François Jeanjean (France)

What does actually reveal the net promoter score? Empirical evidence from European mobile markets

Abstract

Net promoter score is generally considered to be closely related to changes in companies' revenues. However, this relationship is not always so close, it depends on the sector and the market structure. This paper shows that net promoter score is actually much more related to the utility of consumers and as a consequence closely related to the consumers' willingness to pay. The correlation between the net promoter score and the utility of consumers in five European mobile markets is much stronger than the correlation between net promoter score and revenues highlighted by Reichheld (2003). The second is a consequence of the first. The same is for the correlation between net promoter score and profits.

The net promoter score is provided by a survey and the utility of consumers is calculated using the "spokes model" which is an economic model of competition based on horizontal differentiation among firms. The model input data (firms' revenues, number of subscribers and profits) are provided by Merill Lynch, Bank of America.

Keywords: net promoter score, recommend intention, customer satisfaction, consumer's willingness to pay, competition.

Introduction

Measuring customer satisfaction and willingness to pay, or "WTP," is a major strategic objective for managers and marketers, and the best method for doing so has been hotly debated for years. In recent years, the arrival of the "Net Promoter Score" (NPS) indicator: created a small revolution. While it not always the most accurate indicator, it is probably the easiest to use, since it requires only one question: "*How likely is that you would recommend us to a friend or a colleague?*" The people who answer most positively are called "promoters", while those that respond less favorably are called "detractors". The NPS calculates the difference between promoters and detractors. This ease of implementation has prompted managers widely to adopt this new metric.

In his paper (Reichheld, 2003), "The One Number You Need to Grow", Fred Reichheld highlighted the strong correlation between a company's growth rate and its net promoter score in most competitive industries. His second paper (Reichheld, 2006), "The Microeconomics of Customers Relationship", sought to offer a rational explanation of the success of NPS. He suggests that promoters have a good customer experience meaning that they are more loyal and more likely to repurchase. Promoters spend more than detractors; their lifetime with a company is longer because of their loyalty. Consequently, acquisition costs are amortized over a longer period and thus become cheaper. Promoters are less price-sensitive than detractors because they believe they are getting a good value overall from the company. Moreover, promoters help to recruit newcomers by recommending their provider to friends (Word of Mouth). A good NPS tends to increase both market share and sale price and therefore revenues.

NPS has, however, been criticized by other authors. Morgan & Rego (2006), as well as Keiningham, Cooil, Andreassen, & Aksoy (2007) Keiningham, Aksoy, Cooil, Andreassen & Williams (2008) have pointed out that NPS was not always the best indicator for predicting corporate revenue growth, and results varied by industry. Empirical evidence has emphasized the NPS relevance in the telecommunications industry.

This paper shows that in the European mobile markets, the link between the NPS and the consumers' utility, which is close to willingness to pay, is very strong and is even stronger than the correlation between NPS and corporate revenue growth.

NPS appears to be proportional to the rate of development of consumers' utility and could represent a good proxy for it.

The idea is that NPS is designed to be zero at equilibrium. The equilibrium means that there are no changes in the quality of firms' offers nor in the consumers preferences. In that case, there are as many promoters than detractors. The positive effect of promoters is exactly offset by the negative effect of detractors. When a firm increases its quality, consumers' utility as well as willigness to pay increase for this firm. As a result, the number of promoters increases while the number of detractors decreases, which increases NPS. If the competitors have not increased their quality to the same extent, the firm acquires a competitive advantage and increase both its market share and its profits. Detractors of the competitors tend to change for the improved firm. After a while, consumers become accustomed to this new quality and more demanding, finally equilibrium is reformed from the new situation; NPS tends toward zero again.

Let us assume that consumers are distributed according to their utility around a mean value *V*. Let us assume $\overline{V}$ is the value above which consumers are promoters and $\underline{V}$ is the value below which consumers are detractors. When consumers' utility increases, *V* increases which in turn increases the proportion of promoters and decreases the proportion of detractors. If the distribution is roughly symmetrical, the increase of NPS is almost proportionnal to the increase of *V*. However, as NPS tends to return to zero at equilibrium, in contrast to changes in the utility, its variations are not cumulative. As a result, this paper will test the hypothesis that changes in utility are proportional to NPS.

This relationship may be sensitive to competition. When the market is not competitive enough, customers tend to be captive and cannot change providers as they wish. In this case, there is a significant gap between customers' actual behavior and their wishes. This delays the return to equilibrium and thus the return of NPS to zéro. In that case, the relationship between NPS and utility is distorted and NPS does not accurately reflect changes in utility. A strong correlation between NPS and utility is thus the sign of effective competition, while an uncorrelated NPS implies an impediment to customers' desires. Reichheld (Reichheld, 2006) has shown that NPS did not apply for monopolies.

This paper is organized as follows. Section 1 presents a theoretical model of competition in order to determine the relationship between utility and financial performance (prices, revenues and profits). Section 2 describes the data used for the empirical evidence, including both financial data and survey data (NPS). Section 3 compares the two sets of data and highlights the strong correlation between them. Section 4 compares this correlation to the correlation between NPS and corporate revenue growth or between NPS and corporate profit growth and shows that it is much stronger. The difference stems from the fact that utility depends essentially on customer choices while revenues and profits also depend on other parameters and particularly on marginal costs. Improving customer satisfaction has a cost; we found that firms which increase NPS the most are often also those which increase their marginal costs the most. The final section concludes.

1. The spokes model

The spokes model, as described by Chen & Riordan (2007) is a version of the Hotelling model for more than two firms.

The market is represented by a spoke wheel where consumers are uniformly distributed. Each firm is located at the end of a spoke. The wheel diameter is normalized to 1; the length of each spoke is thus 1/2. The size of the market is also normalized to 1. Each consumer located within a spoke compares the utility to purchase the offer by the firm located at the end of the spoke and the offer he prefers from among the other firms. Like all the spokes converge at the center of the wheel, the comparison can be made in pairs between all firms. If there are *N* firms, there will be $\frac{N(N-1)}{2}$ comparisons. Each firm is involved in $(N-1)$ comparisons.

We assume V_i and p_i are respectively the consumer's utility and the price of firm *i*'s offer. We will focus on the comparison between firms *i* and *j*. The length of the two joined spokes is 1. A consumer located at a distance *x* from firm *i* is located at a distance (1-*x*) from the firm *j*. His utilities of purchasing firm *i*'s and firm *j*'s offer are respectively:

$$U_i = V_i - p_i - tx,$$
$$U_j = V_j - p_j - t(1-x),$$

where *t* is the coefficient of differentiation. The indifferent consumer between *i* and *j* is located at $x_{ij} = \frac{V_i - V_j + p_j - p_i + t}{2t}$.

Firm *i*'s market share is written:

$$\sigma_i = \frac{2}{N(N-1)} \sum_{j \neq i} x_{ij} .$$

We assume that firm *i* incurs a marginal cost c_i. The profit of firm *i* is:

$$\pi_i = n\sigma_i (p_i - c_i),$$

Where *n* represents the total number of customers.

