

GRANGER CAUSALITY IN PHILLIPS CURVES: DOES INFLATION RUN FROM OUTPUT TO PRICES OR PRICES TO OUTPUT IN GREECE? A PRELIMINARY ECONOMETRIC MODEL

Ioannis Laliotis

MSc in International Economics, Banking and Finance Cardiff Business School

Ioannis Sklavakis

MSc in Sustainable Development, Harokopion University

Nikolaos Bartzis

MSc in Management University of Surrey

Abstract

The aim of this paper is to examine the existence and direction of the relation between output and prices in Greece, in a short-run Granger causal sense, over the period 1986Q1-2005Q4. More specifically, the Granger causality test is employed in order to specify the direction of causality between the output gap and the surprise inflation. The expected inflation was estimated using a dummy variable in order to capture the shift of the regime after the adoption of the common currency. Next, we employed a number of recently developed time series econometric techniques such as unit root testing and multivariate cointegration. A first indication of a causal relationship between prices and output appeared after the estimation of two specifications of the Phillips, namely a New Keynesian Phillips Curve and a Lucas Aggregate Supply Function, including an exchange rate term as a second driving variable in both the formulations which, however, was found not to be statistically significant. The indication of a unidirectional causal relationship running from prices to output was further strengthened after computing the Granger test for causality.

Method

The existence of a tradeoff relationship between unemployment and inflation remains at the heart of the controversy between economists and policy-makers for several decades. Since it involves two macroeconomic variables of enormous political significance, the temptation of governments and monetary authorities to exploit it in order to deliver their desirable outcomes seems justified, even if not rational in some cases.

Although I. Fischer (1926) was the first one to perform a statistical investigation between inflation and unemployment using US data, the relation between these two macroeconomic variables gained great attention due to the influential study of A.W Phillips (1958) who discovered the negative relation between unemployment and the rate of change of money wage rates in the UK for the period 1948-1957. That statistical evidence gained some theoretical justification over the next years, i.e. in Lipsey (1960) and Samuelson and Solow (1960).

However, after experiencing the phenomenon of stagflation in the 1970s, some serious monetarist objections about the effectiveness of such a tradeoff as a policy rule were raised, mostly by the Monetarist School. Proposing the *expectations – augmented Phillips Curve*, Friedman (1968, 1977) and Phelps (1967a, b) argued that little reliance should be put on the original Phillips Curve since workers were concerned about their real wages and not the nominal ones.

But the Phillips Curve theory was about to receive much more criticism after the “rational expectations evolution” and the neoclassical economists who adopted the hypothesis that agents form their expectations rationally, using all the available information and knowing the structure of the economy. In a series of influential publications, Lucas (1972, 1973, 1976), Sargent (1971, 1973), Sargent and Wallace (1975, 1976), McCallum (1976) and Barro (1977) left a little room for effective policy intervention; assuming rational behaviour only unanticipated money growth could affect real economic variables, the tradeoff seemed to disappear in the long-run.

In the years followed, in order to justify some room for active monetary policy, new models that combined price stickiness together with rational behaviour started to gain attention. The most famous formulations of the so called *New Keynesian Phillip Curve*, were those of Taylor (1979) and Calvo (1983) and laid the foundations of later research based in models incorporating the New Keynesian Phillips Curve, with its later

modification to be just about limitless. With no exception, these models presented canonical Phillips Curves which were driven either by current real marginal cost or today's output gap and were forward-looking in the current expectation of tomorrow's inflation.

After the 1990s the Phillips Curve went through further formulation in order to fit the data, since there have been cases of economic environments of low inflation and low unemployment, so a lot of researchers presented some hybrid models, as those of Gali and Gertler (1999), Fuhrer and Moore (1995) and Roberts (1997). Generally, since the 1990s the research on the New Keynesian Phillips Curve has been huge and numerous studies have been published. This indicates that the Phillips Curve remains a popular topic and it is justified to argue that as long as there are signals of potential exploitability of such a tradeoff relation, the authorities will be always tempted to explore it, keeping the Phillips Curve in the game. Thus, in this paper we try to investigate the existence of such a relationship in a short-run causal sense.

