_2(t) - b_2(t)h_2(t)}{h_1(t)}, 0 \right] \quad (14).$$

$G_1(t)$ and $G_2(t)$ are both exponential, equation 14 becomes:

$$b_1(t) > \max\left[(pc_1(t) + (1-p)c_2(t))\rho_1 - \frac{\alpha_1}{\alpha_2} b_2(t), 0 \right] \quad (15).$$

To conclude about the advantage of dismantling we have, in the same conditions:

$$b_2(t) > \max\left[\frac{p\lambda c_1(t) + (1-p)\lambda c_2(t) - b_1(t)h_1(t)}{h_2(t)}, 0 \right] \quad (16)$$

and

$$b_2(t) > \max\left[(pc_1(t) + (1-p)c_2(t))\rho_2 - \frac{\alpha_2}{\alpha_1} b_1(t), 0 \right] \quad (17).$$

So, there are minimum benefits above which, from an economic point of view both, recycling and dismantling, are interesting. The most interesting is the one for which this minimum benefit is the least. By other words: in a global perspective, it is more efficient the activity that corresponds to a lower level for the minimum interesting benefit.

Recycling seems to be as much interesting as far as it is more economically profitable and our inequalities 14 to 17 are tools that may be applied to evaluate this interest.

5. Strengths and Limitations

Our model contributes for a better understanding of this kind of problems and it (or some modified versions of it) may be applied to study some other social and economic phenomena, such as unemployment, health or projects of investment, for example, with interesting results.

An extension of our model has also permitted to get conclusions about the economic advantages of recycling and dismantling.

The model application to the phenomenon studied in our paper shows that it is very useful and that its conclusions and results are quite simple to understand. Just through its theoretical analysis, we evidence some remarkable topics in analyzing the evolution of the studied system. Or another one, whichever it is, since it is according the assumptions of the model.

In practice, it is essential to estimate λ and *h(t)* to get conclusive particular results for the available data about the system. This will give us the tools to monitor the situation and to suggest solutions. A correct estimation of λ will depend on the arrivals process to be Poisson, in real.

Additionally, in general, it is correct to admit that with very large populations, such as the one we are dealing with, the estimation of *h(t)* is usually technically complicated. So, frequently, the best to do is to estimate directly *h(t)* instead of estimating first the service time distribution and then computing *h(t)*.

A particular situation at which the computation is easier is the exponential service time one, for which $h(t) = 1/\alpha$.

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Externalities and Public Provision of Education

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Abstract **- This paper investigates the role of government in providing education, especially at the regional and local level. The public (or semi-public) good nature of education and the presence of externalities in the production and consumption process can lead to situations of market failure. Consequently the market can be driven to solutions that are not socially efficient and that's the fundamental reason to defend the public provision of education. But there is also a role to be developed by the private school, in this market.**
Locally, the economic analysis points to an important public role in the provision of educational services, especially at the level of basic education. The justification is based mainly on grounds of fairness, that is, the more or less universal access to the benefits of education being the central issue.

1. Introduction

The present study aims to investigate the role of government in providing education, especially at the regional and local level.

Despite the different levels of state participation in the educational market worldwide, it is undisputed that this presence today is very significant, either by the volume of financial resources used, either by the political discussion involved in the definition of the goals and other issues relating to the availability and operation-modalities of the education system, to the interested parties.

The discussion then goes irremediably into a "dual" analysis of efficiency versus equity. In this sense, our analysis intends to inquire about the particular characteristics of functioning of this market that can lead to socially inefficient equilibrium solutions, and thus justify the presence of the state as regulator.

The work is carried out in four points. The first section introduces the concept of externalities. The second attempts to frame education as a public good and discusses the market failures that are associated with the presence of externalities. The third makes the analysis of external effects in the education market that justify the public provision of education. The fourth point addresses the issue of efficiency vs. equity in the market mechanism and includes some considerations regarding the public provision of education in a local context.

1) The "Gallery Of Externalities"

The concept of externalities is, perhaps, one of the most inaccurate of the economic literature. Despite the extensive literature on externalities, the definitions are few and generally unsatisfactory. Many scholars do not even define the phenomenon, identifying it only by its consequences and by enumerating a long list of examples. It's the "gallery of externalities".

Yet, the concept is not new. Introduced by Marshall in the famous "Principles of Economics" (1890), it benefited from a strong controversy in the 20s and 30s of the last century. Highlighted, here, are the contributions of Knight, Young and Pigou and, later, the effort of multiple authors such as Meade, Viner, Scitovsky, Baumol and Oates, among others, to generalize the concept. The 60s and 70s went as the scene of an abortion of the consensus previously generated. After the controversial analysis of Coase, in the early 60s, and the development of the so-called Property Rights paradigm, the discussion would not ever be the same. The discussion about the paper of the Government in the process of internalization of the externalities took a new breath. And, there are, still, significant differences in the classification of the various types of externalities.