The first order condition allows us to determine p_i:

$$p_i = t + \frac{N c_i + \sum_{j \neq i} c_j + (N-1)V_i - \sum_{j \neq i} V_j}{(2N-1)} \qquad (1)$$

and hence:

$$\sigma_i = \frac{1}{N}\left(1 + \frac{(N-1)V_i - \sum_{j \neq i} V_j - ((N-1)c_i - \sum_{j \neq i} c_j)}{(2N-1)t}\right) \quad (2)$$

Let us denote: $c_i^* = c_i - \frac{1}{N}\sum_{j=1}^{N} c_j$, the relative marginal cost, which is the deviation of firm i's marginal cost from the average marginal cost.

In the sale way, $V_i^* = V_i - \frac{1}{N}\sum_{i=1}^{N} V_i$ represents the relative consumer utility. Firm i's market share can be rewritten:

$$\sigma_i = \frac{1}{N} + \frac{V_i^* - c_i^*}{(2N-1)t}.$$

Let us note that $\sigma_i^* = \sigma_i - \frac{1}{N}$ is the difference between firm i's market share and the average market share $\frac{1}{N}$.

Therefore, firm i's relative utility is:

$$V_i^* = (2N-1)t\,\sigma_i^* + c_i^*. \quad (3)$$

2. Data and methodology

2.1. Availability of data. Five countries were studied from Q1 2008 to Q3 2010: Belgium (3 firms), France (3 firms), Spain (4 firms), Switzerland (3 firms) and the United Kingdom (5 firms). Data for Switzerland and the United Kingdom is given using their national currency and required quarterly exchange rates to be converted into €, the exchange rates used are given in Appendix (see Appendix A), for a total of 9 variations quarter by quarter for 18 firms, or 162 observations.

However, some observations are not relevant and must be excluded. In Spain, the NPS for the fourth operator Yoigo is only available from Q4 2009, so we must reject all the previous quarters. In the United Kingdom, the merger between Orange and T-Mobile makes data irrelevant from Q2 2010. A total of 30 observations must be rejected, leaving 132 relevant observations.

2.2. Hypothesis. We are seeking to verify the hypothesis formulated in the introduction: NPS is proportional to the changes in utility, $\Delta V = \beta\, NPS$.

If we take into account the relative utility of firm i, the hypothesis can be written:

$$\Delta V_i = \beta NPS_i^*. \quad (4)$$

In order to test our hypothesis, we will compare the relative NPS, NPS_i^*, to the changes in the relative utility, V_i^*, calculated using the spokes model, for each firm in all of the countries studied.

2.3. Calculating utility from the database using the spokes model. The "Bank of America, Merill Lynch" database provides us with the following quarterly data for each firm in each country: number of subscribers (q_i), revenues (R_i), EBITDA (π_i).

The GfK "Customer Experience Tracker" provides us the quarterly NPS for each firm in each country.

The total number of subscribers in a country is: $n = \sum_{i=1}^{N} q_i$

Firm i's market share is: $\sigma_i = \frac{q_i}{n}$.

(Average) price of firm i: $p_i = \frac{R_i}{q_i}$.

(Average) marginal cost of firm i: $c_i = \frac{\pi_i - R_i}{q_i}$.

Equation (1) can be rewritten:

$p_i = t + c_i + \frac{N(V_i^* - c_i^*)}{2N-1}$ which allows us to calculate the sum of the firms' prices:

$\sum_{j=1}^{N} p_j = N\,t + \sum_{j=1}^{N} c_j$ and thus to determine the coefficient of differentiation t:

$$t = \frac{\sum_{j=1}^{N}(p_j - c_j)}{N}.$$

This data provides everything we need for to calculate the relative utility for each firm, V_i^*, using equation (3) .

3. Empirical evidence

3.1. First model: Significant correlation but low accuracy. As we have done in section 1, we will denote $NPS_i^* = NPS_i - \frac{1}{N}\sum_{j=1}^{N} NPS_j$, the relative NPS of firm i.

We will denote $(NPS_i^*)_Q$, the relative NPS of firm i for quarter Q and $\Delta_{Q1}^{Q2}(V_i^*) = (V_i^*)_{Q2} - (V_i^*)_{Q1}$, the variations of relative utility between Q1 and Q2.

From equation (4), we have $\Delta_Q^{Q+1}(V_i^*) = \beta \sum_Q^{Q+1} NPS_i^*$.

Because NPS is measured quarterly, we assume that the NPS is steady during a quarter and $(NPS_i^*)_{Q+1}$ represents the NPS for all of quarter Q+1 from the end of quarter Q to the end of quarter Q+1. Thus during this time $NPS_i^*(\tau) = (NPS_i^*)_{Q+1}$, so $\sum_Q^{Q+1} NPS_i^* = (NPS_i^*)_{Q+1}$ and the equation to be tested is:

$$\Delta_Q^{Q+1}(V_i^*) = \beta (NPS_i^*)_{Q+1} + (\varepsilon_i)_{Q+1}, \tag{5}$$

where β is the proportionality ratio and $(\varepsilon_i)_{Q+1}$ is the error term.

The coefficient of correlation between $\Delta_Q^{Q+1}(V_i^*)$ and $(NPS_i^*)_{Q+1}$ is 0.190 for 132 observations. It is significant in the table of critical values for the Pearson correlation, and the hypothesis of correlation can be accepted with an error risk lower than 5%. However, the results are not very accurate. The mean of both series is equal to zero because each value is the deviation from the mean. The standard deviation for $\Delta_Q^{Q+1}(V_i^*)$ is 1.61 while the standard error is 1.59. The useful signal is buried in the noise, which is why the correlation coefficient is not higher. The graph below (Figure 1) represents the scatter plot.

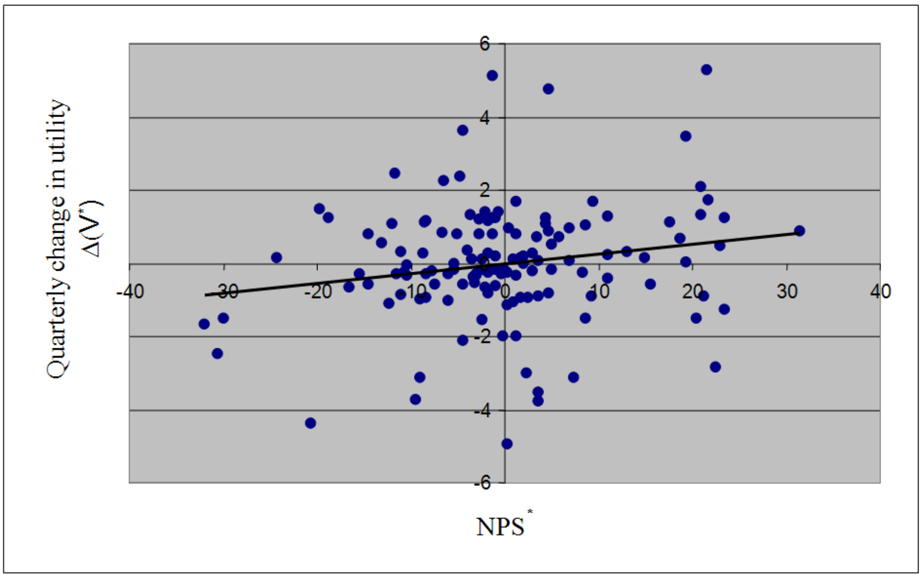

Fig. 1. Quarterly relationship between NPS and change in consumer utility

This raises the question of whether the error results from a lack of correlation between sets or if it is simply a residual error which is independent of the correlation. In the latter case, the correlation coefficient is low because utility has not had enough time to sufficiently exceed the error level.