Data

This paper will focus in the case of Greece, estimating a tradeoff relation of the kind analyzed in previous sections using quarterly Greek data covering the period between 1986Q1 and 2005Q4. The variables of the Consumer Price Index (CPI), the Gross Domestic Product (GDP), the unemployment rate, the public expenditure and the domestic demand as a percentage of the GDP were obtained from the Bank of Greece. The public deficit as a percentage of the GDP was obtained from the IMF's database. The money supply, using the definition of M1 which includes the currency in circulation and sight deposits in commercial banks, and the exchange rate of the euro against the US dollar were provided by various issues of the OECD Main Economic Indicators over the period 1987-2006. The quarterly values of the European CPI were obtained from Eurostat. The conversion from drachmae to euros before 2001 was made by own calculations using the exchange rate of euros against drachmae, 1 Euro = 340.75 Drachmae. It should be mentioned that, wherever needed, the above variables are expressed in constant prices.

Empirical Analysis

The first thing was to test our variables for a unit root process. Using an ADF test we found all our variables to be I(1) except the output gap which was I(0). After that, a necessary task before estimating a version of the Phillips Curve or testing for causality was to estimate the level of the expected inflation. Following the relevant literature, we employed the Engle-Granger two-step procedure in order to test for a cointegrating relationship among the variables that were chosen as determinants of the inflation rate (namely, the money supply growth, the public deficit as a percentage of the GDP and the change of the European CPI). Again, after performing an ADF test, these variables were found to be cointegrating, so we could use them to estimate the level of the expected inflation, using a dummy variable to capture both the regimes in the pre and the post Euro adoption era.

$$p_t = D(a_1 + a_2 m_t + a_3 pd_t) + (1 - D)(a_4 + a_5 peu_t)$$

The fitted residuals obtained from this regression provided us the level of the expected inflation.

Next we estimated two specifications of the Phillips Curve in order to get some early indications about the direction of a causal relationship. First, we estimated a NKPC formulation, but this was not quite fruitful until we took out of the sample the period 1986Q1-1990Q4 where there were some wide fluctuations of the output gap. So, for the remaining period 1991Q1-2005Q4 the estimated regression was:

$$p_t = \underset{(0.049)}{0.878} p_t^e + \underset{(0.058)}{0.124} (y_{t-1} - y_{t-1}^*)$$

It seems that the expected inflation and the lagged output gap have a good explanatory power over the inflation rate. In order to be in greater accordance with the theory, we assumed that the coefficient of the expected inflation equals to one. Under this assumption, the estimated model became:

$$p_t = p_t^e + \underset{(0.06)}{0.111} (y_{t-1} - y_{t-1}^*)$$

The coefficient of the lagged output gap was found not to be statistically significant, leading to a first evidence of a unidirectional causal relationship running from the inflation surprise to the output gap. This evidence was further strengthened when we estimated another formulation of the Phillips Curve which actually resembles to Lucas supply function. The estimated regression was the following:

$$y_t = y_t^* + \underset{(0.250)}{0.738}(p_{t-1} - p_{t-1}^e)$$

The rationale under this specification is that the output is highly related to the potential one when the actual inflation level is higher than the expected level. The coefficient of the lagged inflation surprise was statistically significant, so further evidence that the Phillips Curve runs from inflation to output was provided.

The next step was to employ the Granger test to see whether there is any causal relation between the output gap, $y_t - y_t^*$, and the inflation surprise, $p_t - p_t^e$. A simple ADF unit root test showed that these two variables were found to be stationary I(0) as shown in the table:

Table 1

Unit root ADF tests		
Variable	ADF test statistic	Probability value
$p_t - p_t^e$	-4.581	0.0022
$y_t - y_t^*$	-7.371	0.0000

The essence of the Granger's test for causality seems to be predictability. A variable, name X , is said to Granger – cause another variable Y if past values of X can offer more accurate predictions for the present value of Y . Such a relationship can be investigated in both directions, from X to Y and vice versa. We choose first to test if there is any causal relationship running from inflation surprise to the output gap. The estimated model was:

$$y_t - y_t^* = \underset{(0.001)}{0.001} + \underset{(0.129)}{0.051}(y_{t-1} - y_{t-1}^*) + \underset{(0.273)}{0.709}(p_{t-1} - p_{t-1}^e)$$