In a general approach, we can say that we are in the presence of external economies (or diseconomies) whenever the utility of an agent is influenced by the utilities of other agents, that is, the decision of an agent depends on and is influenced by the decisions of others; or when a given agent can not appropriate all the benefits that he creates or is not forced to pay all the damages that generates for the community.

This idea is present in the definition of externalities of Baumol and Oates (1975) by two conditions:

- We are in the presence of externalities when the utility or production of an individual includes real variables whose values are chosen by others (individuals, corporations, government) without particular attention to the effects on his welfare.
- The decision-maker whose work affects the utility or production function of others, does not receive (or pay) in compensation for that activity,

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an amount equal to the marginal costs or benefits that result.

This definition leads us to the element of general agreement: the externalities are the cause of the divergence between private profit and social benefit (or private cost/social cost) and lead to situations where market mechanisms do not lead to optimal allocation of the resources.

The General Equilibrium Theory postulates that assuming the hypotheses of perfect competition in the market and perfect divisibility of goods and factors, the market forces leads to a situation of Pareto-optimum, so that any change of behavior from an individual or company and the impact on the welfare or income from other individuals or companies is transmitted through the system of prices.

Exceptions include, however, a number of situations where there is direct interdependence between agents operating outside the market. It is in this line of thought, that Meade (1952) defines external economies. For this author the external economies exist when the output (x_1) of a firm depends not only on inputs used (l_1, c_1, ...) but also from the output (x_2) and the factors used (l_2, c_2, ...) within another company or group of companies, that is, $x_1 = F (l_1, c_1, ..., x_2, l_2, c_2)$. This is a situation of direct interdependence between producers. The example of the apples and the bees, provided by the author, is now a classic. The "Fable of the Bees" put in evidence the way that, the near presence of a bee-keeper producer operation, creates a better result in a farm of apples production. In fact, the bees, facilitating the *polinization* of apples flowers, generate a surplus in terms of apples farm profit. That is reflected in the microeconomic production function of the apples firm.

However, this clear situation of direct interdependence among producers is not unique. Bourguinat and Scitovsky also mention a number of other situations of interdependence that are now part of the extensive gallery of externalities.

Bourguinat (1964) referred the situations in which the satisfaction of an individual may depend not only on his consumption or effort but also from outside influences that can come from three categories of agents:

- Producers: we find the example of the external economies created by an industry making some infrastructures that benefit the in-habitants of a region, without the capacity of appropriating the benefits created or, conversely, the external diseconomies resulting from certain polluting activities that generate noise or smoke or toxic waste.
- Government: all benefits available to the community by the state, including the so-called public goods and services (scientific research programs, among others) constitute, for the population, partial external economies, since there is no equivalence between the disutility of tax incumbency and the usefulness of services received.
- Consumers: the interdependence of consumers leads to situations where the satisfaction level of an individual is affected not only by his level of product consumption, but also by the satisfaction of other consumers with higher incomes, often leading to imitation and contagious effects.

Particularly interested in externalities at the consumption level are, also, Buchanan et Stubblebine (1962). For these authors, externalities exist as long as the utility of an individual *A* depends not only on the activities he chooses (x_1, x_2,...) but also from an activity (Z) chosen by another person *B*.

Scitovsky (1954) extends the concept into situations in which this interdependence operates through market mechanisms. The definition of external economies then arises in terms of profit. Thus, whenever the profits of a company (P_1) does not depend only on the production itself (x_1) and inputs used (l_1, c_1,...) but also from the production (x_2) and other inputs (l_2, c_2 , ...) from other companies, we invoke the presence of externalities: $P_1 = G (x_1, l_1, c_1, ..., x_2, l_2, c_2 ...)$.

In this case, the external economies work through the market, affecting prices directly. For example, the investment in an industry lead to the expansion of its productive capacity and can lead to falling prices of its products and rising prices of inputs used, and that benefit, respectively, the consumers of these products and the suppliers of inputs. Note that those agents will not pay the equivalent compensation. We are in the presence of so-called *pecuniary* external economies, a classification that comes from Viner, as opposed to so-called *technological* external economies that correspond to those given by Meade.

2. Public Goods and "The Anatomy of Market Failure"

According to Bator (1958), externalities are basically market failures whose anatomy should be investigated. The market failure is understood here as the failure of a system of prices and market rules designed to signal the desirability or non-desirability of a given activity. This is to be evaluated with respect to the solutions of a social welfare function that is maximized.

