The differential effect of revenue rises and cost savings on investors' valuation of growth options. Evidence from a comparative case in the electricity business *

El efecto diferencial de los aumentos de ingresos y los ahorros de costes en la valoración de las opciones de crecimiento por parte de los inversores. Evidencia aportada por un caso comparativo en el sector eléctrico

Susana Alonso Bonis **. Universidad de Valladolid
Valentín Azofra Palenzuela. Universidad de Valladolid
Gabriel de la Fuente Herrero. Universidad de Valladolid

ABSTRACT This paper seeks to analyze the way investors consider growth option values when pricing equity. To achieve this objective we study the effect on stock prices of a comparative case of direct foreign investment involving acquisition of two different growth options, whose valuation has already been well-documented in prior literature. The case consists of the two sequential investment stages carried out in the Chilean group Enersis by the Spanish electricity company Endesa in the second half of the 1990s. The effect of growth option values on investors' expectations is analyzed on the basis of the abnormal returns in the period around the time of the investment announcement. Our results show that a growth option which value comes from future rise in sales has a greater impact on stock returns than that of a growth option whose value is based on cost savings.

KEYWORDS Real options; Corporate valuation; Abnormal returns; Case study; Capital budgeting.

RESUMEN En este trabajo se analiza la forma en que los inversores consideran los valores de las opciones de crecimiento al establecer los precios de las acciones. Para conseguir este objetivo estudiamos el efecto en los precios de los títulos de un caso comparativo de inversión directa en el extranjero, que implica la adquisición de dos opciones de crecimiento diferentes, cuya valoración está bien documentada en la literatura previa. El caso se refiere a las dos etapas secuenciales de la inversión llevada

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** **Corresponding author:** Susana Alonso Bonis. Departamento de Economía Financiera y Contabilidad. Universidad de Valladolid. Avda. Valle del Esgueva, 6, 47011 Valladolid. Tel. + 34 983423334. Fax: +34 983183038. E-mail: salonso@eco.uva.es

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a cabo por la eléctrica española Endesa en el grupo chileno Enersis, en la segunda mitad de los años 90. Se analiza el efecto de los valores de la opción de crecimiento en las expectativas de los inversores sobre la base de las rentabilidades anormales en el intervalo de tiempo alrededor del anuncio de inversión. Nuestros resultados muestran que una opción de crecimiento cuyo valor procede de los futuros incrementos de los ingresos tiene un impacto mayor en las rentabilidades de los títulos que la opción cuyo valor se basa en los ahorros de costes.

PALABRAS CLAVE Opciones reales; Valoración de empresas; Rentabilidades anormales; Estudio de casos; Presupuesto de capital.

1. INTRODUCTION

This paper analyzes the impact of real options value on stock prices. According to the real options approach (Kester, 1984), the market value of a firm's equity, E_0, is the sum of the present value of assets-in-place attributable to its shareholders, E_0^{AiP}, and the present value of its growth option portfolio E_0^{GO}:

$$E_0 = E_0^{AiP} + E_0^{GO} \quad (1)$$

Assets-in-place (henceforward *AiP*) refers to the commitments already undertaken by the firm: that is, current investment already accepted. The value of this component derives from the stream of cash-flow generated over time, and is equivalent to what the traditional discounted cash-flow (*DCF*) model attributes to the company as a whole. However, the value of a firm's assets comes not only from ownership of cash-flow as generated by a given resource allocation, but also from ownership of the resources themselves and, hence, from cash-flow generated by any other alternative allocation (Andrés *et al.*, 2005). Growth option (henceforward *GO*) portfolio refers to these rights to decide the allocation of resources which have value, to the extent that they affect future cash-flow. Estimating this source of value is the main goal of the real options approach.

In an efficient market, a change in any of these corporate sources of value, such as from a new investment, should be reflected in stock prices and, therefore, in market returns. Prior empirical literature has analyzed the relevance of *GO* values mainly through evidence provided by case study research. Focusing on the valuation of *GOs* embedded in a particular investment has the advantage of allowing in depth study of the value creation process, and the variables on which it depends [(1)]. Some evidence also exists for addressing the impact of real options on market values through indirect approximation in a sample of firms, assuming efficient markets (Kester, 1984; Berger *et al.*, 1996; Danbolt *et al.*, 2002; Andrés *et al.*, 2006; Alessandri *et al.*, 2007).

However, one issue which remains unexplored is analysis of the impact of real options value on stock prices from the perspective of market inefficiencies. Previous empirical findings of market anomalies, such as size, calendar, momentum or value effect, among

(1) Numerous case studies have been carried out in the area of natural resources due to the greater availability of information (Sick, 1989). More recently, this evidence has extended to biotechnology (Micalizzi, 1999; Kellogg and Charnes, 2000; Stark, 2001; León and Piñeiro, 2004; Rubio and Lamothe, 2006), Internet portals (Sáenz-Diez *et al.*, 2008), taxi licenses (Albertí *et al.*, 2003), real estate investment (Rocha *et al.*, 2007), and automobile component suppliers (Azofra *et al.*, 2004).

others, raise the question as to whether stock prices accurately reflect the *GO* value. Our aim is to analyze the relation between a firm's stock prices and the value of its *GOs*. Our interest stems from the intuition that even if equation (1) were right, not all types of *GOs* would be correctly valued by investors.

In the presence of information inefficiencies, we should consider that investors might attach different value attributes to equivalent sources of value. Swaminathan and Weintrop (1991) and Ertimur *et al.* (2003) find that investors react more strongly to an earnings surprise induced by a dollar of sales increase than by a dollar of cost savings. Furthermore, Ertimur *et al.* (2003) provide evidence that these differential market reactions are stronger in the case of growing/emerging companies (in the initial stages of their life cycle) than in the case of value firms. One possible explanation for this asymmetry is that investors interpret information as a sign of persistence and/or noise, and react more strongly to any surprise which is more permanent and/or less noisy (Ertimur *et al.*, 2003; Berger, 2003).

This evidence suggests that investor reactions may differ when valuing a firm's *GOs,* depending on its main value source. The value attained by a company from exercising a *GO* may increase mainly from two sources: an increase in its revenues, or a saving in costs. To the extent that a revenue increase is more frequent in the initial stages of a firm's life cycle, it may be considered a more permanent source of value. Similarly, since a reduction in expenses is more typical in the latter stages of a company's life cycle, its effect on value may be considered less recurrent or more transitory. This effect may be greater in the presence of market inefficiencies and information problems as investors will be more prone to interpret all types of signs in order to generate their return expectations.

Therefore, we posit the hypothesis that, in the presence of information problems, investor reactions are stronger for the acquisition of a *GO* whose value comes from a sales increase than for the acquisition of a *GO* whose value is based on cost savings.

We evaluate this hypothesis by analyzing returns over a period of time around the announcement of two sequential corporate investment decisions involving the acquisition of different *GOs*. This case consists of actual investments made by the Spanish company Endesa when seeking to gain control of the Chilean electricity group Enersis in the second half of the 1990s. We consider that studying stock price variations associated with a firm's two consecutive investments is an appropriate research strategy for two main reasons. Firstly, focusing on a case study makes it easier to attain the value of *GO,* which is otherwise an almost unobservable variable; and secondly, examining the effect of two *GO* acquisitions undertaken close in time and by the same firm, although differing in the nature of their value source, allows us to isolate and compare in depth the relevant evidence for the problem under consideration.