According to the above, the coefficient of the lagged inflation surprise term is statistically significant so the null hypothesis of non causality is rejected at the 5% level of significance so the inflation surprise Granger – causes the output gap. In other words, the lagged inflation surprise has a good explanatory power over the current value of the output gap so it can be argued that there is a causal relationship running from inflation to output. This finding confirms the implications provided when we estimated the two specifications of the Phillips Curve earlier in this section. Furthermore, this finding is consistent with those of Papapetrou (2001) and Tsionas (2003) which also worked using Greek data. However, the causal relationship between inflation and output seems to be a unidirectional one, but bearing in mind the estimated Phillips Curves this should not come as a surprise. Hence, as expected, when we tested the hypothesis of causality running from the output gap to the inflation surprise, the estimated coefficient of the lagged output term appeared not to be significant, implicating that there is not a causal relationship running from output to inflation

Results

The empirical analysis showed that there is a relationship between prices and output in the Greek economy. This was confirmed not only by the two estimated Phillips Curves but also from the Granger causality test between surprise inflation and output gap. Specifying the models estimated with one lag, the estimation results were in favor of a unidirectional causal relationship running from the surprise inflation to the output gap. When the deviation of the actual inflation rate from its expected level is increasing this seems to have a positive impact on the widening of the output gap which normally leads to a decrease in the rate of unemployment. Hence, unanticipated changes in the price level can affect real economic variables in the short –run.

References

- Barro, R.J., 1977, "Unanticipated Money Growth and Unemployment in the United States", *American Economic Review*, vol. 67, no. 2, pp 101-115
- Calvo, G.A., 1983, "Staggered Prices in a Utility - Maximizing Framework", *Journal of Monetary Economics*, vol. 12, no. 3, pp 383-398
- Fisher, I., 1926, "A Statistical Relation between Unemployment and Price Changes", *International Labour Review*, vol. 13, no. 6, pp 785-792
- Friedman, M., 1968, "The Role of Monetary Policy", *American Economic Review*, vol. 58, no.1, pp 1-17
- Friedman, M., 1977, "Nobel Lecture: Inflation and Unemployment", *Journal of Political Economy*, vol. 85, no. 3, pp 451-472
- Fuhrer, J. and Moore, G., 1995, "Inflation Persistence", *Quarterly Journal of Economics*, vol. 110, no. 1, pp 127-159
- Gali, J. and Gertler, M., 1999, "Inflation Dynamics: A Structural Econometric Analysis", *Journal of Monetary Economics*, vol. 44, no. 2, pp 195-222
- Lipsey, R.G., 1960, "The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1862-1957: A Further Analysis", *Economica*, vol. 27, no. 105, pp 1-31
- Lucas, R.E. Jr., 1972, "Expectations and the Neutrality of Money", *Journal of Economic Theory*, vol. 4, no. 2, pp 103-124
- Lucas, R.E. Jr., 1973, "Some International Evidence on Output - Inflation Tradeoffs", *American Economic Review*, vol. 63, no. 3, pp 326-334
- Lucas, R.E. Jr., 1976, "Econometric Policy Evaluation: A Critique", *Carnegie-Rochester Conference Series on Public Policy*, vol. 1, pp 19-46
- McCallum, B.T., 1976, "Rational Expectations and the Natural Rate Hypothesis: Some Consistent Estimates", *Econometrica*, vol. 44, no. 1, pp 43-52
- Papapetrou, E., 2001, "Bivariate and Multivariate Tests of the Inflation - Productivity Granger - Temporal Causal Relationship: Evidence from Greece", *Journal of Economic Studies*, vol. 28, no. 3, pp 213-226
- Phelps, E.S., 1967a, "Phillips Curves, Expectations of Inflation and Optimal Unemployment over Time", *Economica*, vol. 34, no. 135, pp 254-281
- Phelps, E.S., 1967b, "Money-Wage Dynamics and Labor-Market Equilibrium", *Journal of Political Economy*, vol. 76, no. 4, pp 678-711
- Phillips, A.W., 1958, "The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957", *Economica*, vol. 25, no. 100, pp 283-299
- Roberts, J.M., 1997, "Is Inflation Sticky?", *Journal of Monetary Economics*, vol. 39, no. 2, pp 173-196
- Samuelson, P.A. and Solow, R.M., 1960, "Analytical Aspects of Anti - Inflation Policy", *American Economic Review*, vol. 50, no. 2, pp 177-194
- Sargent, T.J. and Wallace, N., 1975, "Rational Expectations, the Optimal Monetary Instrument and the Optimal Money Supply Rule", *Journal of Political Economy*, vol. 83, no. 2, pp 241-254
- Sargent, T.J. and Wallace, N., 1976, "Rational Expectations and the Theory of Economic Policy", *Journal of Monetary Economics*, vol. 2, no. 2, pp 169-183
- Sargent, T.J., 1971, "A Note on the 'Accelerationist' Controversy", *Journal of Money, Credit and Banking*, vol. 3, no. 3, pp 721-725
- Sargent, T.J., 1973, "Rational Expectations, the Real Rate of Interest and Natural Rate of Unemployment", *Brookings Papers on Economic Activity*, vol. 1973, no. 2, pp 429-480
- Taylor, J.B., 1979, "Staggered Wage Setting in a Macro Model", *American Economic Review*, vol. 69, no. 2, pp 108-113
- Tsionas, E., 2003, "Inflation and Productivity: Empirical Evidence from Europe", *Review of International Economics*, vol. 11, no. 1, pp 114-129