The central theorem of the modern Theory of Welfare, known as the *Duality Theorem*, tells us that under certain restrictive assumptions about technology, consumer spending and motivations of the producers, the equilibrium conditions that characterize a system of competitive markets has a perfect correspondence with the requirements of Pareto-efficiency, as we mentioned. The problem of maximizing the welfare leads us to determine a set of "shadow prices" which have the analytical characteristics of prices, wages, interest rates and rents. But this implies that the calculation of the

decentralized market account for all economic costs and benefits relevant to the welfare function.

According to Bator, this duality can fail.

- Either because the market misses the signals/ incentives sent to the system, or by the structure more or less monopolized the market. We find ourselves in what he calls the technical externalities: situations where due to various causes (in general, problems of indivisibility and interdependence) market private and social costs, or benefits, differ, in the margin and in total values, whether the benefits.
- Because, due to institutional imperfections of organization and capacity limitations of accounting, some inputs are not properly accounted for. There is, here, a flaw that Bator calls "failure by enforcement." The author refers to a series of situations where the market fails in the extent that one factor is not paid - including fisheries and all situations of free access to natural resources. In this type of market failed matches a group of externalities means that the "ownership externalities".
- Either because it simply does not exist. It is the so-called "failure of existence" and that corresponds to the case of public goods.

It is this latter aspect that interests us especially.

For Samuelson, the quality that defines a public good is the consumption of each individual does not imply any subtract-ability in the consumption of the good by another individual. In this case, the formal conditions of the marginal rate of substitution that define the frontier of possibilities of Pareto-efficient utility does not lead to any kind of vectors of market prices used when a routine, useful for establishing the output-mix and for the distribution in a decentralized organization, is working.

In a simple language: A strong argument for state intervention in education derives exactly from the nature of public or semi-public good. The definition of public good and its differentiation from private goods can be seen as follows: A pure public good has two main properties: non-rivalry and non-exclusion. In the case of education, we are faced with goods and services with public goods nature: non-exclusion (no user can prevent someone else to use, too, the educational services) and non-rivalry in consumption (the use of services by a consumer does not decrease, at least significantly, the amount available for consumption by other consumers). In fact, individuals may act as "free riders" and acquire the services at zero prices. The presence of positive externalities in this case is evident, in that the consumer does not pay for using the service a price equal to marginal benefit.

The greater the degree of rivalry (that is associated with the idea of scarcity), and the degree of exclusion (associated with the idea of property), plus the public good approaches a pure public good. It is evident that the pure public goods are rare.

As for education, its inclusion as a public good depends on the actual educational level. At the level of compulsory schooling (the mandatory first years of school-education), this formation is seen as an absolute desideratum and absolutely necessary to prevent. So it that is often seen as a real public good, especially in European societies where the "*welfare state*" is the rule. In these societies the rule is the almost full government provision of education at this level of education.

However, the same cannot be said for the post-compulsory education. First, financially it would be very complicated in the context of current public policy, think on an absolute public provision of education, particularly at the university level. Simultaneously, it is recognized that at this level, the degree of responsibility for the education of young-adult and adult should have to pass to a more personal level of motivation and financial participation.

In terms of “ownership” and speaking about non-rivalry characteristics, it can be assumed that this level of post-compulsory education is to some extent, not rival. A set of individuals can take ownership of both the teacher's knowledge. However, the classroom may have limitations in terms of space available for the attendance of students. The teacher capacity to care and of tutoring is limited.

Regarding the exclusion, the situation is more debatable. If education and teaching were of universal free access then the exclusion would be impossible but if, for example, at the level of higher education, given the existence of "numerus clausus" and the existence of tuition (even at lower cost) the exclusion is already a fact, in this sense, we can approach a semi-public or even private provision. In fact, what usually happens is that, with limited entries in the public university, the excess demand will have to be met with private provision of university education.

There are still issues of ideological nature. Those have to do with the personal attitude/position in the face of state intervention in these areas, not forgetting that Education Policy can be an important element of social regulatory function. In fact, corporate propaganda reflects the interests of dominant social groups and is central to social reproduction models.

Beyond the discussion of higher or lower economic efficiency of the State's economic performance as an agent, there is a political discussion about the social functions of the state that is always present in this debate and that includes the important issue of fairness that we deal ahead .

3. Externalities and the Provision of Public Education

Given the foregoing, the question should be how far the public provision of education turns out to be. That means we must identify the externalities associated with the goods and services in education

(and the market failures associated with the education market), to justify the presence of the Government.

According to Chagas-Lopes (2004) and Blaug (1991) we can identify at least the following externalities associated with education:

In terms of positive externalities, we noted that the skilled and highly qualified worker or manager is a factor of productivity gains and ability to attract more dynamic capital: with the introduction of new technologies, rather than the logic of competition for low wages; with reflections on the overall development of society. Social marginal benefits are clearly superior to the marginal private benefits.