3.2. Second model: higher and increasing accuracy. The only way to answer this, letting utility evolve over a longer period, using several quarters instead of a single quarter. The standard deviation of V_i^* should increase over time, and if the standard error does not increase in the same proportions, the correlation should improve and the coefficient of correlation should increase.

We will compare the evolution of relative NPS to that of relative utility, V_i^* over a period of time of $k \geq 1$ quarters.

In this case, because NPS is steady during a quarter:

$$\Delta_Q^{Q+k}(V_i^*) = \sum_Q^{Q+1} (NPS_i^*)_{Q+1}.$$

As a result, we will test the following expression:

$$\Delta_Q^{Q+k}(V_i^*) = \beta \sum_{j=1}^{k} (NPS_i^*)_{Q+j} + (\varepsilon_i)_{Q+k}. \tag{6}$$

Data for Spain was available for only 4 quarters (from Q4 2009 to Q3 2010) and data for the UK for only 7 quarters (from Q3 2008 to Q3 2010). There are thus 18 available observations for each value of k when $k \leq 4$, for a total of 72 observations. For $4 < k \leq 7$, the Spanish data is not available and there are 14 available observations for each value of k, for a total of 42 observations. For $7 < k \leq 9$, the British data is not available and there are 9 available observations for each value of k, for a total of 18 observations. We thus have a total of 132 available observations. For all countries with the exception of Spain, the value of Q in equation (6) is the second quarter of 2008: Q = Q2 2008. For Spain, Q is the third quarter of 2009: Q = Q3 2009 (See Appendix B). The coefficient of correlation is now 0.745, which is highly significant. The standard deviation for the set of 132 V_i^* observed has reached 2.35, as opposed to 1.61 in the previous model, while the standard error has remained almost steady at 1.58. The graph below (Figure 2) represents the scatter plot for the second model.

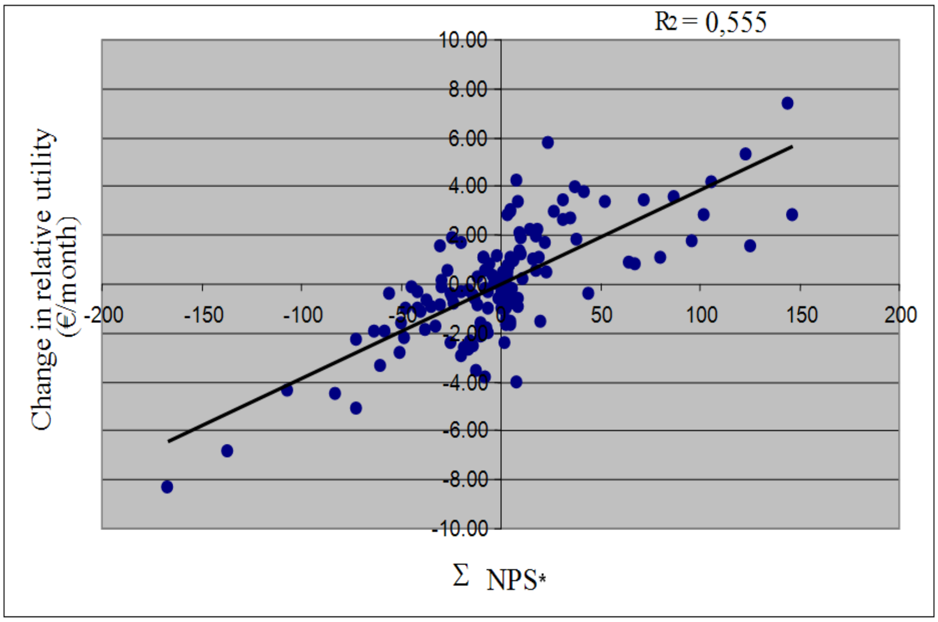

Fig. 2. Long-term relationship between NPS and change in consumer utility

The increase in the duration of the evolution of utility has dramatically improved the correlation, which suggests that the standard error does not stem from a poor correlation but from a residual error which is independent of the correlation.

3.3. Test of increasing correlation. In order to confirm this, we will weigh each NPS value with the number of quarters, k. We will then perform the following linear regression:

$$\Delta_Q^{Q+k}(V_i^*) = (\beta_1 + k\beta_2)\sum_{j=1}^{k}(NPS_i^*)_{Q+j} + (\varepsilon_i)_{Q+k}.$$

The regression provides a positive and significant value for β_2 (see Appendix A, Table A4) which means that the correlation is increasing.

3.4. A useful signal emerges from the noise. The mean of the series $\Delta_Q^{Q+k}(V_i^*)$ and $\sum_{j=1}^{k}(NPS_i^*)_{Q+j}$ is equal to zero because V_i^* and NPS_i^* are the deviation of each firm from the national average. However, when the number of quarters k increases, the standard deviation of the series also increases, while the standard error between the two series remains roughly steady, despite fluctuations quarter by quarter. It is worth noting that standard deviation of both series seems evolve almost like a standard normal distribution whose standard deviation is σ=1.11.

Indeed, each additional quarter amounts to add such standard normal distribution to the previous one. After k quarters, the standard deviation of the sum of k such standard normal distributions is $\sqrt{k}\sigma$. Figure 3 below represents the evolution of the standard deviation of $\Delta_Q^{Q+k}(V_i^*)$, $\sigma_V(k)$, the evolution of the standard deviation of a standard normal distribution, $\sigma_N(k)$, and the standard error, $\varepsilon(k)$, according to k. This suggests that the distribution of the values of $\Delta_Q^{Q+k}(V_i^*)$ around the mean are almost randomly distributed.