DECISION MAKING UNDER RELATIVE UNCERTAIN CONDITIONS IN HOTEL SECTOR: DECISION TREES

Dr. Dimitris Laloumis

Ass. Professor in Tourist Enterprises Department
T.E.I of Athens

Abstract

The position of an enterprise in given time is consequence of decisions taken in the past. Decision-making is influenced by many factors, and mostly by conditions and people who make the decision. A method that facilitates decision-making is called decision trees, where possible alternatives are examined extensively; so that the best is selected. However, this does not mean that the appropriate conditions for making the most suitable decision always exist.

Special Features of Hotel Enterprises

The hotel product is polymorph and complex, compiled of separate different products. These products are delivered at different moments in different places by different people.

Many of the services composing the hotel product are consumed when produced and cannot be in a client's possession because of its non-material nature. Due to this, there is often no ability to make corrections in case of defective products, except for the ability to reduce the cost of damage.

Hotels demand highly-rated investments in fixed cost. The numeral supremacy of fixed assets in relation to floating assets is obviously shown on balance sheets. This is why hotels belong to intense-fixed cost enterprises.

The business risk increases as the investment budget rises and the time between the production and the income of sold products expands. Hotels combine both of these negative assets, and are ranked as among those functioning in conditions of high danger.

The productivity in hotel enterprises is absolutely inelastic (cannot get higher in case of price reduction), as long as it is related to the existing premises; because the productivity of the agreed services is limited by the capacity of the hotel.

In the hotel sector, the constant expenses are ostensibly higher, compared to the variable ones. The constant expenses which stem from the premises (amortizations or rents, taxes and maintenance) are high due to the impact of fixed costs to the property total.

Hotels are characterized by continuous production even when no demand exists. While the demand fluctuation is frequent and intense; the hotel cannot increase and decrease its staff, correspondingly, particularly the specialised ones. For this reason, during its functioning period it maintains a minimum number of staff that could be called Safety Staff. So, in spring, the vast majority of Greek season hotels has many empty although ready for use rooms, and can serve the 100% of its capacity in departments. Therefore, the salary payment is not very elastic as compared with the production level, while it is a big part of the cost percentage, no matter what happens with the hotel occupancy rate.

From an economical point of view, these factors lead hotel enterprises into a difficult position of binding the production inelasticity together with the cost inelasticity.

In combination with the low percentage profit of hotel activities, the facts above force the sector to use the maximum space of installations. Basically, this means that hotels have to achieve the highest possible occupancy percentage.