Likewise, it can be said that education works in terms of the security and safety of a higher level of income. Individuals with higher levels of education perform usually better paid professions, increasing levels of disposable income, which offset, in terms of potential demand, the demographic problems of steep decline of the workforce in countries where the "Welfare State" works the best. The existence of higher income levels are still an important support for obtaining funds for the governments, through taxes and other fees, which keep the public social policies (including education, itself).

We may also apply the multiplier effects of education and research and development on the endogenous growth of countries as well as the multiplier effects on consumption of public goods (such as health or culture) that stem from the existence of a literate and educated population.

It should be noted that, from the perspective of the individual who has free (or lower cost than the actual price) education, there is a positive externality clearly identifiable in that their marginal benefit is clearly higher than its marginal cost because private compensation to society that is paid is not the equivalent of the benefit that results from increased individual improvement becoming from their training.

In terms of negative externalities it is also possible to highlight some aspects ranging from the exclusion of the non-qualified individuals of the new information societies (where the multiplicity of sources and forms of learning turns out to be a disadvantage for the "new illiterates" of the TICs-Technologies of information and communication); to the migration and plunder of the high qualifications from the developing countries to the developed countries, a veritable brain-drain that inevitably leaves the poorest and least developed countries disqualified.

In the same direction, we can identify the purpose of demonstration / imitation effect that lead to the adoption, by the poor countries, of the standards of rich countries with high consumption. That leads to the depletion of natural resources and to the jeopardizing of the sustainability of the development process. The globalization of culture and education is, at this level, a factor of considerable importance.

Apart from the issue of the presence of externalities and their consequences in the poor functioning of the education market, we also highlight a key aspect concerning the shortcomings of the education market: their reduced transparency and the difficulties that arise due to problems of asymmetric information. In this sense, for some authors, the active intervention of the state is justified in this market.

In fact, education is a "merit" good and one of the reasons for the apparent dysfunction of the market is just the critical situation of being a good for which it is difficult to judge quality. Students themselves have difficulty in choosing. Government intervention is justified because the design of this choice is necessary. Information does not reach every consumer on equal terms. The very ability to decode the message that is associated with the "announcement" of educational available services is different between different social status levels.

Asymmetric information is still visible in that the responsible for educational provision have a more secure notion of the product quality they are offering, when compared to what it is provided to potential consumers. To this extent, students can be led to demand for lower-quality institutions or courses with few career options (with surplus students compared to the expected demand in the labor market, etc.). Therefore, the state should regulate the supply of education.

Moreover, throughout the training process, individuals may have needs that can only pay income in the future and raises the possibility of using the banking system. But for this system, probably the risk of these operations is high, given the amortization period to be extended and given the lack of knowledge about the future. Here, too, the intervention of "social management of risk" by the State is important.

Summarizing: The need to consider the effects of externalities, or the need to overcome the difficulties of a market with imperfections, all seem to be reasons to justify the Government regulation of education. How far can go the provision of education by the state ends up being more then a matter of financial resources available, and obviously an ideological issue that results from a more or less liberal view about the way we understand the activity of the agent - *State* in the economy and in the society.

4. The Efficiency *versus* Equity Issue. Local Provision of Education

As we said, the issue of education provision by the state cannot remain only in the eternal debate about the greater or lesser efficiency of the Government in allocating resources.

Admittedly, there are interesting arguments that seek to justify private provision of education as the

traditional arguments of the gains derived from price and quality competition and freedom of choice by consumers.

However, the main justification for state intervention in the education system comes to the aim of "raising the general level of education and training" that is intended in most modern societies. At stake here are issues of equitable distribution of income and development gains that the competitive economy has difficulties in securing.

We get both issues of social cohesion, between social groups or between different regions and locations.

At the bottom, the fundamental issue is how to ensure equal opportunities of access to education by the less privileged by not allowing their lack of means and any other access problems to create a situation of absolute impediment of realization of their capacities and of integration in the competitive economy. Somehow, we need a kind of positive discrimination that favors the least protected individuals, explicitly, in the system.

It is precisely in this level of "equalizing" opportunities that the regulatory activity of the state and public provision of education, are more justified. For this purpose the state may resort to various forms of assistance (see Chagas Lopes, 2004):

- Through the finance system, by using various social support alternatives, from "free" and universal education system, to school vouchers or school loans to pay in the long-term, scholarships, school residencies and other forms of social school support (food, transportation, etc.);
- Construction of the necessary educational infrastructure (schools, sports halls, libraries, roads, etc.);
- By seeking to combat school dropouts;
- Strategy to prevent the monopolization of the education market in certain areas of science and at various spatial scales (national, regional, local);
- By direct intervention in the management of schools and regulation of relations between public education and private education;
- Production of information relating to the education system and its dissemination;
- Through the legislative process: taking explicitly a positive discrimination to the poor, facilitating, for example, certain types of access to several areas and levels of education services.

