Game theory and the new entrant: Independence Bank and the USFFCU

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ABSTRACT

The problem of mutually dependent decisions between a rival firm entering a market and the incumbent firm shielding its market share can be illustrated in the brief case-study developed by the authors. It describes the Independence Bank, a new entrant that is considering to expand its financial services to all the campuses of the University of South Florida (USF). However, the USF Federal Credit Union (USFFCU) has been the sole provider of financial services to USF students, staff, and faculty since 1959. The firms are opting for different levels of advertising expenses to gain or retain customers in this sound and stable market. This case-study provides a practical and interesting pedagogical tool with which to address sequential games and the Nash Equilibrium.

Keywords: Case Study, Game Theory, Sequential Games, Subgame Perfect Nash Equilibrium, Financial Institutions.

INTRODUCTION

A classic application of sequential games is the "incumbent versus new entrant" game, in which a firm must choose whether to enter a market. The incumbent, or the firm currently established in the market, might respond by choosing to accommodate the new entrant and thus losing market share or to challenge the opponent by reducing prices. The main issue is the occurrence of interdependent decisions, whereby each firm's actions may strongly affect its rival. This paper provides a useful pedagogical tool for college and graduate-level educators who use the case-study system. This case is brief, interesting, and manageable for a class discussion on game theory and sequential games. The case can be expanded to include more complex scenarios, such as incomplete information sequential games.

THE CURRENT SITUATION

David Weiss was sitting at the ornately carved desk in his spacious new office. As the recently hired Chief Risk Officer, David had the responsibility of identifying threats to the financial success of the credit union. This was David's first time in the C-Suite and he had a lot riding on this job. As his eyes danced around the office, David noticed an article sitting on a corner of his desk with some highlighting and a few intensely scribbled notes across the top. This must have been another "gift" left by his predecessor; −he wondered if it was as thoughtful as the bag of rotting fruit he found in his filing cabinet. As David unfolded the article, he saw the headline "Independence Bank Comes to Town: Successful regional bank opens first Tampa Bay area branch at USF." David's eyes grew wide. He leaned over towards the crisp white notepad resting at his side; "trouble" was the word he quickly scribed on the page.

Since 1959, the USF Federal Credit Union (USFFCU) has been a not-for-profit financial cooperative chartered to provide financial services to the students, staff, and faculty of any of the University of South Florida's (USF) campuses. As a credit union with a limited membership, it has been largely insulated from competition. The USFFCU has generated positive returns to its membership in each of the last five years despite a weak economy, falling home prices, and anemic loan demand.

However, the credit union has had a bull's eye on its back for years because the community it serves can be quite lucrative. The average lifetime earnings of college graduates are double that of individuals with only a high school diploma (Greenstone and Looney, 2011). Doctoral degree holders are even better off, with lifetime earnings nearly triple those of high school graduates (Carnevale et al., 2010). College graduates are a prime target for real estate, small business, and other high-yield loan products, as they are substantially more creditworthy than the average consumer is. University personnel are also highly desirable customers because they tend to be very stable borrowers.

In 2001, the Florida Regional Bank was the first to launch an on-campus bank location to compete with the USFFCU. This venture stalled because the bank suffered significant financial setbacks; it was thus forced to shelve its plans to expand throughout the Tampa Bay area.

Sources of Profitability

Credit unions generate income in three ways: through non-interest income (fees), interest income (loans), and investment income. Profitability has largely been derived through interest

income or the difference between what banks receive in interest payment on loans and what they pay out to depositors. In the last ten years, however, major macroeconomic shifts have reduced the profits flowing from this source.

In conducting his profitability analysis, David used average loan and fee data covering the credit union's entire member base of 33,000 individuals and calculated an average annual contribution of $84 to net income per existing customer and an average membership period of 9.22 years (see Table 1, Columns 2 and 3). David believes that an analysis must recognize that the current credit union members are significantly more profitable than new members would be; current members have higher product usage rates, and their average loan balances are significantly higher. Moreover, current members generate an average of $774.48 in net income over the lifetime of the relationship. By contrast, new members generate an average of only $243.45 in net income over the lifetime of the relationship. Therefore, David chose to divide members into 'existing member' and 'new member' categories and to focus his analysis on 'existing members'.

Next, David consulted with the credit union's CFO, former bank executive Theo Walcott, to assess Independence Bank's profitability ratio. Theo suggested taking the publically available data in the credit union's financial reports and adding 20 percent to the figures provided. Theo explained that banks' profitability typically exceeds that of credit unions due to the for-profit nature of the former.

"Stickiness" of the Product

Banking products tend to be "sticky," since consumers are unlikely to leave their existing provider unless they are highly dissatisfied with the current costs and services. In this electronic age, direct payroll deposits and the automatic payments of bills, cell phone charges, and mortgages have made switching between providers time consuming. Consumers must usually notify each entity individually and provide the account number and routing number for the new bank account. This inconvenience, known as a "switching cost," is a barrier that works in the favor of the incumbent financial institution. Marketing is an efficient tool for overcoming this hurdle. Well-targeted marketing campaigns can persuade customers to switch to a new financial institution (The Financial Brand, 2011). Incentives can be as small as free pizza and Coke at a branch or as lavish as cash payments exceeding $100 per customer.