A necessary requirement for the achievement of this goal is the conception of most profitable decisions, often in very limited time space.

Making Business Decisions

Decision is the choice made after thinking. Consequently, decision making essentially requires having more than one choice in order to make a comparison. **For this reason, the decision defines as much of what someone chooses as well as what choice is discarded.**

Business decisions deal with the need of changing a situation, then controlling the possibility of a change. This change has to do with the transformation of an in-effective situation to another one, most desired. The hotel management has to make the decision whether or not to carry out this change, and also find out the most appropriate action to make it happen.

Decisions often lead to changes disordering the normal enterprise function. The significance of each time decisions is major for determining the course of the hotel enterprise, because **its present position is a consequence of past decisions**. This is why managers must have no doubts to make these important changes.

It is not always easy to make the correct decision, because most times important information is missing and enterprise executives lack the necessary skills and know-how for information processing; or even more, information processing does not lead to secure results but to possible ones. Making the correct decision requires the appropriate people, supported by suitable information, to use the right methods. Nowadays, personal computers can contribute significantly to issues of decision taking, since the problem we deal with is specific and its variables can be countable.

Decision Makers and Conditions of Conceiving

Decisions can be made in conditions of:

◇ **Certainty**, in which the results of the decision are certain. For example, a seasonal hotel can easily decide against a proposal of an agency of little importance, to book over allotment in high season.

◇ **Partial uncertainty**, in which alternatives' odds can be measured. For example, a known tourist agency proposes a low demand hotel a three-year exclusive collaboration, promising high fullness percentage.

◇ **Uncertainty**, in which alternatives cannot be measured. For example, an unknown tourist agency proposes exclusive collaboration, but with exorbitant rates.

The level of uncertainty depends on the conditions and the sector's environmental altered rates, and also on the complexity and the sensitivity of the enterprises¹. Hotel enterprises are complex and sensitive, often facing a slowly changing environment, however showing high sensitivity in economical and political changes, as well as in social changes.

The very same conditions can be received by one enterprise as the cause of high uncertainty, while not by another. This happens because what defines the level of uncertainty are not the environmental conditions themselves, but the environmental information received by the enterprise along with its processing level. Thus, during the Gulf War, some hoteliers were concerned and took measures to overcome the forthcoming situation, while others ignored the possible problems that could appear.

Uncertainty pushes the enterprises for structures guaranteeing the ability to adapt in their environment. Enterprises not facing the problem of high uncertainty tend to build cumbersome and bureaucratic structures; while enterprises facing certainty conditions prefer more flexible structures.

The significant decisions determining the fate of a hotel enterprise are taken by people whose relation with the hotel varies, just as under different circumstances. Based on this concept we can distinguish two cases²:

Decisions Made by the Businessman – Creator of the Enterprise

The creator of the enterprise bears the palm of administration, feels totally connected with it and seeks its development more than its problem solving. The businessman knows the weaknesses and the advantages of the enterprise and trusts his business instinct, often making risky decisions.

Decision-Making in Situation of Adaptation The businessman – manager coincidentally took the lead of the enterprise and is in situation of adaptation. In this case, he manages without knowing the corporal operations in depth, giving more significance to dealing everyday problems rather than configuring strategic growth. The received decisions, consequently, are usually of small importance.

Avoidance Decision Making. Avoidance decisions are those which aim at avoiding damage, without aiming the best possible choice. For this reason there are solutions to be chosen that:

- o ignore problems (by hoping they stop existing)
- o are connected with another usual way of reaction with no consideration whether it is the appropriate
- o reduce conflicts between people or teams.

Of course, these solutions do not look forward to growing the enterprise.

¹ Mpourantas D. «Management» Mpenos Athens 2001

² Papadakis B. «Business strategy, Greek and International Experience» Mpenos, Athens 1999

Making Decisions of Sensible Amendments. This concerns decisions of small importance, after systematical processing of information focused on the changes of the environment, targeting the continuous adaptation of the enterprise.