In the local context, these issues of equity in the market access and of public provision of education services can take an interesting shape. Several issues are to be answered. Is it justified the public provision of education at the local level? On what level(s) of education? Why? With what fundament? What is the role of local government in the quality of the education system? What are the problems that the local authorities face in these areas? What are the difficulties in the relationship with central Government?

The usual answers in some tests to validate this analysis, in the Portuguese case (see Oliveira, 2007), enhance the justification of public provision of education at all levels of education, based on criteria of fairness - "that all citizens have access to education." Secondly, the local Governments have usually assigned important responsibilities in terms of primary education (Kindergarten and 1st cycle), coming this public provision of education services to play an important role, especially in matters of school transport, school social work, maintenance of infrastructure and support for complementary activities (as after-school activities).These skills involve important financial resources in the local context. Likewise, it is called the attention for the critical tension between the Central Government "that only distributes responsibilities to local power" but does not accompany this devolution of powers in the education sector with the "decentralization" in financial terms.

5. Concluding Remarks

The public (or semi-public) good nature of education and the presence of externalities in the production and consumption process in the education market can lead to situations where the market can be driven to solutions that are not socially efficient. That's an important reason to defend the public provision of education.

But there is also a role to be developed by the private school, in this market. The questions are to be put in terms of price and quality of the service, but also on equity grounds, the more or less universal access to the benefits of education being the central issue.

Locally, the economic analysis points to an important public role in the provision of educational services, especially at the level of basic education. The justification for public provision based mainly on grounds of fairness, "equality of citizens' access to education." There are still some problems in the complex relationship between Central Government and Local Government with regard to financial issues, including the adequacy of transfers of funds to the local institutions to enable them to cope with the new powers that are being conferred in the fields of Education.

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Socio-Economics in Transition Times: A Reflection on Cooperation as a Strategy to Promote Wealth

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***Abstract*: The discussion on cooperation in the context of transition in developed countries, in times of crisis is very accurate at the present moment. World has changed and the relative positions have been profoundly modified motivated by the effective changes in the last two decades in the political and strategic measures adopted in international negotiations in the context of the World Order (Disorder!). Developed economies have believed that their abilities would remain for the long term. Qualifications and specialization in developed economies were not enough to guarantee that globalization and markets' opening would be successful in the long term. Governments have not understood that. In consequence, in many developed countries financial cash problems and an ambience of structural crisis have emerged. The problem may grow if right measures are not implemented correctly and timely. The very recent experience shows that many difficulties may keep a weak economic (and social) development for these countries. Global measures are needed and international cooperation must be effective in order to allow economic strategies to conduct many developed countries to the way of growth. However, the emergent countries will continue in the front line, despite what happens in the near future with structural strategies to be adopted by developed countries.**

Keywords - Cooperation, debt, development.

1. Introduction

Cooperation in the context of crisis considering the present period of transition, pointing to social and economic hard changes in developed countries, seems essential at the present moment. Developed economies have believed in the past that their abilities would remain for the long term. High qualifications and specialization of these economies conducted politicians to rush the globalization and to open completely their markets, believing that they were prepared for the global competition.

However, the optimistic views of politicians were proper and conform their will but were wrong in the philosophy and in the implementation of the strategies. The visible consequence is that many countries in Europe (for instance) are dealing nowadays with severe financial cash problems and with a crisis that is providing growing disasters in social terms.

The sovereign debts, the external national debts, the weak long term economic growth for more than a decade are factors that show the wrong options in the past. The problem may grow if correct measures are not implemented correctly and timely. The very recent experience shows that measures are implemented out of time and with no political abilities. Governments react very late, there is no correct evaluation of the problems, institutions are not coordinated, political interests are overlaid comparing to the national interests of countries. Global measures are needed and international cooperation must be effective in order to have economic strategies to guarantee many developed countries' growth.

Nowadays' problems discussion in the context of transitions is very accurate at the present moment. The actual crisis and the existing and crescent difficulties generated by the severe measures that governments are implementing currently, particularly in some European Countries, bring to the discussion the idea that governments have to be necessarily more effective in solving economic inefficiencies and in solving the lack of regulation or simply the wrong terms of regulation, particularly in the financial area. Many regions and many families as much as many companies in many countries in Europe are dealing with severe national economic and social problems. The crisis brought a set of additional national problems. Many sectors and many regions have now extremely difficult conditions due to the decreasing of countries' economic situation.