The cases analyzed are representative of investments known as «strategic» or «necessary» which are accepted despite their negative Net Present Value (henceforward, *NPV*). These investments could reflect a particular case of the agency problem of free cash flow. In fact, other authors, such as Trillas (2001), have analyzed the same operation, concluding that it was a sub-optimal investment which destroyed shareholder value. However, it might also reflect an efficient decision with a strategic value beyond the expected value of direct cash flows, emerging from the fresh opportunities to open up for the firm, as

shown by Alonso *et al.* (2009a and 2009b) [(2)]. These two papers analyze the initial and final investment in Enersis, respectively, and interpret each as a means of improving the value of Endesa's *GOs* in the Latin American electricity business. Our analysis is based on the research findings reported in these previous papers and explores the relation between real option value estimates and stock price movements on the basis of the analysis of abnormal returns in an event window. That is, we take GO value estimates in Alonso *et al.* (2009a and 2009b) as given and use them, together with our estimations of abnormal returns presented in section 4, to test the hypothesis concerning the impact of the nature of the *GO* on the firm's stock price.

These two investments match the criteria of providing *GOs* of a different nature and, therefore, are representative of the phenomenon studied. The first investment involved acquiring 29.04% of Enersis equity plus the option to control its future *GOs* in the Latin American market. Specifically, Endesa would obtain the option to invest in the Brazilian electricity distribution market. The value resulting from this option exercise emerged mainly from increased sales. The second investment was designed to gain a majority control of Enersis. This control provided Endesa with the option of taking control of the generating company, Endesa Chile, through the Chilean holding itself. The benefits of exercising this option were based mainly on cost savings as a consequence of both integrating production and distribution operations, and the transfer of Endesa's experience as an efficient vertically integrated company.

Our analysis shows that the sign and significance of cumulative abnormal returns (henceforward *CARs*) in windows close to the announcement of the investment depend on the nature of the *GO*. In the case of the first investment in Enersis, which was designed to gain control over future sales growth, the *CARs*, above all in the days prior to the announcement, are statistically significant and positive. By contrast, in the second investment, the *CARs* obtained in the days prior to the announcement are statistically not different from zero, although those *CARs* obtained in the days following the announcement are significant and clearly negative. In this case, the major benefits to emerge from exercising the *GO* were felt to be the expense reductions achieved by transferring Endesa's know-how.

The remainder of the paper is structured as follows: section 2 describes the methodology; section 3 explains the main characteristics of the comparative case where we present the analysis of the *CARs* of Endesa shares. We show the relation between them and estimated *GO* values in sections 4 and 5, respectively, for the first and second investments; Section 6 discusses the main findings, and section 7 concludes the study.

2. METHODOLOGY

Under the efficient market hypothesis, any change in the nature of the components in equation (1) should be reflected in the market value of shares. This means that any announcement of such a variation should imply a change in expected returns and, consequently, in stock prices. Accordingly, we explore the relation between the

(2) There is a third possible explanation based on managerial overconfidence: Overconfident managers tend to overestimate the accuracy of available information and their ability to control it, leading them to accept unprofitable investments (Gervais, 2010).

announcements of the two corporate investments undertaken by Endesa, their *AiP* and *GO* imputed values, and stock prices.

To assess the pricing effects of these events, we estimate the *CAR* in a time window around the announcement dates of both investments (3). We obtain the *CAR* for different periods of time around each announcement date. The *CAR* from Day t_1 before the announcement date to Day t_2 after the announcement date is calculated by adding the daily abnormal returns (henceforward *AR*):

$$CAR(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_t$$

We compute AR_t as the difference between the observed return (R_t) and the «normal» or risk-adjusted return, as shown in the following equation:

$$AR_t = R_t - \hat{\alpha} - \hat{\beta} * R_{M,t} \quad (2)$$

where $\hat{\alpha}$ and $\hat{\beta}$ are the ordinary least squares (*OLS*) estimated coefficients for the market model:

$$R_t = \alpha - \beta * R_{M,t} + \varepsilon_t \quad (3)$$

$R_{M,t}$ being the market return, α the expected return which is independent of the market, β the beta coefficient and, finally, ε_t a zero mean disturbance with a time invariant constant. The market model is based on the assumption that asset returns are jointly normal and temporally independent and identically distributed. Given this assumption, the estimated *OLS* coefficients are efficient and consistent.

The abnormal return is the disturbance term of the market model. Under the null hypothesis that the event has no effect on stock price and is conditional on the market return over the event window, the abnormal returns will be jointly normally distributed with a zero conditional mean and conditional variance which has two components: *(i)* the first component is due to future disturbances, and *(ii)* the second is the additional variance induced from sampling error in the parameter estimates. This second term approaches zero asymptotically as the length of the estimation period increases and, in finite samples, the sampling error induces serial correlation in the abnormal return (4).

We compute normal returns using a period of 180 days of returns prior to the event window used when calculating the *CAR*. As the market return, we use the IBEX-35 Index return. The significance of the *CARs* is analyzed through the *t* statistic such that, if they are significant, the null hypothesis that the *CARs* are equal to zero is rejected.

To explore, firstly, the impact of these investments on Endesa's *AiP* and *GO* values, and, secondly, the relationship between the variation of the latter and the variation of Endesa stock prices, we use the findings in Alonso *et al*. (2009a and 2009b). In these papers, the value of the *AiPs* was estimated by using an adaptation of the Kester model (1984) and expected earnings per share from analysts' mean consensus forecasts in

(3) To compute CARs, we follow the standard methodology in the literature of Event Study (Fama *et al*., 1969; Campbell *et al*., 1997; Mackinlay, 1997; Binder, 1998; Aktas et al., 2007).

(4) For a more detailed explanation about statistical properties of abnormal returns see Mackinlay (1997).

the Institutional Brokers Estimate System (I/B/E/S) historical database. Values of the *GO* embedded in these investments were estimated by using an adaptation of the proposal by Longstaff and Schwartz (2001). In appendices 1 and 2, we present the main valuation assumptions, inputs and results for both *AiP* and *GO* values carried out, respectively, in Alonso *et al*. (2009a and 2009b).

3. THE INVESTMENT CASES

Announcement of the investment agreement signed between heads of Endesa and Key Managers (a small number of executives who exercised effective control of the Enersis Board) took place on 30 July, 1997. Enersis was the leading private electricity holding in Latin America controlling the Chilean electricity market —in production through Endesa Chile, and in distribution through Chilectra— and holding major interests in electric companies in Argentina, Peru and Brazil.