Making Decisions Under Multiple-Guided Centres. These entail decisions taken under situations of conflict between members of the management. It is a quite often phenomenon at hotels managed by families, where the conflicts take place not only between family members, but moreover between the family and the manager or the enterprise executives. The prevailed decisions come from compromising and retreating.

Making Culturally Influenced Decisions. These decisions can be made by different decision centers over an enterprise, but the enterprise culture provides these decisions with a common direction resulting in the creation of a uniform dynamic enterprise development. Of course, the necessary requirement is the prevalence of a remarkable enterprise culture in all enterprise levels.

Decision Making Under Confusing Conditions. These are decisions taken by imposing groups upon the administration. Having not a specific direction, not only do these decisions not serve a strategy but also they do not serve the enterprise itself.

Decision Making Under Pressure. The hotel sector is characterized by the constant fluctuations in its service demand. It is a frequent phenomenon to observe pressure created for productivity without being given the necessary means or time space. In this case, the executives are required to take decisions under pressure.

Decision Trees. The decision trees are diagrams of consecutive choices and their possible consequences in conditions of relative uncertainty. The diagram depicts the branches of different possibilities and leads to problem analysis in order to reveal the most profitable solution.

In the tree diagram, the nodes are points of decision or incidental events while the lines depict each choice. The initial problem is analysed in possible solutions and afterwards the possible results of each solution are traced. These results may constitute issues for analysis in order to create a tree with branches constantly increasing until the possible solutions to be found.

On a decision tree two kinds of nodes, the **decision nodes** (symbolized with a small square) and the **nodes of incidental events** (symbolized with a circle)³

To proceed on making decisions with this method, we necessarily have to describe factors influencing the problem. These factors are:

- ◇ Mission statement
- ◇ Purpose
- ◇ Time available
- ◇ Resources available - space
- ◇ Problem solving manager – administrative skills
- ◇ Funds available

Solutions opposing to the specifications above must be rejected or considered after much attention.

For example (watch scheme 1), we make the hypothesis that the marketing department of a 500 bed hotel functioning 365 days per year, estimates that if it operates an advertising campaign, the maximization of its fullness is possible. Consequently the hotel income can be counted by the product:

$$500 \times 100 \times 365 \times (\text{ADF}) = 18,25 \text{ million} \times (\text{ADF})$$

ADF is average daily fullness.

It is also considered that there is a 60% chance of high demand and a 40% chance of low demand. More precisely it is appreciated that:

- If operating a 100,000 € advertising campaign, in case of high demand the occupancy will reach 90%, while in case of low demand the occupancy will drop to 80%.
- If operating a 80,000 € advertising campaign, in case of high demand the occupancy will reach 80%, while in case of low demand the occupancy will drop to 70%.
- If not operating an advertising campaign, in case of high demand the occupancy will reach 60%, while in case of low demand the occupancy will bottom-out at 50%.

³ Decisions taken under Bayes' criteria. In program, the nodes are created by the interrelation MAX(x1,x2,...,xn), and the nodes of incidental facts by the interrelation EMV(p1%;event1;p2%;event2;;;pn%;event n). «pn» equals the odd of facing the n-th fact.

With the facts above there is the creation of a tree same as that of scheme 1. The first solution appears to be the most preferable; because the expected income excluding campaign expenses is $7,855+3,84=€11.695$ million, while the second solution brings $7,56+3,91=€11,47$ million and the third one $6,75+3,65=€10,4$ million. The calculations are now done by computers. Widespread softwares are:

Decision Tools Suite which is a complete sum of five products designed to cooperate in the area of combining analysis targeting the best analysis of decisions in a complete set. Decision Tools Suite includes the programs: **RISK**, **PrecisionTree**, **TopRank**, **BestFit**, and **Riskview**. These programs are designed to cooperate in a complete interface as they function through a common Microsoft Excel toolbar.

- **DecisionPro** which can solve problems of decision making in a simple way, as shown in scheme 2.

TRUE shows the branch of the decision tree which offers the most advantageous solution, while FALSE shows the branches with disadvantageous solution(s).

Obstacles in Decision Making

Many obstacles can affect the make of the orthologic decision.