2. The Need for a Global Reflection

The world population keeps growing on, and many restrictions are necessary to the present and for next generations. This is the time to think on this. The future is in front of us and will depend on the present decisions. And first of all, politicians and public policy makers have to be aware of the challenge.

In fact,

- Property rights may be in the center of the discussion and a new model for modern societies may be discussed. Now, many individuals are at poverty levels or close to that.

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- Public social national policies that were characteristic of developed countries have now to be reconsidered. Public budgets are lower than before and policies more selective and more restrictive. Many projects of social responsibility are possible and may be developed, involving communities in order to create value, in order to organize structures from which families may live from. There are local organizations to be created and local public authorities to be involved to create the necessary structures to permit the development of such kind of organizations.
- Bureaucracy and excessive rules and obstacles to the implementation of private projects have to be removed to guarantee successful implementation of projects. Anti-commons tragedies must be avoided considering that, as Buchanan and Yoon (2000) say, there are often "disparate institutional structures" which have to be overpassed. The persistence of bureaucratic circuits of approval and implementation of projects can difficult entrepreneurship activities and that diminishes the potential of regional development. It is necessary now to develop local and regional projects in private sector and develop industry and agriculture, including mining and aquaculture projects.
- New kind of projects, dealing with technological innovation, can be developed involving Universities and local organizations, by creating structures for new value development.
- New projects involving local communities and local companies in order to create new economic and social projects;
- New practices have to be considered for citizens in the day by day way of life;
- And many other ways of creating value through cooperation and common strategy designs have to be generated, as well.

People have already perceived that there are limits to growth and that resources are finite. Developed countries have now to reformulate strategies and to create new ways of generating wealth. Innovation must keep on, and rules in the international market must be adapted to consider a way to generate wealth and growth by developed countries in the international context, creating new rules for the international trade. It is no longer possible to keep developed countries to grow if there is not a growing industrial and agricultural basis. Some European economic countries are facing this problem and the only way to grow and create a structure for development and to generate enough wealth for guarantee standards of life of citizens is to recuperate a strong production basis, which in many aspects and regions has been lost.

3. The Portuguese Situation

Portugal is one of the most affected countries in Europe in this contextualization. In fact, in Portugal the situation got worse considering the level of sovereign debt and the context of growing debt of families and companies, what conducted Portuguese Government to ask for financial support from E.U. and I.M.F.

Many sectors and many regions are now facing extreme conditions due to the decreasing of the country's economic situation. Portugal is one of the most affected countries in Europe in this contextualization. In fact, in Portugal the situation got worse considering the high sovereign debt and the context of growing debt of families and companies.

For many years, individuals created the habitude of a new easy style of life, concerning to the fact that a better consumption standard has been existing; for long time usually people got their own house; since long ago it has been normal to have regular travels and holidays and a new uncomplicated standard of life, which has been existing for several decades, being now put in question. This is true for Portugal and true for many families in other European countries.

Considering that, it can be said also that property rights are now in the center of the discussion again. Private property or social property? Own houses or rent houses? Living in cities or coming back to countryside? Going to jobs by car or going in public transports? Using particular affairs or using communal goods, instead? Creating associations in order to produce economies of scale or continuing to have self-decisions, about own staff on many things as usual in the last decades?

In Portugal, in the last decades, families used to think that they could have a house, that they could buy it using loans and they were considering that this was a good investment for the future. In general, families have opted for having, at least, one house. The interest rates were very low and the context helped to create the illusion that in the future everything would be easy and a context of wealth would remain "forever". However, recently, the difficulties began to grow sharply and in the last years thousands of families in Portugal had to deliver their houses to banks, precisely the entities which have offered cheap loans.

Additionally, many thousands of people have migrated to the cities in coastal zones creating a new style of pressed life on these cities and generating a strong pressure in the mortgage sector. Houses prices have risen. However, given the difficulties in the last decade, the boom in this sector was not so strong in Portugal as it was in other countries, as it is the case of Spain.

It has been common to see one car one person in the last decades when people were going from suburbs to Lisbon, the capital, going to their jobs. Now, this practice may have to be reconsidered.

It is necessary now to make a reflection about the way of living the day by day and the way to change

paradigms in what some kind of savings for the day are concerned.

The era of cheap energy has also come to a critical point. Energy is getting more expensive and now many scenarios must be made for the future.

4. Cooperation as a Strategy to Get Wealth effective Results

Cooperation may represent a way for human race develop strategies for getting better results of an activity.