This initial agreement allowed the Spanish company to acquire 29.04% of Enersis equity, and to attain control over its future foreign investment opportunities, in exchange for payment of 1,500 million dollars, 2/3 financed by debt. Enersis' shareholder structure shaped the way in which Endesa's entry into the Chilean group's capital was conceived, and was what ultimately led to a review of said initial investment. In terms of «ownership rights», the main shareholders in Enersis were the Pension Fund Administrators (PFAs) who held 32% but who, through legal imperative, had no involvement in the running of the company, a task delegated to the Key Managers. The second main shareholder in Enersis was Chispas, who held a 29.04% share in Enersis in terms of «ownership rights» and control over whom was in the hands of the Key Managers [(5)]. The main terms of the deal between Endesa and the Key Managers were: firstly, Endesa would obtain a majority of equity in Chispas, by paying a present value of 1,000 million dollars for 29.04% of «ownership rights» associated with the stake of Enersis employees or previous employees. Secondly, Endesa would sign certain management contracts with the Key Managers to obtain 100% of the «decision rights» by paying a present value of 500 million dollars. Finally, the agreement also included setting up Endesis whose mission was to channel Endesa and Enersis' investments in Latin American. In accordance with what was established, Endesa would control 55% of Endesis, while the remaining 45% would be controlled by the Chilean group.

Despite its initial plans, Endesa's primary investment did not allow them to obtain the desired control over Enersis. The main reason was mistrust amongst Enersis shareholders regarding the clauses of the initial deal. Three months after this agreement, in late October 1997, the agreements signed were reviewed extensively, the main consequence for Endesa being the loss of the decision rights linked to the Key Managers' stake, although acquired ownership rights were maintained. A new way of deciding future joint investments was established which involved analyzing each opportunity individually and equal shareholding of both groups. In exchange, breaking the initial agreements freed the Spanish company from paying 250 million dollars. However, the

(5) The Key Managers' involvement in Chispas capital was only 0.06% although this was in the form of so-called «B shares» which gave them the majority of decision rights. In addition to the B shares, Chispas' capital was made up of «A shares», which were mainly in the hands of employees or former employees of the Enersis group, and accounted for 99.94% of the total. These afforded more dividend share rights but less participation in administrative control.

situation after renegotiation did not respond to Endesa's expectations: 1,250 million dollars had been spent to acquire 29.04% of the ownership rights and 0% of the control rights over Enersis. The Spanish company was the main shareholder in Enersis in terms of ownership rights but controlled only three of the seven member Board of Directors.

This remained the situation for one year during which time the second main shareholder in Enersis, the Pension Fund Administrators (*PFAs*), exercised effective control over the Board. The *PFAs'* objectives clearly differed from those of the Spanish company: while Endesa's aim was to use Enersis as a vehicle through which to channel future investments in Latin America, the *PFAs* —without the financial muscle to undertake Endesa's expansion plans— were interested in selling their stake in Enersis and its affiliated generating company, Endesa Chile [6]. Additionally, the interest shown by certain American firms in acquiring Enersis' 25.3% share of Endesa Chile's capital only served to heighten tension amongst Enersis shareholders.

At the end of December, 1998, the Enersis Board of Directors proposed the sale of its stake in Endesa Chile in order to improve Enersis cash flows. The decision was a direct setback to Endesa's plan to expand in Latin-America. Endesa therefore opted to continue investing in order to gain control of Enersis as a means of halting the separation of Endesa Chile [7]. As a result, on 23 January, 1999, the Spanish company launched a takeover bid for 32% of Enersis at a price of 1,450 million dollars to attain control of the company and thus try to avoid having to disinvest in Endesa Chile.

Endesa's investment in Enersis equity allows us to identify two different investment cases with their own implications for both sources of value: *AiP* and *GO*. These two events correspond, respectively, to the initial agreement announced on 30 July, 1997 and the announcement of the second takeover bid for Enersis on 23 January, 1999.

The initial investment agreement with Enersis allowed Endesa to acquire 29.04% of the cash flows which the Chilean Group *AiPs* were expected to generate. Further, it allowed the Spanish company to control future Enersis *GOs* in the Latin American market. Specifically, the main option identified at the time arose from the privatization of the electrical distribution business announced by the Brazilian government in July 1997 and subsequently put into effect over the following five years [8]. In consequence, the project's sources of value were the *AiP* value corresponding to the stake in Enersis equity, and the growth option value corresponding to the investment opportunity in electrical distribution in Brazil. Each of these sources of value has been analyzed in a previous paper (Alonso *et al.*, 2009a). We thus take these results for our study. According to Alonso *et al.* (2009a) the Extended NPV derived from the initial investment in Enersis equity is the difference between the initial outlay of 1,500 million dollars, and the sum of the present value of the *AiPs* corresponding to the stake in Enersis equity and the present value of the *GO* in electrical distribution in Brazil. The benefits to emerge from exercising this option were based on the increase in future cash-flows resulting from the spread of Enersis operations in Latin America.

(6) The importance of Endesa Chile for Enersis was clear. Endesa Chile accounted for 12% of revenue, 14.3% of operating results, and 28.3% of net profit for Enersis in 1997.

(7) If Endesa directly bid for 25.3% of Endesa Chile, the price of its investment strategy would entail a major increase.

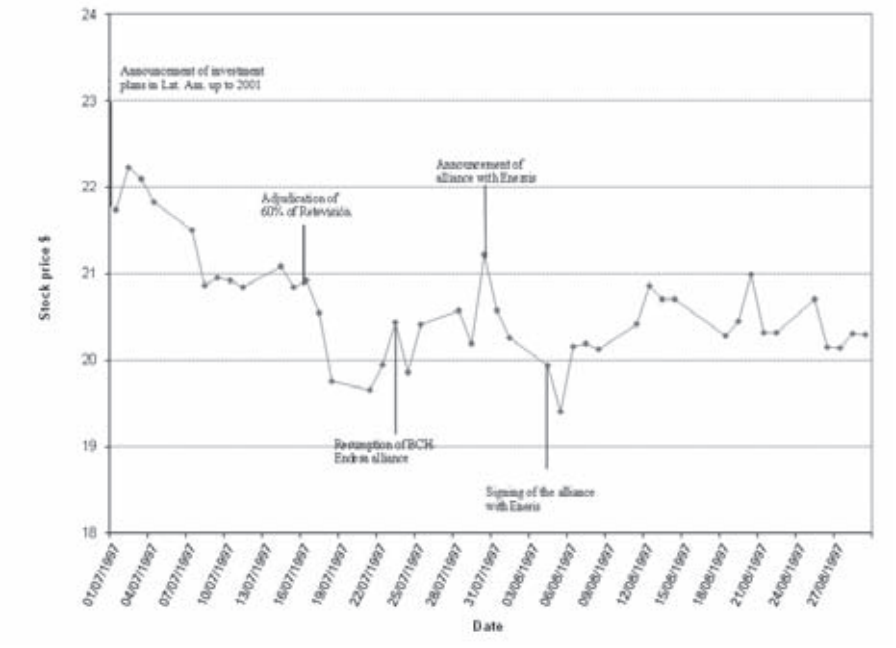
(8) Said information contributed towards generating a favorable climate *vis-à-vis* the creation of growth opportunities in Brazil which might have affected Endesa's share price prior to the announcement of Enersis' initial investment.