Managers and the rest of the staff do not have the demanded time to make an orthologic decision. Knowledge, information and know-how which can serve the procedure of making decisions, may not be available.

Sometimes the people responsible to make decisions do not have an analytic and composed way of thinking which are necessary for decision making, or they lack necessary creativity to detect satisfying solutions.

Other times, they decide by choosing a learned habit of theirs, meaning that they bring back a solution from similar past problems, often not having observed the diversity of the current situation.

The biases and the stereotypes which possess people, that is to say the shaped perceptions with regard to various subjects, frequently prevent the rational analysis of problems. Thus, it is possible that a director considering the young people as flippant, impedes the advancement of appreciable young people to executive level, when facing important problems of discovering capable executives.

References

- Drucker Peter "The Practice of Management" Heinemann, London, 1954
Fred David «*Strategic Management*» Merrill, 1989
Glueck W. and Jauch L. "Strategic Management and Business policy" McGraw-Hill 1984
Goffee R. & Jones C. "What Holds the Modern Company Together" Harvard Business Review, November-December 1996
Jones William. «*On Decision Making in Large Organizations*». Rand corp. Santa Monica. 1964
Mintzberg H. & Waters J. "Of Strategies - Deliberate and Emergent" Strategic Management Journal 1985, pp 257-273
Zeugaridis K. Spyros. «*Management Lessons*» Institute of Education and Management, Athens
Zeugaridis K. Spyros. «*Organizing and Managing*». Kyriakidi. Thessaloniki 1983.
Keiser R. James «*Hotel Enterprise Management*» Hellin, Athens 2000
Kotler Ph. «*Marketing Management*» Interbooks Athens 1994
Laloumis D. «*Hotel Management*» Stamoulis, Athens 2003
Mpourantas D. «*Management*» Mpenos Athens 2001
Papadakis B. «*Business strategy, Greek and International Experience*» Mpenos, Athens 1999
Pistofidis Chr. and Tsoukas Char. «*Contemporary Enterprise Organising*» ASE, Thessaloniki 1989
Prastakos Grigoris «*Management Science*» Stamoulis, Athens 2000
Rutherford D. G «*Hotel, Management and Functions*» Hellin, Athens 1999
Chassiotis Vassilios «*Introduction to Strategic Management Principles*» Athens, Stamoulis 1998