Presenting for reference what happens in commons area, it can be said that this kind of problem may be integrated in the very well-known problem that results from the traditional formal issue "Dilemma of the Prisoner" that is relevant in the Game Theory analysis.

For allusion, this problem is posed in Game Theory for situations in which two players, for instance, in the game have dominant strategies, what makes that the solution of the game is a dominant strategies' equilibrium. This equilibrium is stable and players will not change their choices. What is a problem is that this kind of solution implies a total payoff that is under the result that the players could have if they had some form of cooperation between them.

In these situations, players will choose the dominant strategy (which in the case of the natural resources exploitation, for example, is always the strategy of non-conservation) and they will not have incentives to use it efficiently and conserve the resource. Players are compelled to switch this strategy because they are functioning in competition conditions. So, this puts a player in a situation that represents a dilemma with ethical boundaries. By one side, player really thinks that it is important to have a proper management policy for the use of a resource in the long term but by the other side he is compelled to have an egoistic and myopic view of the resource use and exploits it too much compared with the ideal inter-temporal production level.

The problem of over-exploitation has long been claiming for good practices coming from international cooperation and coming from a preserving approach on the processes of decision making of resource management institutions. This may be some kind of a contribution to solve some of the multiple problems in the ethical area of commons. So, to solve the problem of maintaining the biodiversity, the preservation and related ethical issues in this area, it is necessary to pose questions about how to use environment and Earth resources and how to treat other species, plant or animal. And this may bring the possibility to develop projects considering the possibility of exploit the Nature in self-interest, using it at the same time that it is preserved, by for example using nature tourism instead killing animals or destroy trees.

In Azores, Portugal, the example of whales, which are used for tourism projects, is an interesting case in the way how to use nature for good instead to destroy it, by killing the whales for consumption, as it was done before; or even as it is made now by specific communities when they get whales with "scientific purposes"! (?).

This problem raises a central question in resources economics when resources are exploited. What should be the level of the inter-temporal discount rate, that is, the time preference rate? This discount rate allows to make the evaluation of projects. In this sense, its level is a form of highlighting the relation between present and future consumption. It gives an idea about the way present generation gives importance to the resources left to the future generations and their level of welfare.

Although cooperation is an important and constant phenomenon in nature in many situations, human cooperation may represent an important way to manage resources and to bring to group better global results for the present and for the future. The cooperation for many other species with regard to the scale and range of cooperative activities may be represented maybe at a lower scale, although it is fundamental for some species to get food and crucial for their survival as well, in so many known situations.

The differences among the way humans and non-humans use cooperation as a strategy may bring conditions to analyse different and an enormous set of situations in which cooperation is relevant as an appropriate strategy. Anyway, for our purposes, the important to see in this study is how in the strategies employed to maintain cooperation and control free-riders, humans may use it as a strength to keep communities aggregated and unified to face difficulties risen by crisis' times as the ones that some developed countries are facing nowadays.

Cooperative behaviours may induce immediate results but sometimes the long term results are even more effective and important. However, many people often prefer the benefits of short time, for themselves considering their self-interest, than the long term benefits from cooperation, greater for all the group, with enormous advantages in a set of subjects, from which all the group may benefit, even if it is necessary to create rules with that purpose.

In many situations, inducing an effective cooperation and avoiding free-riding, it is important that a set of enforcement mechanisms are used, which conduct to higher levels of cooperation and to the effective involvement of the group elements. This may involve and may stabilize practices among unrelated individuals and in large groups (see Melis and Semmann, 2010).

Besides, cooperation may be seen also for developing activities that bring add of value. For example, in a community, cooperation in agriculture or when a house is built, cooperation in a small

community where people helps each other brings significant advantages that have to be considered in account.

5. Learning from the Experience on Previous Projects

There are many projects around the world where experience has shown how populations have benefited so many times from cooperation.

Cooperation, when players are committed and effectively involved, brings very interesting results and this kind of results is real in many parts of the world and in several eras of the History.

Now, it is time to work on this. Individuals are facing critical problems and the perspectives for the future are not optimistic. Solutions may be found in the creation of associations and through the existence of common projects involving several kind of agents, with complementing capabilities.

Prof. Ostrom thinks that traditional systems, like market and state, work well in some situations, but not in all and explains how managing resources through alternative ways may often contribute to bring wealth to many individuals.

The problem has been explained for many situations in developing countries but conclusions may be driven to the situations when difficulties happen in developed countries for these times in transition. For hard times, simple solutions may be found but considering that people have now to face a new relationship in terms of communities' frameworks. Often people are embarrassed with the situation, because often in developed countries the poverty is embarrassing. However, this situation is going to grow and cooperation in communities must grow as well to get more specific results by getting wealth through common projects induced by cooperation.