The last and final round in Endesa's takeover of Enersis began with the decision by the Enersis Board to dispose of Enersis' stake in Endesa Chile. The impossibility of setting in motion the management model sought by the Spanish electricity company in Enersis brought about the launch of a takeover bid for the Chilean group which, were it successful, would have allowed Endesa to acquire 32% of the cash flows to be generated by Enersis *AiPs*. More importantly, it would give Endesa control over management of the group's future *GOs*, the investment option in Endesa Chile being the most imminent of those opportunities. Therefore, the value sources in the final investment were the assets in place value corresponding to the 32% stake in Enersis, and the growth option value corresponding to the option to invest in Endesa Chile. Each of these value sources has also been evaluated in a previous paper (Alonso *et al.*, 2009b), so we take the results for our study. Again, the Extended NPV derived from final investment in Enersis equity is the difference between the outlay of 1,450 million dollars, and the sum of the present value of the *AiPs* corresponding to the stake in Enersis equity and the present value of the *GO* in Endesa Chile. The benefits to emerge from exercising this option were based mainly on cost savings, both from vertical integration of production and distribution and transfer of Endesa's know-how, and its wide experience as a vertically integrated company.

4. STOCK PRICES AND THE OPTION TO INVEST IN BRAZIL

Figure 1 shows the price trend of Endesa shares between 1 July and 31 August, 1997, with an indication of the principal events which might have influenced the stock price. The announcement of the alliance with the Chilean group, Enersis, led to a rise in

Figure 1
Daily stock price of Endesa (values in US dollars)



the Spanish electricity company's stock price which passed 21 dollars per share. This announcement corroborated the information published at the beginning of the month regarding the substantial resources to be set aside and invested in Latin America over the following years.

The *CARs* in the event window are reported in table 1. According to literature concerning event studies (Arnold and Parker, 2007; Cox and Portes, 1998; Forbes, 1994; Oxera, 2006; Eckbo and Wier, 1985), we compute the *CARs* for nine different event windows. Endesa *CARs* are positive and statistically significant at the 10% level in the windows prior to the announcement (up to 15 days). This evidence may be coherent with the fact that rumors had been circulating days before the announcement of the agreement regarding the existence of these negotiations. In this case, investor expectations should reflect both the stake held in a major electricity group and the *GOs* embedded therein. It is interesting to consider that barely a few months earlier, in February 1997, Endesa's Chairmanship had been removed and that the new Chairman, Rodolfo Martín Villa, had declared the Spanish company's interest in undertaking foreign investments with the intention of actually controlling its subsidiaries. In fact, in early July, the investment plans in Latin America for the coming years were made public, with a foreseen investment of over 2,500 million dollars. In consequence, we may consider that the positive abnormal returns constitute evidence indicating the relevance of the value of the *GOs* which investors attribute to investing in the Chilean group [(9)].

Table 1

Cumulative abnormal returns around the announcement of Endesa´s initial investment in Enersis

This table presents the cumulative abnormal return around the announcement of the investment. Risk adjusted returns are obtained using the market model regression, which reports α = 0.0006125, β = 1.2436 and R_2 = 35.157%.

Accumulation period	*CAR*	*Average AR*	*CAR Deviation*	*t-statistic*	*p-value*
(-20; 0)	5.439%	0.259%	0.013	0.893	0.394
(-15; 0)	10.381%	0.601%	0.011	2.086	0.061 (*)
(-10; 0)	8.831%	0.803%	0.012	2.192	0.063 (*)
(-20; +20)	6.418%	0.196%	0.013	0.989	0.328
(-15; +15)	12.670%	0.433%	0.012	2.025	0.050 (**)
(-10; +10)	9.792%	0.523%	0.014	1.739	0.097 (*)
(-5; +5)	7.988%	0.726%	0.015	1.507	0.163
(-5; +10)	8.927%	0.558%	0.013	1.661	0.129
(0; +10)	1.298%	0.118%	0.014	0.288	0.789

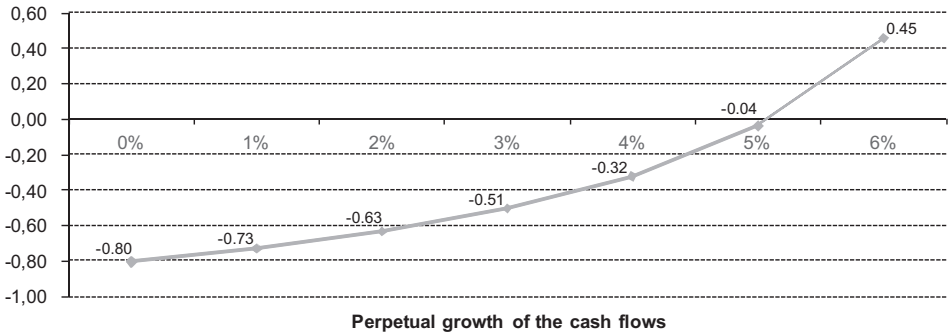
** Significant at the 0.05 level. * Significant at the 0.10 level.

(9) The reliability of these results obviously depends on the R_2 regression coefficient. The higher the R_2, the greater the reduction in the variance of abnormal returns, which increases the test's power to detect abnormal return. Although not extraordinary, this R_2 coefficient is similar to those reported in the R_2 and price inefficiency analysis (Hou, *et. al*, 2006).

Figure 2 presents the sensitivity of *AiP* valuation to change in the perpetual growth rate of cash-flows following the model in Alonso *et al.* (2009a) [10]. Estimated *NPV* varies between minus 835,259,908.42 dollars (corresponding to a value of minus 0.8031 dollars for each share in Endesa) when the growth rate is nil (g = 0%), and 472,661,226 dollars (0.4545 dollars for each share in Endesa) when the growth rate is six per cent (g = 6%). These results show that, except for high g [11] values, estimated *NPV* does not *per se* justify Endesa's investment decision and, therefore, no positive change in stock prices in the event window.

Figure 2

NPV per Endesa share of the initial investment in Enersis (values in US dollars)



Results in table 2 relate the *CARs* in the event window and the weight of the investment value attributable to each Endesa share. We first analyze the results in Panel A. In this Panel, we show the investment value attributable to each Endesa share, calculated as the sum of the value per share of Endesa's Assets-in-place and the incremental value per share of the growth option embedded in the investment in Enersis [12]. To calculate this sum, we consider the *Extended NPV* per share as obtained in Alonso *et al.* (2009a), which includes the value attributable to Endesa's improvement in the *GO* in Brazil. These results are presented for two scenarios: when political interference in determining the distribution margin is not considered (without regulatory risk) and when regulatory uncertainty of the margin reaches 50% (with regulatory risk). We also consider different assumptions regarding the overpricing offered in the tender (10%, 30% or 50% increases in the strike price), or alternatively, the likelihood of a successful bid (33% or 66%). As expected, the valuation results in Panel A show a negative relation between the value of the investment opportunity in Brazil and the premium paid. Likewise, option values increase with the likelihood of a successful bid. The results also show that an increase in regulatory uncertainty reduces the value of the investment opportunity in all cases

(10) In Alonso *et al.* (2009a), the present value of assets-in-place is obtained using the discounted net income model proposed by Kester (1984), which involves identifying non-discretionary investments with a maintaining of current assents. In this model, it is assumed that net income increases at a constant rate g. The value of equity attributable to assets-in-place is thus given by the expression:

$E_0^{AiP} = \frac{NI_1}{k-g}$ where NI_1 represents the net income in the following period, and k the risk-adjusted discount rate.