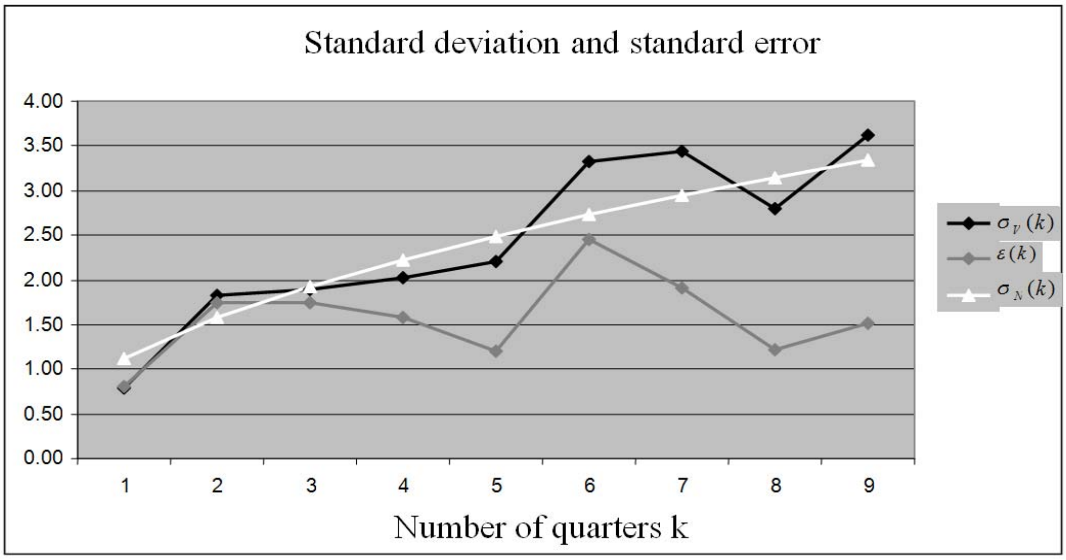

Fig. 3. Standard deviation and standard error over time

The increase in standard deviation means that the absolute values of the series increase and as a result, the correlation increases too. The ratio standard deviation on standard error can be interpreted as a signal to noise ratio. Figure 4 below represents the signal to noise ratio (in decibel),

$$SNR_V(k) = 10\log\left(\frac{\sigma_V(k)}{\varepsilon(k)}\right), \text{ and}$$

$$SNR_N(k) = 10\log\left(\frac{\sigma_N(k)}{\mu}\right),$$

with $\mu = \frac{\sum_{k=1}^{9} \varepsilon(k)}{9}$, the mean of $\varepsilon(k)$ on the 9 quarters.

One can notice the strong increase in standard error for $k = 2$ and $k = 6$. This corresponds to the Q4 2008 and Q4 2009 for Belgium, France, Switzerland and the UK (not for Spain where $k = 2$ corresponds to Q1 2010 and where $k \leq 4$). 4^{th} quarters seem to generate more errors than other. This is probably the effect of Christmas season when many promotions are offered to customers.

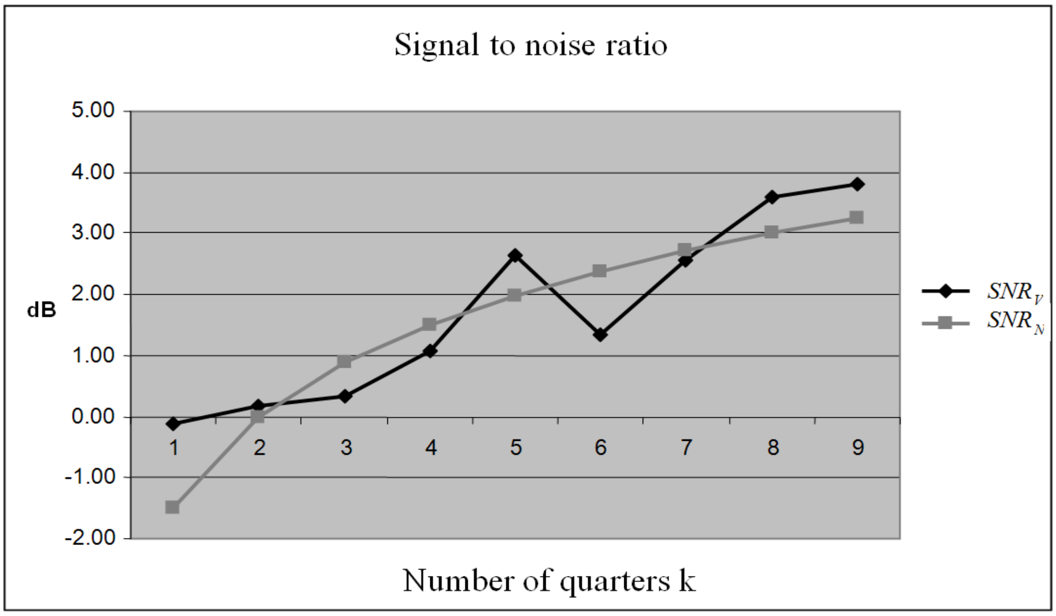

Fig. 4. Comparison between utility and normal distribution

An increase in SNR improves the correlation. The following Figure 5 presented below illustrates the relationship between variable $SNR_V(k)$ and the coefficient of correlation between the two series $\Delta_Q^{Q+k}(V_i^*)$ and $\sum_{j=1}^{k}(NPS_i^*)_{Q+j}$.

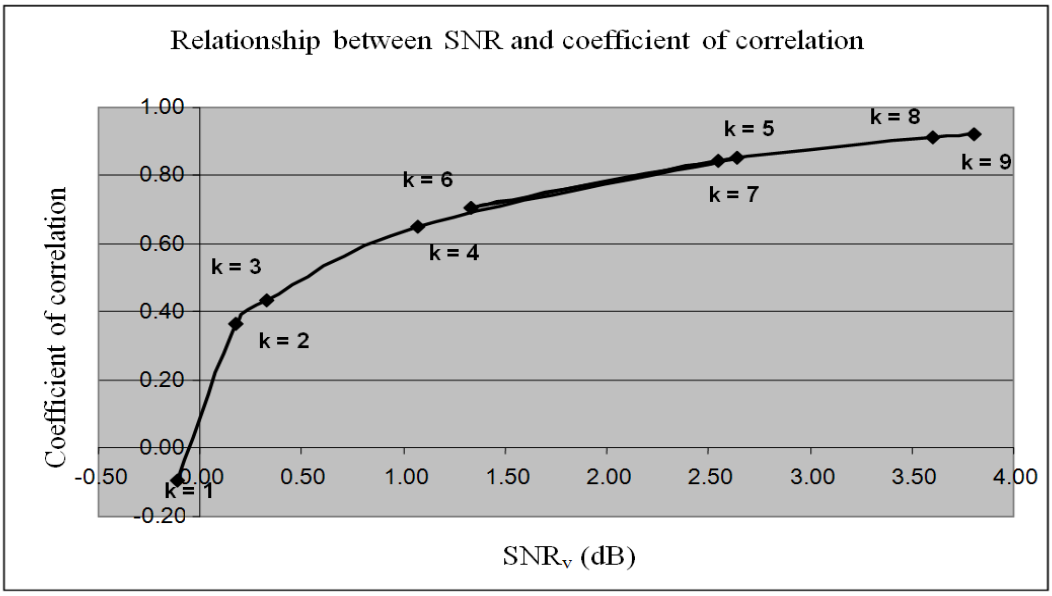

Fig. 5. Relationship between SNR and coefficient of correlation

One can notice that for $SNR_V(k) = 0$, the coefficient of correlation is close to zero, in such a case, the level of noise is equal to the level of signal. When k increases, $SNR_V(k)$ tends to increase and the coefficient of correlation increases as well (excepted for k = 6. For k = 2, despite the slight improvement of the SNR, the coefficient of correlation increases anyway because of the very strong slope of the curve here. When k is great, the coefficient of correlation tends toward 1. In this study, for k = 9, the coefficient of correlation attains 0.92.