For Portuguese situation several cases can be presented to develop projects, using cooperation, for instance. Anyway, these solutions are not restrictive to Portuguese situation, obviously. Several communities may face the same problems and who have some cultural affinities that allows to face the problem by the same way, particularly in the European Mediterranean countries, now facing hard times.

For agriculture, for example, many times the resources at a low scale may be better managed at a community level**.** For some kind of cultures and several situations there are ways through which small farmers can work together effectively if they aid each other to plant and harvest together. Sometimes cooperation can be seen as a powerful way in the organization of the agriculture deal. This kind of help is not the only way to manage efficiently, but often it is a powerful way. It may be seen for managing forests or pasture lands.

6. Portuguese Socio-economic Situation and Cooperation's Advantages

Portugal is facing now severe macroeconomic measures that are affecting Portuguese people, and the habitudes of many Portuguese families are now changing drastically. The impact of brutal cuts in salaries or the increasing on fiscal charges to levels considered as unfair by the Portuguese President, or yet the rise of other kind of difficulties as the increasing of banking interest rates and other obstacles to the financial support of the economy brings a climate of hard feelings and disappointment to the Portuguese people. It is this situation the one that Portuguese people are facing now in their day to day life. In such a situation, it is important to find out new ways of living the day. Usually, people use their own resources, financial or others, to get their performances. Now, with very restrictive conditions, for many people new experiences have to be tried. The financial difficulties are conducting people to new circumstances and it is crucial that people create new habitudes for the day to day status quo.

Having in account the examples of Prof. Ostrom (see for example, Ostrom, 1990; Ostrom, 1999; Ostrom, 2000; Ostrom and Ostrom, 1977; Ostrom *et al*, 1999; Ostrom *et al*, 2002), some others can be presented in order to show the benefits of cooperation. Just to give an example, let's show some cooperation advantages in a low scale. Some local communities in Portugal in the past, and also and in particular nowadays, and even in several other places in the world, people in the community have their own sheep or goat or what else, and there is a person, different each day, that will make the pasturing. Just working as an example, it can be seen that cooperation results as a strong way to improve efficiency of the exploitation of the community's works. It is time for creating new conditions to create new real communities in which wealth may be generated like the one presented here.

Another example may be given for little villages in the countryside, where migration took people to coastal zones in the past. Now, it is possible again to bring populations to these "lost" areas. Several ways are possible. Giving incentives for people coming back, developing projects attracting people through for example local tourism projects, fixing some people there and developing infrastructures to generate a commercial area with restaurants and hostels with nature tourism activities in the area, depending on several factors, to be studied, case by case. This is true for many Portuguese places as it is for many other European Mediterranean regions. In these regions many ways of cooperating is possible, at several levels, including the cooperation among local authorities and local companies and families, organizing structures to become successful.

7. Perspectives for the Future

The social and economic perspectives, in the short and medium period, are not positive

considering the present context of the present crisis, considered at a very large sense: social, political, economical, crisis of macrostructures, considering European organizations, national organizations, local organizations and considering the way they are organized including the internal way of organization. A profound reflection is needed and a structural change got urgent. The castle is coming down and the speed of decisions is evident to be necessary.

For the future, new stages for development are crucial, based on the paradigms and on new ways of organizing central, regional and local structures of public administrations as far as changes are needed for markets, companies, and way of regulating the markets and the spaces.

In Portugal, new hard living times are expected. New ways of combining structures and ways to produce seem obvious to be necessary and governments have a hard job to deal with.

8. Conclusion

The current situation that many countries face, particularly the European, including Portugal, shows that new strategies are needed. Hard times are coming and the evidences show that new solutions have to be got. The governments look for solutions and negotiate common measures to obtain global results. However, the problems are cumulative and have been emerged from a distant time, coming from several decades ago, and solutions are not easy now to be found. Measures have been delayed for long time and politicians created embarrassing situations. Late solutions may be no viable solutions and each time that a solution is prepared it seems to be out of time.

Cooperative measures in EU governments and European Regional Organizations have been prepared, in a consensus basis and a global solution has been sought. However, particular situation of European countries is very different and results are hard to get.

In national terms, heavy measures are being implemented in several countries, in particular in Portugal, and a process of economic impoverishment of the country happens. This obliges that new solutions may be got. And cooperation may allow to solve certain kind of social and economic problems. Now, besides of that, cooperative political strategies may easy the process. The main political parties in Portugal signed a commitment to implement the measures defined with an International Work Group (from EU and IMF) known as Troika to get results in economic area, to overcome the crisis. The measures are hard to implement but this process of commitment and cooperation helps the process. Besides, new ways of micro economic cooperation need to be implemented considering the new stage of the regional and international macro-economic situation.

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