(11) The range of values computed for the perpetual growth rate g is based on a central point of 3%, the value used in Alonso *et al.* (2009a) following the annual inflation rate for the valuation currency (US dollar).

(12) Values per Endesa share are computed based on the 1,040,022,396 total of Endesa's outstanding shares.

due to the reduction in the average simulated values of both the state variable and the underlying investment, implying that the optimal result is to exercise the option on fewer occasions.(13)

TABLE 2

EXTENDED NPV PER ENDESA SHARE AND ITS WEIGHT IN THE STOCK PRICE

Panel A: Extended NPV per Endesa share (values in US dollars).

	Without regulatory risk	*With 50% regulatory risk*
	With Premium Payment	
Prem. 10%	0.409	0.154
Prem. 30%	-0.065	-0.214
Prem. 50%	-0.435	-0.462
	With likelihood of Adjudication	
Prob 66%	0.192	-0.074
Prob 33%	-0.256	-0.327

Panel B: Weight of the Extended NPV per share with respect to the stock price of Endesa for different windows around the date of the investment announcement (%).

Windows (-10; 0) (-10;+10)	***Without regulatory risk***		***With 50% regulatory risk***	
	With Premium Payment			
	Stock Price beginning 20.787	*Mean stock price (-10; 0) 20.286*	*Stock Price beginning 20.787*	*Mean stock price (-10; 0) 20.286*
Prem. 10%	1.967%	2.016%	0.740%	0.759%
Prem. 30%	-0.312%	-0.320%	-1.029%	-1.054%
Prem. 50%	-2.092%	-2.144%	-2.222%	-2.277%
	With Probabilities of Adjudication			
	Stock Price beginning 20.787	*Mean stock price (-10; 0) 20.286*	*Stock Price beginning 20.787*	*Mean stock price (-10; 0) 20.286*
Prob 66%	0.923%	0.946%	-0.355%	-0.364%
Prob 33%	-1.231%	-1.261%	-1.573%	-1.611%
Windows (-15; 0) (-15;+15)	***Without regulatory risk***		***With 50% regulatory risk***	
	Panel A: With Premium Payment			
	Stock Price beginning 20.861	Mean stock price (-15; 0) 20.425	Stock Price beginning 20.861	Mean stock price (-15; 0) 20.425
Prem. 10%	1.960%	2.002%	0.738%	0.753%
Prem. 30%	-0.311%	-0.318%	-1.025%	-1.047%
Prem. 50%	-2.085%	-2.129%	-2.214%	-2261%
	Panel B: With likelihood of Adjudication			
	Stock Price beginning 20.861	Mean stock price (-15; 0) 20.425	Stock Price beginning 20.861	Mean stock price (-15; 0) 20.425
Prob 66%	0.920%	0.940%	-0.354%	-0.362%
Prob 33%	-1.227%	-1.253%	-1.567%	-1.600%

Panel A shows the Extended NPV per Endesa share including the value attributable to the GO in Brazil, as obtained in Alonso *et al.* (2009a). Panel B shows the weight of the Extended NPV per share over the stock price for time intervals in which the estimated CARs are significant. For stock prices, two values are considered as reference: *(i)* the price at the beginning of the reference window, or *(ii)* the average reached during the days covered by the window prior to the investment announcement. It should be noted that these values depend on the time intervals around the date of the investment announcement.

(13) For a more detailed explanation see Alonso *et al.* (2009a).

Panel B of table 2 shows the weight of the *Extended NPV* per share over the stock price; namely the result of dividing the Extended NPV per share by the stock price. For this stock price, we take as a reference value either the price at the beginning of the reference window or the average reached during the days covered by the window prior to the investment announcement. The weight of the *Extended NPV* per share with regard to the stock price is calculated for time intervals around the date of the investment announcement in which the previously estimated *CARs* are significant. The same relations as those referred to in the previous paragraph remain regarding the relationship between these weights and the overpricing offered in the tender or, alternatively, the likelihood of a successful bid. As can be seen, when these weights are positive they reach maximum values of around 2%. These values are significantly distant from the *CARs* estimated for the different windows around the time of the investment announcement and which are over 10% in most cases.

Analyzing these differences proves interesting. We might consider reviewing the scenarios set out in Alonso *et al.* (2009a) with the aim of proposing a more «optimistic» valuation of the expansion option in Brazil. However, in view of the results, this does not seem to be sufficient given that, if we observe the trend which the weights show for the premium values exhibited, we can for example predict that not considering the overpricing offered in the tender will improve the Extended NPV but not enough to justify *per se* the *CAR*.(14)

5. STOCK PRICES AND THE OPTION TO INVEST IN ENDESA CHILE

Figure 3 plots the price trend of Endesa shares in the time period around the second and final takeover bid for Enersis. As can be seen in the Figure, Endesa's stock price underwent considerable fluctuations from the date on which the Enersis board of directors decided to sell its stake in the subsidiary, Endesa Chile. At the time the takeover bid was launched, Endesa's stock price rose slightly above what it was when the Board took the decision to sell. However, from that date onwards, and even though large fluctuations were still in evidence, there was a clear downward trend in the Spanish firm's price.

As in the previous stage, we estimate Endesa *CARs* for different time windows, both symmetrical and non-symmetrical, around the announcement date of the takeover bid. In view of the results in table 3, we can affirm that using symmetrical windows does not reveal any significant result for the different intervals considered. However, the *CARs* are negative and statistically significant in the days subsequent to the takeover bid announcement (15). These results clearly indicate that prior investor expectations do not recognize any value-creation associated with the decision adopted by Endesa management.(16)

(14) The first section of Panel B shows that, when the stock price is 20.787, the value of the weight of the Extended NPV per share varies between -2.092% when premium payment is 50%, and 1.967% when premium payment reaches 10%. We can expect that, although premium payment takes value 0%, the increase in the weight of the Extended NPV per share does not reach the previously estimated CAR value.

(15) The R-squared market model regression improves compared to that achieved in the first investment, indicating that almost 48% of the Spanish firm's observed profitability can be explained from the market model.

(16) It should be noted that prior to the beginning of the event window, investors might have discounted in Endesa stock prices the negative consequences of the Enersis Board announcement made in mid-December 1998.