The useful signal which is buried in the noise for the low values of k, emerges from the noise when k increases and consequently, the correlation becomes stronger and stronger.

Likewise the coefficient of correlation, the coefficient of determination R^2 increases with the SNR and hence tends to increase with k. For k = 9, adjusted $R^2 = 0.72$, NPS explains more than 72% of the willingness to pay. The following Figure 6 represents the evolution of the adjusted R^2 according to $SNR_V(k)$.

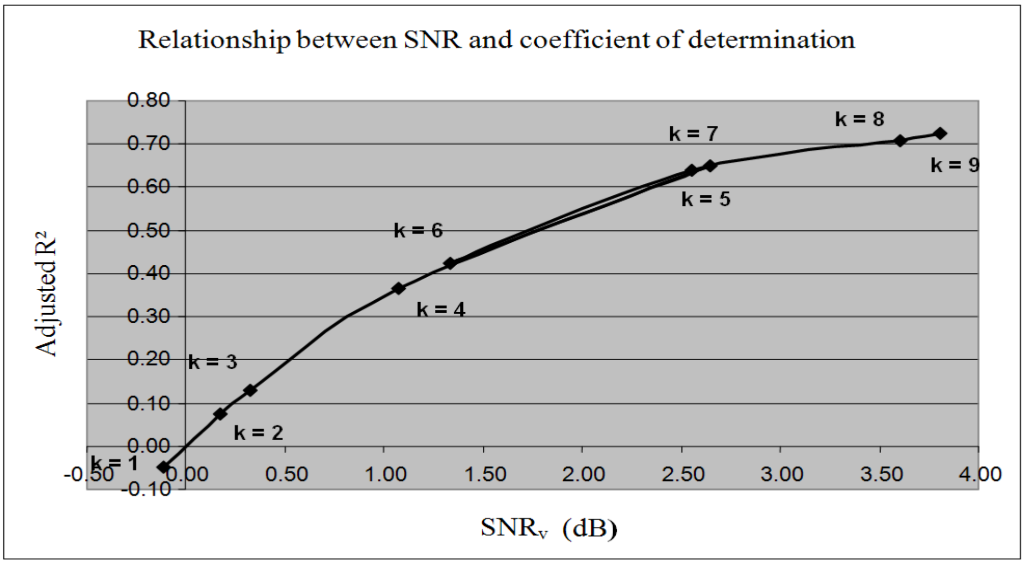

Fig. 6. Relationship between SNR and coefficient of determination

This increasing correlation confirms the hypothesis $\frac{dV}{d\tau} = \beta\, NPS$ and allows us to estimate parameter β.

3.5. Estimation of parameter. The accuracy of the estimation increases like the correlation with the number of quarters, k. Therefore the most accurate estimation is given for k = 9. In such a case, the estimation leads to $\beta = 5\,\text{cent€}/month$ with a 15% standard error. That means that has a probability of 50% to be in the range: 4.3 to 5.8 cent €/month or a probability of 95% to be in the range: 3.3 to 6.8 cent €/month.

$\beta = 5 \text{ cent } € / month$ means that a 10-point NPS per quarter corresponds to a 0.5 €/month increase in consumer utility. The NPS is measured each quarter and the results are cumulated over time. In other words, a 5-point NPS per quarter during a year corresponds to 1€/month increase in utility and thus closely 1 €/month in willingness to pay, as it is closely related to utility. However, if all firms have the same NPS, their relative NPS will remain unchanged and therefore also their relative utility. This does not mean their individual utility does not increase; only that it increases identically for all firms. In such a case, all things being equal, revenues and profits remains steady. Firms can benefit from the increase of utility of their customers, only when it is higher than that of their competitors.

There are no significant differences between countries, adding a dummy country does not provide additional information.

A comparison of the relative evolution of utility, V_i^*, and net promoter score NPS^*, using the coefficient β we have estimated, firm by firm in each country is available in Appendix B.

Firms that have the greatest changes are often also those that give the most accurate results because they deviate more from the margin of error for example: Swisscom (Switzerland); Hutchinson 3 (UK); Bouygues (France) or Yoigo (Spain).

4. Correlation between NPS, revenues and profits

The correlation between NPS, revenues and profits has already been clearly indicated by Reichheld (2003). We aim to show that this correlation is much weaker than for utility. Utility depends essentially on customers' choices and thus on their satisfaction which can be measured by NPS, while revenues and profits, while they heavily depend on NPS, are also subject to other factors which are independent of customers, including marginal cost, coefficient of differentiation t and total market size n.

Equation (1) can be rewritten:

$$p_i = c_i + t + \frac{N(V_i^* - c_i^*)}{(2N-1)}$$

Revenues and profit of firm i can be written:

$$R_i = \frac{nN}{t}\left(\left(\frac{t}{N} + \frac{V_i^* - c_i^*}{(2N-1)}\right)^2 + \frac{c_i}{N}\left(\frac{t}{N} + \frac{V_i^* - c_i^*}{(2N-1)}\right)\right), \quad (7)$$

$$\pi_i = \frac{nN}{t}\left(\frac{t}{N} + \frac{V_i^* - c_i^*}{(2N-1)}\right)^2. \quad (8)$$

Equations (7) and (8) show that revenues and profit will evolve quadratically with the development of relative utility V_i^*, and thus with the relative NPS. This fulfils the second generalization of Gupta & Zeithaml (2006) *"The link between satisfaction and profitability is asymmetric and non-linear"*.

However, revenues and profit are also very sensitive to variations in efficiency, c_i^*, differentiation t, or the total market size n.

Equation (6) illustrates the relationship between utility and NPS. We can write the similar relationship between the evolution of revenues and NPS:

$$\Delta_Q^{Q+k}(R_i^*) = \beta \sum_{j=1}^{k} (NPS_i^*)_{Q+j} + (\varepsilon_i)_{Q+k}. \quad (9)$$

The coefficient of correlation is 0.503 for 132 observations. It is still significant but weaker than the correlation between utility and NPS (coefficient of correlation 0.745). The graph below represents the corresponding scatter plot (Figure 7).