Figures

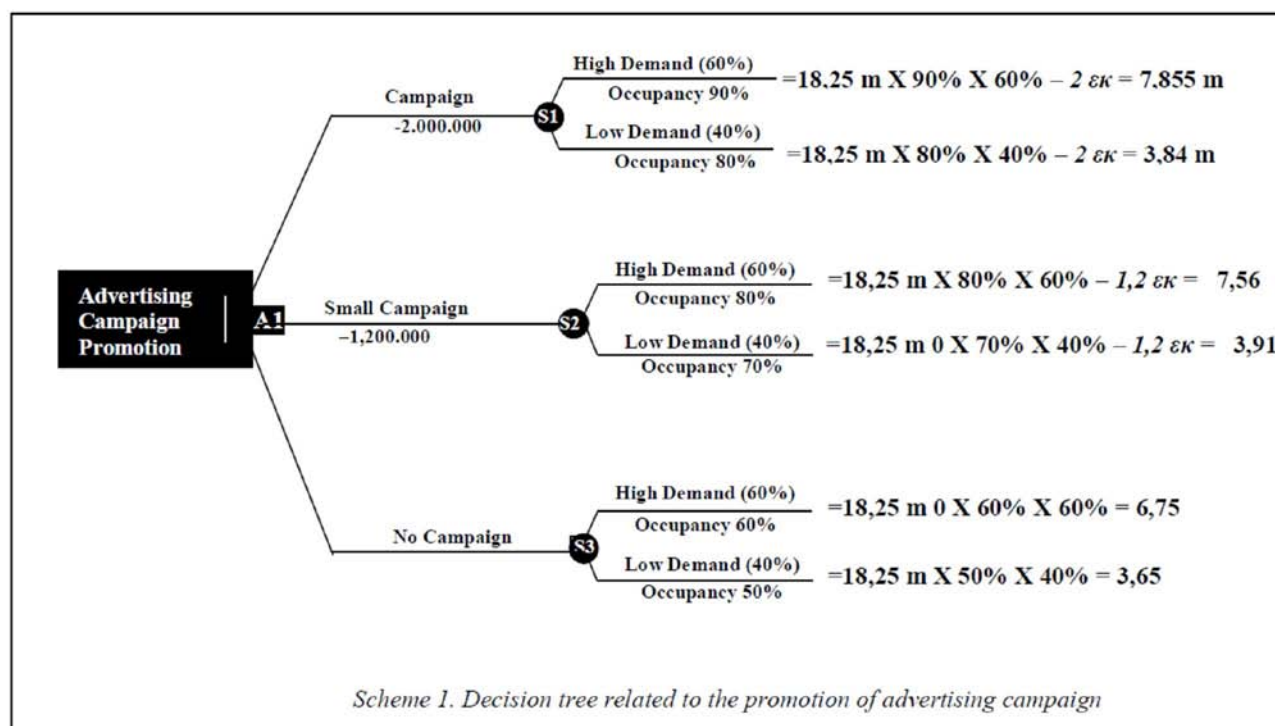


Figure 1. Decision tree related to the promotion of advertising campaign

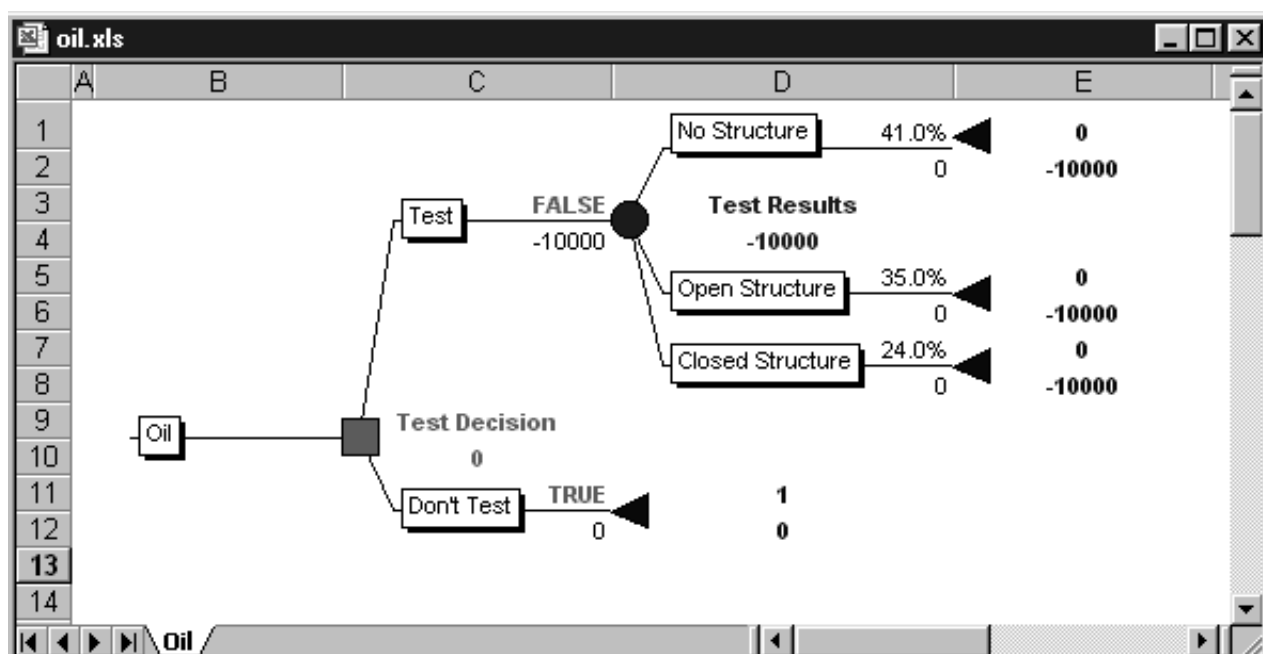


Figure 2. DecisionPro Program