To determine whether the value effect of the decision taken by Endesa management is properly reflected in its price variations, we again consider the *Extended NPV* of Endesa's second and final investment in Enersis. This value should be obtained by subtracting the 1,450 million dollar outlay required in the takeover bid from the sum of the present value of expected cash flows from *AiPs,* and the value provided by the option to invest in Endesa Chile. The *AiP* value is again determined by adapting the

FIGURE 3
DAILY STOCK PRICE OF ENDESA SHARES (VALUES IN US DOLLARS)

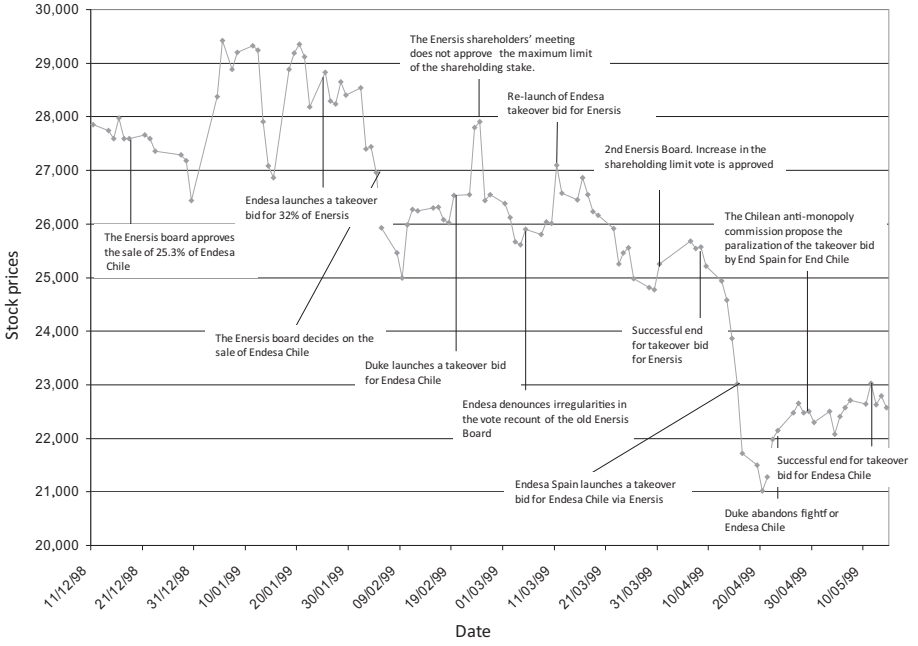


TABLE 3
CUMULATIVE ABNORMAL RETURN FROM ENDESA'S FINAL INVESTMENT IN ENERSIS

This table presents the cumulative abnormal return around the announcement of the final investment. Risk adjusted returns are obtained using the market model regression, which reports the values for α (-0.002025) and β (0.6239). R_2 is 47.693%.

Accumulation period	*CAR*	*Average AR*	*CAR Deviation*	*t-statistic*	*p-value*
(-10; 0)	3.000%	0.273%	0.018	0,499	0629
(-20; +20)	-8.769%	-0.205%	0.016	-0.815	0.420
(-15; +15)	-5.263%	0.158%	0.018	-0.498	0.622
(-10; +10)	-9.527%	-0.454%	0.017	-1.241	0.229
(-5; +5)	0.561%	0.051%	0.015	0.113	0.912
(0; +10)	-12.708%	-1.155%	0.009	-4.288	0.002(**)
(0; +15)	-10.966%	-0.731%	0.0128	-2.278	0.043(**)
(0;+20)	-10.387%	-0.519%	0.013	-1.824	0.090(*)

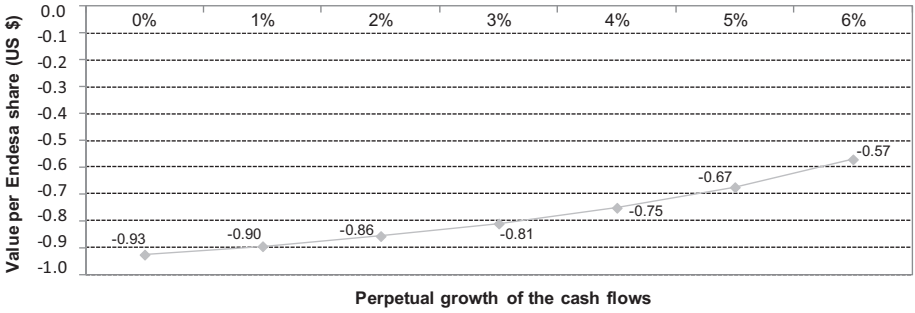
***Significant at the 0.01 level. **Significant at the 0.05 level. *Significant at the 0.10 level.

Kester Model (1984), and the option to invest in Endesa Chile is estimated by adapting the Longstaff and Schwartz (2001) proposal, following Alonso *et al.* (2009b) (17).

Valuation of the *AiP* allows us to evidence its insufficiency when it comes to justifying the decision adopted by the Spanish electricity company. Figure 4 plots the investment valuation results for perpetual growth values of cash flows between 0% and 6%. Bearing in mind the tax saving generated by prearranged debt, the *NPV* resulting from this second investment in Enersis varies between minus 963,915,820.37 dollars (corresponding to a value of minus 0.9268 dollars per Endesa share) when the perpetual growth rate is 0%, and minus 593,670,002.76 dollars (minus 0.5708 dollars for each Endesa share) with a 6% growth rate.

Figure 4

NPV per Endesa share of the second investment in Enersis (values in US dollars)



Panel A in table 4 shows some of the results attained by Alonso *et al.* (2009b) with regard to the *Extended NPV* per share. These values are computed for different assumptions regarding the improvement in the margin (18) and the premium determining the strike price of the investment option in Endesa Chile. The *Extended NPV* clearly grows as the estimated improvement in the margin per megawatt increases following the Spanish electrical firm's involvement in the running of the operation, and evidences a non-monotonous relation with the bidding premiums. The explanation for this unusual relationship must be sought in the different premium sensitivity of the two options used to estimate the value of the marginal option to invest (19). These results suggest that the second investment was only justified due to an optimistic expectation of the impact of Endesa's control over the efficiency of the Chilean company, regardless of the premium paid.

The valuation results for the extended NPV are related to the closing price reached on the announcement date of the operation in Panel B. These weights vary between -2% and 2% in accordance with the scenarios shown. These values differ considerably from the *CARs* shown in Table 3 and are estimated for different accumulation periods, fluctuating between -12% and -10%, when significant. Besides the considerations regarding the

(17) Appendix 2 sums up the main hypotheses, parameters, and valuation results reported in this paper.
(18) This margin improvement is due to the greater efficiency which the Spanish company expected to be attributed to management of Endesa Chile.
(19) For a more detailed explanation see Alonso *et al.* (2009b).

TABLE 4

EXTENDED NPV PER ENDESA SHARE AND ITS WEIGHT IN THE STOCK PRICE ON THE DAY OF THE ENERSIS TAKEOVER BID ANNOUNCEMENT

Panel A: Extended NPV per Endesa share (values in US dollars)

	Premium in the takeover bid	*Margin improvement*				
	Via Enersis (29.7%)	0%	4%	8%	12%	16%
	50%	-0.611	-0.500	-0.324	0.222	0.624
	40%	-0.585	-0.449	-0.362	0.014	0.217
	30%	-0.561	-0.451	-0.391	0.339	0.588

Panel B: Weight of the Extended NPV per share compared to Endesa's stock price on the day of the takeover bid announcement (%)

	Premium in the takeover bid	*Margin improvement*				
Stock price	Via Enersis					
29.073	(29.7%)	0%	4%	8%	12%	16%
	50%	-2.102%	-1.718%	-1.192%	0.817%	2.295%
	40%	-2.011%	-1.546%	-1.332%	0.052%	0.800%
	30%	-1.928%	-1552%	-1.438%	1,246%	2.165%

Panel A shows the Extended NPV per Endesa share including the value attributable to the GO in Endesa Chile, as obtained in Alonso et al. (2009b). Panel B shows the weight of the Extended NPV per share over the stock price for those time intervals in which the estimated CARs are significant.

valuation assumptions or the existence of a greater number of investment opportunities linked to Endesa's takeover of Enersis, the prevailing result is the prominently negative value of the *CAR*s. In this case, investors react in a markedly negative way to Endesa's decision and might have underestimated the *GO* value embedded in this second investment in Enersis.