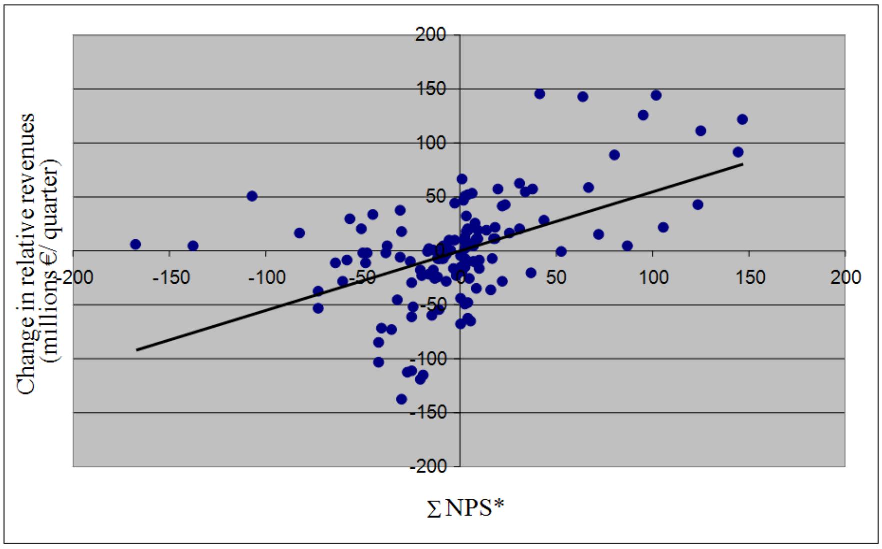

Fig. 7. Relationship between change in relative revenues and relative NPS

In the same way, the relationship between the development of profits and NPS can be written:

$$\Delta_Q^{Q+k}(\pi_i^*) = \beta \sum_{j=1}^{k} (NPS_i^*)_{Q+j} + (\varepsilon_i)_{Q+k}. \quad (10)$$

The coefficient of correlation is 0.085, which is too low to be significant. Figure 8 below represents the corresponding scatter plot.

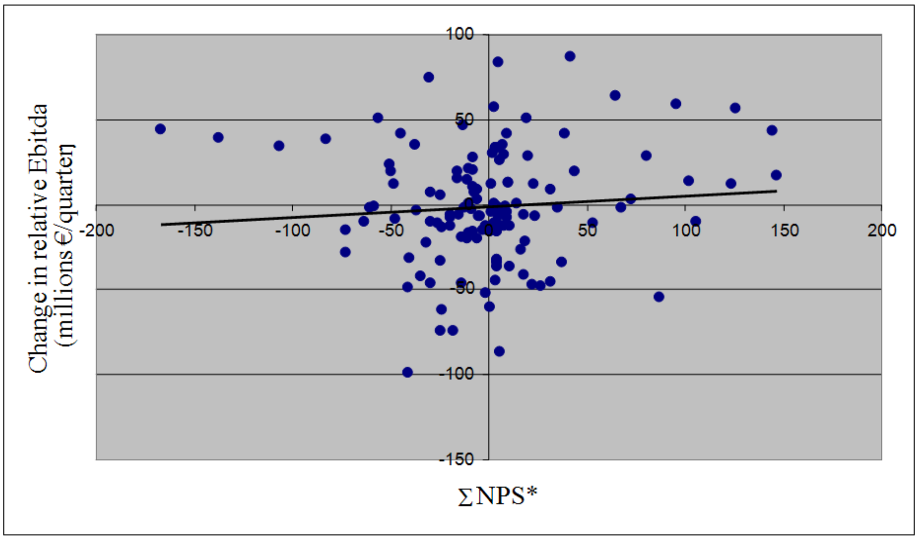

Fig. 8. Relationship between Change in relative EBITDA and NPS

Equation (8) indicates that profits are very sensitive to marginal costs. Let us add marginal costs to the regression.

$$\Delta_Q^{Q+k}(\pi_i^*) = \beta_1 \sum_{j=1}^{k} (NPS_i^*)_{Q+j} + \beta_2 \sum_{j=1}^{N} (c_i^*)_{Q+j} + (\varepsilon_i)_{Q+k} \quad (11)$$

β_1 and β_2 are both quite significant: $\beta_1 = 0.379^{***}$ and $\beta_2 = -11.44^{***}$. The opposite signs of β_1 and β_2 suggest that firms with a high NPS which increase their consumers' utility the most quickly are also generally those which increase their marginal costs the most. In other words, this suggests that the increase in utility and marginal costs are correlated. The correlation coefficient is 0.838 for 132 observations, which indicates a strong correlation. This explains why the correlation between profit development and NPS is so weak. The increase in NPS often requires an increase in quality for consumers. This tends to increase marginal costs and reduces the benefits provided by consumers' satisfaction. In equation (7), the increase of marginal costs reduces the term $V_i^* - c_i^*$ but it is compensated by the term $\frac{c_i}{N}$. In equation (8) the term $\frac{c_i}{N}$ disappears and can no longer compensate for the reduced efficiency. Moreover, the coefficient of correlation between evolution of profits and $(V_i^* - c_i^*)$ is 0.500 for 132 observations, which is quite significant.

Figure 9 below represents the scatter plot between utility and marginal costs.

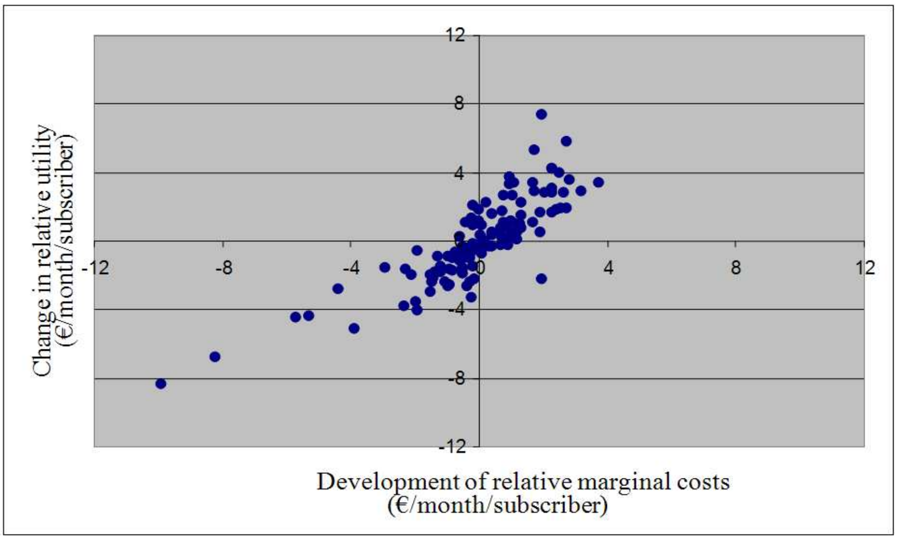

Fig. 9. Relationship between the change in relative utility and marginal costs

Conclusion

The correlation between NPS and utility is very strong in the European mobile markets which we studied. It explains most of the variations in utility. It is clearly the sign of competitive markets where customers can switch providers at will without much hindrance.

The standard error does not vary significantly with the duration of observation, while NPS tends to increase; therefore, the relative error decreases and causes the increase in the correlation between NPS and utility. We can consider that the NPS faithfully reflects changes in utility and as a consequence in willingness to pay. A 5-point NPS per quarter over a year corresponds to about 1€/month increase in willingness to pay.

The correlation between NPS and revenues exists but is less pronounced due to the fact that utility depends entirely on consumers while revenues also depend on strategic interactions among firms.

The correlation between NPS and profits is even lower because profits are very sensitive to variations in marginal costs and firms which increase their customers' utility the most are also often those which increase marginal costs the most.

As part of further research, it might be relevant to find out how NPS could be used as an indicator of the competitiveness of a market, looking at the correlation coefficient between utility and NPS.

This would distinguish what comes from the merits of the firms that manage to differentiate themselves from their competitors and what comes from an abusive customer retention.

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Appendix A

Table A1. Exchange rate

	Q2 2008	Q3 2008	Q4 2008	Q1 2009	Q2 2009	Q3 2009	Q4 2009	Q1 2010	Q2 2010	Q3 2010
CHF ->€	0,620	0,621	0,656	0,667	0,661	0,658	0,662	0,684	0,708	0,751
GBP ->€	1,261	1,259	1,191	1,099	1,136	1,149	1,105	1,127	1,170	1,201

Source: Fxtop.com.

Calculated values of $\Delta_Q^{Q+k}(V_i^*)$ and $\sum_{j=1}^{k}(NPS_i^*)_{Q+j}$ are presented in Tables A2 and A3

Table A2. Author's calculation using Bank of America Merrill Lynch data

$\Delta_Q^{Q+k}(V_i^*)$

Country	€/month	Q3 2008	Q4 2008	Q1 2009	Q2 2009	Q3 2009	Q4 2009	Q1 2010	Q2 2010	Q3 2010
Belgium	*k*	1	2	3	4	5	6	7	8	9
	Firm 1	-1,01	0,06	-2,05	-1,84	-2,13	-2,53	-3,59	-2,38	-2,95
	Firm 2	0,78	0,55	-0,89	0,99	-0,81	0,44	0,25	1,04	0,75
	Firm 3	0,23	-0,60	3,03	2,83	2,94	2,09	3,33	1,34	2,20
France	*k*	1	2	3	4	5	6	7	8	9
	Firm 1	1,14	-2,42	-0,72	-1,69	-0,28	-4,05	-1,68	-1,55	-1,45
	Firm 2	-0,21	-1,78	-0,45	-0,52	-0,77	-1,74	-0,95	-1,13	-0,33
	Firm 3	-0,92	4,20	1,17	2,22	1,06	5,79	2,64	2,68	1,78

Table A2 (cont.). Author's calculation using Bank of America Merrill Lynch data

Country	€/month	Q3 2008	Q4 2008	Q1 2009	Q2 2009	Q3 2009	Q4 2009	Q1 2010	Q2 2010	Q3 2010
Spain	*k*						1	2	3	4
	Firm 1						1,10	-2,63	-0,37	-1,03
	Firm 2						0,72	-0,23	-0,42	-0,31
	Firm 3						-0,30	-0,88	-0,11	-0,42
	Firm 4						-1,52	3,75	0,90	1,77
Switzerland	*k*	1	2	3	4	5	6	7	8	9
	Firm 1	0,94	0,51	3,97	3,38	3,39	3,52	4,18	5,30	7,37
	Firm 2	-0,32	1,09	-3,84	-2,69	-2,42	-1,88	-2,23	-3,33	-2,27
	Firm 3	-0,62	-1,60	-0,13	-0,70	-0,97	-1,64	-1,95	-1,96	-5,10
UK	*k*	1	2	3	4	5	6	7		
	Firm 1	-0,23	-0,50	0,45	0,72	0,20	1,86	1,93		
	Firm 2	0,46	-0,43	0,80	1,10	2,80	1,52	2,83		
	Firm 3	0,33	-0,01	-0,28	0,99	1,68	2,92	3,42		
	Firm 4	-0,85	-0,59	1,86	1,69	-0,32	0,52	0,16		
	Firm 5	0,29	1,53	-2,83	-4,50	-4,36	-6,82	-8,35		

Table A3. Author's calculation using GfK data

$$\sum_{j=1}^{k} (NPS_i^*)_{Q+j}$$

Country		Q3 2008	Q4 2008	Q1 2009	Q2 2009	Q3 2009	Q4 2009	Q1 2010	Q2 2010	Q3 2010
Belgium	*k*	1	2	3	4	5	6	7	8	9
	Firm 1	-6,00	-1,67	-6,00	-7,00	-10,00	-13,33	-12,33	-15,00	-19,33
	Firm 2	-5,00	-7,67	1,00	3,00	5,00	3,67	3,67	5,00	4,67
	Firm 3	11,00	9,33	5,00	4,00	5,00	9,67	8,67	10,00	14,67
France	*k*	1	2	3	4	5	6	7	8	9
	Firm 1	-1,67	2,00	3,33	5,00	4,33	8,00	3,33	5,00	2,67
	Firm 2	-7,67	-10,00	-13,67	-24,00	-23,67	-32,00	-34,67	-40,00	-41,33
	Firm 3	9,33	8,00	10,33	19,00	19,33	24,00	31,33	35,00	38,67
Spain	*k*						1	2	3	4
	Firm 1						-8,50	-18,00	-24,50	-41,00
	Firm 2						3,50	6,00	4,50	1,00
	Firm 3						-15,50	-30,00	-44,50	-56,00
	Firm 4						20,50	42,00	64,50	96,00
Switzerland	*k*	1	2	3	4	5	6	7	8	9
	Firm 1	7,00	18,00	37,33	53,00	72,33	87,33	106,00	123,67	144,67
	Firm 2	-6,00	-8,00	-7,67	-16,00	-24,67	-37,67	-48,00	-60,33	-72,33
	Firm 3	-1,00	-10,00	-29,67	-37,00	-47,67	-49,67	-58,00	-63,33	-72,33
UK	*k*	1	2	3	4	5	6	7		
	Firm 1	3,00	1,20	1,60	4,60	1,40	10,80	17,80		
	Firm 2	23,00	44,20	67,60	80,60	102,40	125,80	146,80		
	Firm 3	-4,00	-2,80	5,60	16,60	22,40	26,80	31,80		
	Firm 4	-11,00	-12,80	-24,40	-19,40	-19,60	-26,20	-29,20		
	Firm 5	-11,00	-29,80	-50,40	-82,40	-106,60	-137,20	-167,20		

Table A4. Test of increasing correlation

Regression statistics	
Multiple R	0,75621969
R Square	0,57186822
Adjusted R Square	0,56088259
Standard Error	1,54668713
Observations	132

ANOVA

	df	SS	MS	F	Significance F
Regression	2	415,40029	207,700145	86,8224138	1,2967E-24
Residual	130	310,991343	2,39224108		
Total	132	726,391631			

Table A4 (cont.). Test of increasing correlation

	Coefficient	Standard error	T stat	P-value	Lower 95%	Upper 95%
β_1	0,01620873	0,01012488	1,600881	0,11183062	-0,00382214	0,0362396
β_2	0,00360506	0,00157422	2,29005987	0,0236287	0,00049065	0,00671947

Appendix B. Firm by firm comparison of NPS and utility

Let us compare the variations of relative utility V^* and relative net promoter score NPS^*.