6. DISCUSSION

The results in the previous sections do not allow us to demonstrate that *GO* values are properly reflected in stock prices, at least not as predicted by efficient market theory. We find that the sign and significance of *CARs* in windows near the announcement of the investment differ for each of the cases valued. In the case of the first investment in Enersis, designed to gain control over the future sales growth, the cumulative abnormal returns, above all in the days prior to the announcement, are statistically significant and positive. This might, therefore, evidence the effect of *GOs* on investors' valuations. Meanwhile, in the second investment, the *CARs* obtained in the days prior to the announcement do not statistically differ from zero, although the *CARs* obtained in the days following the announcement are significant and clearly negative.

The main difference between the two cases is their main source of value. In the first case, the embedded *GO* is defined on the stream of cash-flows to emerge from electricity distribution in Brazil, as a result of its imminent privatization. When valuing this *GO,* investors not only recognized the existence of future benefits associated with discretionary expansion in Brazil but also attributed to them a higher value than would be derived from valuing them using appropriate models and extensive information.

In the case of the option to invest in Endesa Chile, the major benefits to emerge were felt to be the expense reductions achieved by improving efficiency of both Endesa Chile's operations and by integrating distribution and generation. The in-depth analysis in Alonso *et al.* (2009b) reveals that this efficiency improvement was due to the transfer of Endesa's know-how and experience as a vertically integrated company. However, our findings indicate that investors did not consider this information when pricing Endesa stock prior to the announcement. Furthermore, even in the most pessimistic scenarios regarding the transfer of efficiency and the size of the premium to be paid to gain control of Endesa Chile, investors might have underrated the value of this *GO* after the announcement was made.

In this respect, it should be mentioned that at the time the second investment announcement was made there were certain hurdles which affected its success, such as the need to reform the statutes of the Chilean group in order to increase the maximum stake-holding. This might have brought about potential undervaluation of Endesa stocks due to extreme investor pessimism. However, our results may be better explained by information problems which might have led investors to overreact differently to economically equivalent events. In fact, our findings are in line with prior literature on investors' reacting differently to an earnings surprise induced by a dollar of sale increase and a dollar of cost savings (Swaminathan and Weintrop, 1991; Ertimur *et al.*, 2003). These previous works explain such evidence as a consequence of the different persistence and/or noise of each of these two value sources: investors react more strongly to any surprise induced by a sales increase as it is expected to be more permanent and/or less noisy than any surprise induced by an equivalent cost saving (Ertimur *et al.*, 2003; Berger, 2003). Furthermore, Ertimur *et al.* (2003) provide evidence that these differential market reactions are stronger in the case of growth companies than in the case of value firms.

Our results are consistent with these arguments, showing that investor perception regarding future cash-flows to emerge from exercising these two *GOs* differed significantly. In-depth analysis of the findings in Alonso (2009a and 2009b) reveals no other marked differences in both cases apart from the nature of their value source. Both investment outlays were alike: US$ 1,500 million, in the first case, and US$ 1,450 million, in the second. The financial policies were also comparable: in the first case, 2/3 of the outlay was financed by debt and, in the second case, the investment was totally financed by debt. Both projects reported negative NPV and were considered as strategic investments by Endesa managers. Therefore, the hypothesis of higher perceived persistence of a sales increase over that of a cost saving can be seen as a highly credible explanation. There are, however, possible alternative explanations for our results. Apart from random hypotheses, another possible explanation relates to increased investor pessimism resulting from successive setbacks during the operation. Future evidence from additional cases will enable us to shed light on a topic which has important implications for equity valuation.

7. CONCLUSION

In this paper, we have sought to explore how investors incorporate new information into *GO* valuations. Specifically, we analyze whether investors are more concerned with specific *GO* sources of value. A comparative case study may be considered an appropriate

research strategy to evaluate how similar *GOs* affect stock prices. Detailed analysis of sources of value enables us to determine whether investors attach different value attributes to comparable *GOs,* providing a basis for discussing possible explanations. Specifically, we examine the valuation results reported by Alonso et al. (2009a and 2009b) for investments made by the Spanish electricity company, Endesa, in the capital of the Chilean group, Enersis. The takeover of the Chilean group involved two different investments with the consequent variation in sources of value.

We estimate the *CARs* of Endesa shares in an interval around the time of the announcement of both investments. Although the *CARs* are significant in both investments, in the initial investment they are clearly positive and are obtained prior to the announcement date, while, for the final investment, only the cumulative returns in the days after the announcement are significant and, moreover, negative.

In the first investment, in which the *CARs* are positive, we can state that stock prices may reflect *GO* values. On the other hand, evidence for the second case seems to indicate that they did not consider *GO* values when pricing Endesa shares, or if they did, they valued the embedded *GO,* assuming that takeover of Endesa Chile would not lead to any substantial improvements in performance. Taking into account the differences between both *GOs* embedded in these investments, our analysis has allowed us to observe that the market might have overreacted positively (negatively) to the announcement of the acquisition of a *GO* whose value emerges from a sales increase (expense saving). These results are in line with the intuition that in the presence of information problems, investors tend to attach different value attributes to available information regarding *GOs,* depending on their nature: *GOs* based on sales increases seem to be interpreted as a more permanent source of value than *GOs* based on cost savings.

Finally, we draw attention to the limitations of this paper. Firstly, our conclusions are based on our estimations of CARs. As a result, all the common limitations in event study literature are also applicable here: non-synchronous trading, departures from normality … Secondly, our research is based on in-depth analysis of two cases. This has allowed us to exploit detailed information regarding the investment features and its sources of value to evaluate how the nature of *GOs* may impact stock prices. However, these findings cannot be statistically generalized. Rather, examining large-samples may be an important issue for future research to test the statistical significance of the relation between the nature of *GOs* and stock prices.

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APPENDIX 1

SUMMARY OF ALONSO *ET AL.* (2009A)'S VALUATION OF ENDESA'S INITIAL INVESTMENT IN ENERSIS

AiP valuation	***GO valuation***
Main assumptions	
• Future non-discretionary investments and expected equity cash flow are equal to economically maintaining assets and expected mean net profit, respectively. • Enersis net profit increases perpetually at a constant rate, g. • Debt interest generates tax savings which increases AiP values. • The value attributable to Endesa's investment is 29.04% of Enersis' total AiP value.	• Investment in Enersis provides Endesa with preferential access to invest in the Brazilian electricity distribution market. • Underlying asset is a stake in future cash-flows to emerge from electricity distribution over a given leased area in Brazil. • Life-span of underlying asset is indefinite and generates a constant perpetual cash-flow. • Opportunity expires in five years and may be exercised each six months. • Value resulting from option exercise is weighted by likelihood of success of alliance in adjudication of tender. • Future cash-flows from underlying asset depend on two state variables: 1. Distribution unit margin (difference between revenues and energy acquisition costs) following a geometric Brownian process with Poisson jumps (encompassing the possibility of abnormal variations due to political interference). 2. Demand for electricity in Brazil which follows a geometric Brownian process with Poisson jumps (reflecting possibility of abnormal variations from dry periods). Correlation between non-anticipated changes in variation of demand and of distribution margin is assumed to be 90%. • The GO value attributable to Endesa investment is the difference between the value of the option to invest in Brazil through the alliance with Enersis and the value of the option which Endesa maintains by itself.
Input estimation	
• Expected net profit for 1997 (NI_1 = 0.026 US$) is proxied by analysts' mean consensus forecast in historical data base I/B/E/S. • Risk adjusted discount rate for investment (K_e = 8.7%) is computed using CAPM. Risk-free interest rate and market premium are obtained by mean return of 10-year American bond (R_f = 6.22%), and Fama and French´s (2002) estimates (MP = 4.23%), respectively. Beta coefficient (⊠ = 0.587) is estimated from prior 60 monthly returns of Enersis stocks and S&P 1200 Global Index. • Perpetual growth rate for Enersis AiP cash-flows is 3% (g = 3%)	• Strike price per megawatt distributed is estimated from data of previous tenders and set equal to 186.75 US$. • Success probabilities in adjudication of tender range from 33% to 66%. • Cash-flows to emerge from underlying asset are computed as: $F_t\,(S_t, M_t) = (MB_t - Cost_t)(1-\tau)$ where MB_t is the operating gross margin of distribution activity calculated as: $MB_t = M_t \cdot S_t \cdot c$, being: M_t: Unit margin per megawatt distributed, whose evolution is estimated from historical variation of GDP in Electricity, Gas and Water sector between 1953 and 1996. S_t: Demand for electricity in Brazil, whose evolution is estimated from historical data on electricity consumption in Brazil between 1952 and 2003. c: Percentage of demand which can be met in the case of adjudication of tender. Estimated from expected market share by tender and minority shareholding of a local partner and set equal to 7.5%. $Cost_t$ is the sum of items which reduce operating gross margin and are obtained as a percentage of gross margin: $Cost_t = 0.75 \cdot MB$ τ is tax rate estimated from information offered by Brazilian Institute of Geography and Statistics and set equal to 30%.
Results	
NPV is negative and equal to -525,327.458 dollars (-0.5051 dollars per Endesa share)	• Value of GO in Brazil is relevant enough to justify Endesa investment in Enersis. • Positive relationship between value of GO and likelihood of success in tender. • Negative relationship between value of GO and the overpriced tender offered. • Increase in regulatory uncertainty reduces value of GO under all assumptions considered.

APPENDIX 2

Summary of the valuation of the second investment of Endesa in Enersis

AiP valuation	***GO valuation***
Principal hypotheses	
Cash flow attributable to shareholders is identified with net profit.	Value of the option is obtained as the difference between the value of the investment option in Endesa Chile via the alliance with Enersis and the value of the option which Endesa maintains per se. For this, different scenarios of the premium are used which determine the option exercise price.
Net profit of Enersis increases at constant rate, g.	Life-span of underlying investment is assumed to be indefinite and is divided into an initial period of ten years, T = 10, at the end of which it is assumed that investment generates a perpetual cash flow equal to the last one obtained in the previous period.
Value of current investment is adjusted by tax savings generated by debt.	Possibility of investing in Endesa Chile over three years, evaluating option exercise twice a year (each six months) The improved efficiency which takeover of Endesa Chile by Endesa entails is assumed. It is introduced in valuation via the growth variable of operating unit margin, with a range of values between 0 and 16%, generated starting from the year following exercise of the option.
The value attributable to the AiP is calculated as: $V_0^{AiP} = \frac{0{,}32 \cdot NI_1}{k_e - g}$	The value resulting from the investment opportunity in Endesa Chile is weighted by the likelihood of success in takeover by means of a 50% probability. Dependence of cash flows underlying exercise of option on two variables: 1) Unit margin of distribution which measures the difference between revenue and acquisition costs of energy distributed. 2) Demand for electricity in Brazil.
Estimation of the parameters	
NI_1 Expected net profit in following period. Taken from historical data base I/B/E/S of Datastream, (0.018 US$)	F_t Underlying asset: value of cash flows discounted which investment is expected to generate. Cash flow in t is calculated as: $F = (\sum_i MB_{i,t} - Cost_t)(1-\tau)$ MB_t: gross margin of generating activity in countries in which Endesa Chile operates. It depends on five uncertain variables related to energy generated in each country. It is calculated as: $MB_{i,t} = m_{i,t} \cdot W_{i,t} \cdot s_i$ Gross margin in market *i* is obtained by multiplying unitary margin, $m_{i,}$, volume of energy generated in that market, $W_{i,t}$, and share which Endesa Chile serves in market, s_i
k_e Discount rate adjusted to risk for Endesa share (11.63%). CAPM is applied with a market premium of 4.23% and risk-free rate of 5.83%.	$Cost_t$: items which reduce gross operating margin. They represent a percentage of gross margin. $Cost_t = 0.5 \cdot \sum MB_t$ τ: Corporate tax rate (15%)
G Constant rate of perpetual growth of cash flow. Estimated between 3% and 7%.	$W_{i,t}$ Total volume of energy generated in markets in which Endesa Chile operates: Argentina, Chile, Colombia, Peru and Brazil. Brownian geometric process with Poisson jumps which reflect abnormal variations in dry periods caused by dependence on hydraulic generation. $dW_{i,t} = (\alpha_i - \lambda_i \cdot k_i) \cdot W_{i,t}dt + \sigma_i \cdot W_{i,t} \cdot dz_i + (\pi_i - 1) \cdot W_{i,t} \cdot dq_i$ Parameters are estimated for each country and are defined as in the previous stage.

(Continue in next page)

SUMMARY OF THE VALUATION OF THE SECOND INVESTMENT OF ENDESA IN ENERSIS (CONT.)

Beta	Beta coefficient obtained from monthly correlation of return of Endesa and Global Index S&P 1200 for five previous years. (1.372)	*X*	Strike price. Calculated from Endesa Chile stock price with premiums between 30% and 50% for option via Enersis (i.e., option to buy 29.7% of Endesa Chile) and premiums between 60% and 100% for direct acquisition option by Endesa (i.e., purchase option of 55% of Endesa Chile). As a result, the strike prices of these options fluctuate, respectively, between 1,286 and 1,484 million dollars for investment option via alliance, and between 2,902 and 3,627 million dollars for independent investment option.
Principal results			
NPV varies between -843 million dollars and -439 million, depending on perpetual growth rate of cash flows considered for Enersis. Whatever the case, it is negative and allows us to justify decision adopted by Endesa.			Incremental value of investment option for Endesa share varies between 118 million dollars, when improvement in margin is zero and premium values are higher, and 1,847 million dollars when improvement in margin is 16% and premium is lower. Values of the investment option increase as estimated improvement in margin increases from stake in management of Spanish electricity company, and fall with premium to be paid in takeover bid. Investment option in Endesa Chile only allows compensation of negative NPV in certain scenarios.