Belgium

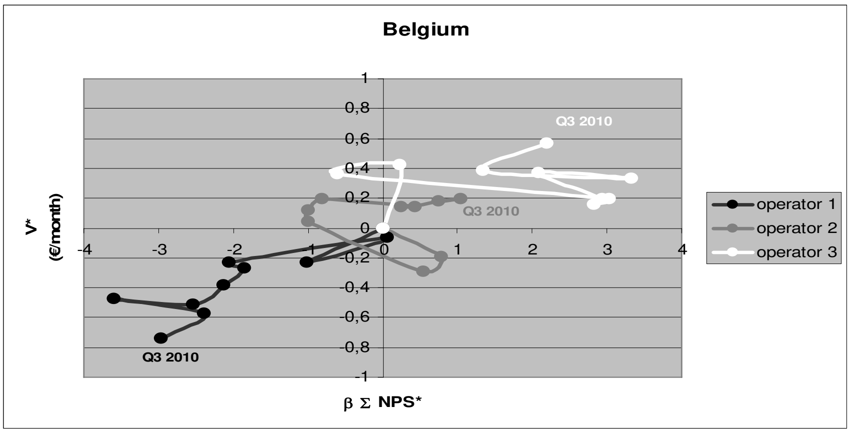

Fig. B1. Comparison between NPS and utility in Belgium

France

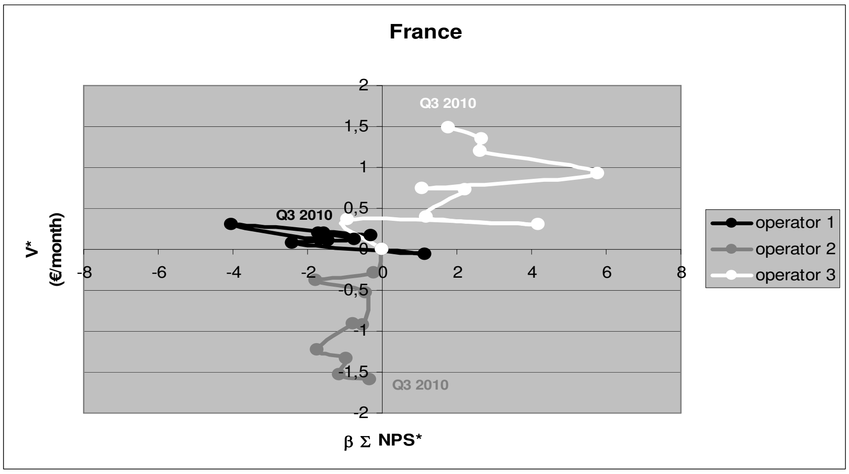

Fig. B2. Comparison between NPS and utility in France

Spain

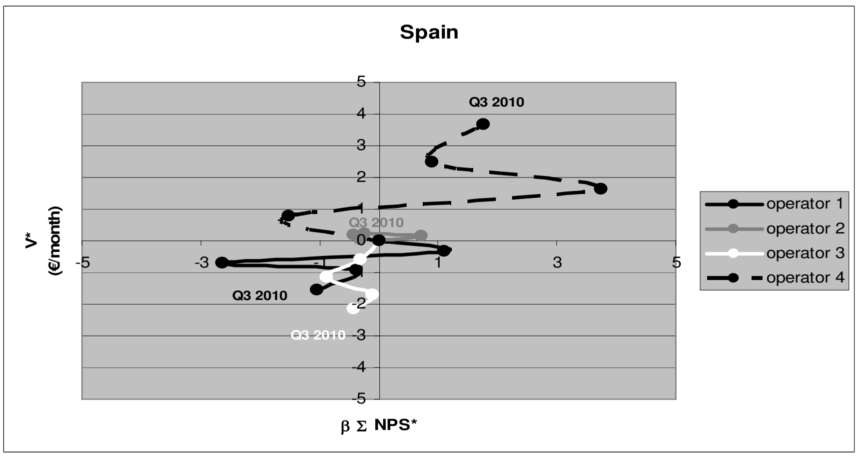

Fig. B3. Comparison between NPS and utility in Spain

Switzerland

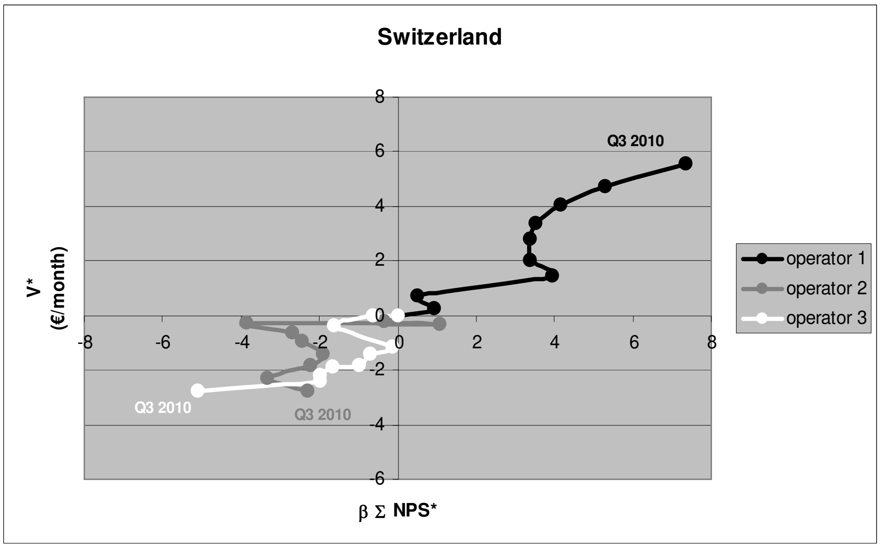

Fig. B4. Comparison between NPS and utility in Switzerland

United Kingdom

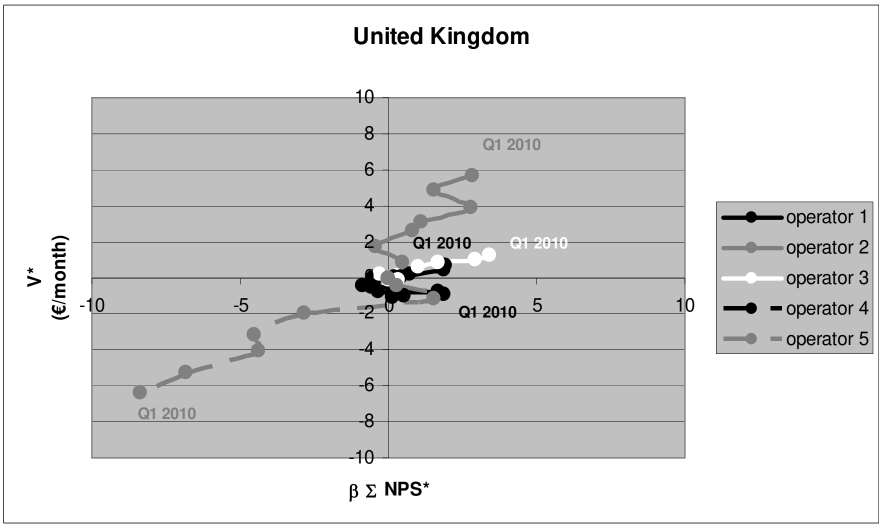

Fig. B5. Comparison between NPS and utility in the UK