THE DILEMMA

After conducting further research, David learns that the Independence Bank will be locating a branch on the main university campus within the next 12 months. David's dilemma today is to determine the optimal level of advertising expenditure needed to defend against the threat posed by this new competitor. David and Theo have been working to construct a strategic response for two weeks. They are considering three options: (1) aggressive advertising (AA), involving an additional $100,000 in advertising expenses; (2) medium advertising (MA), with an enhanced marketing budget of $20,000; or (3) low advertising (LA), which preserves the status-quo. Advertising is a broad label covering all sorts of promotional activities, including special on-campus events, promotional product giveaways, targeted mailings to key segments of the customer base, and other highly targeted activities.

The challenge is that, while the USFFCU does not know how much the new entrant will spend on its marketing campaign, industry data suggest that three options are available to it (see Table 1, Column 1, in Appendix): (1) aggressive advertising (AA); medium advertising (MA); or low advertising (LA). If the competitor follows an AA strategy, current members will become more likely to defect from the credit union (see Table 1, Column 5, in Appendix). Each option implies its own possible outcome and David has calculated each one for the Independence Bank (see Table 2, in Appendix).

The USFFCU is also concerned that college freshmen may be captured by the new bank's marketing campaign, a key success factor for the credit union because of the sheer numbers involved: more than 4,000 new students undergo student orientation every year. David knows that a slow response could allow Independence Bank to gain significant market share. However, he is confident because USFFCU has a long history at USF that word-of-mouth advertising will be the vital and inexpensive method by which current customers steer new ones to the USFFCU.

This morning, David and Theo brought their analysis before the senior leadership team, who is uncertain about how to determine the optimal marketing strategy. Tables 1 and 2 (Appendix) provide possible scenarios and profitability outcomes for both institutions that follow the three marketing options. The leadership team believes that the best-case scenario would be for the new competitor to choose a low level of advertising and for the credit union to choose the AA strategy. However, this option is the least attractive to the Independence Bank. The leadership team believes that further analysis is necessary in order to predict the strategic choices that each entity will make, given their interrelated outcomes.

TEACHING NOTES

The USFFCU has been the main financial service provider for the University of South Florida campuses since 1959. David Weiss, the credit union's new Chief Risk Officer (CRO), has learned that the Independence Bank will be opening a branch on the Tampa Campus for the first time in school history. The concern is that the Independence Bank will capture current and future members from the credit union. As the CRO, David has made a recommendation to the leadership team regarding marketing expenses in response to the threat of the Independence Bank opening a USF location.

Questions for Class Discussion

1. Briefly summarize the case and David's problem.
2. Conduct a sequential game analysis of two competitors among whom the new entrant is the Independence Bank and the incumbent firm is the USFFCU.
3. Identify the dominated and/or dominant strategies (if any) and the Sub-Perfect Nash equilibrium in this game.
4. Provide alternative strategies for the USFFCU to consider.

For more advanced classes in game theory, this case could be expanded by providing the probabilities for each strategy and asking the students to calculate the expected outcomes. Some information could also be concealed as a way of developing a sequential game with incomplete information.

Possible Solutions

To assess the situation, students may conduct a sequential game in which the Independence Bank is the new entrant and the USFFCU is the incumbent in the USF's financial services market. In this case, each player has three options or branches to choose from: aggressive advertising (AA), medium advertising (MA), and low advertising (LA). David believes that his analysis of the Independence Bank is accurate despite his lack of current data. In response to the new competitor's strategies, the USFFCU must determine its advertising budget. Figure 1 (Appendix) illustrates the extensive form for this game. The payoffs at the end of this "decision tree" are simple calculations from Tables 1 and 2 and Column 6 (Appendix), but one can assess the present value of the income stream over the stipulated period minus the current advertising costs.

To find the optimal strategies for both players, let's apply backward induction. Consider the last actions of the game. The USFFCU would never choose MA; thus MA is USFFCU's dominated strategy. If the USFFCU finds itself in the upper or middle branches, its best strategy would be AA; but if the game takes the USFFCU to the lower branch, it can choose AA or LA. Going backward in the decision tree and anticipating USFFCU's responses, the Independence Bank's best options is to choose AA (see Figure 1). The Subgame Perfect Nash Equilibrium (SNE) is for the Independence Bank to choose AA and for the USFFCU to choose AA. It is evident that, if this game were played for 'n' number of periods, a discount rate could be calculated that may change the SNE.

As an alternative strategy, the USFFCU could offer higher interest rates on deposit accounts or lower interest rates on loans. This pricing strategy could help them retain existing customers and attract new customers as well, but it would work most effectively if the USFFCU could identify their price sensitive customers. Moreover, the current macroeconomic situation, in which interest rates are close to zero and the spread between deposit and loan rates is narrow, makes this strategy difficult to apply. Other alternatives to consider include matching the Independence Bank's promotional offers (in a tit-for-tat strategy) or moving the game from a one-time situation to a multiple-period setting, which could change the payoffs and the SNE. Developing a major social media marketing campaign that appeals to college and university students is another option not yet fully exploited by the industry (Kolesnikov-Jessop, 2012).

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APPENDIX

Table 1. USFFCU Options and Outcomes

USFFCU-AA ($100,000)				
(1)	**(2)**	**(3)**	**(5)**	**(6)**
Independence's Response	Mean Annual Contribution to Net Income	Average Tenure of Membership (in years)	Change in Number of Existing Members	Expected change in Net Income = (2) x (3) x (4)
AA	$84	9.22	-250	($193,620)
MA	$84	9.22	-200	($154,896)
LA	$84	9.22	-50	($38,724)
USFFCU-MA ($20,000)				
Independence's Response	Mean Annual Contribution to Net Income	Average Tenure of Membership (in years)	Change in Number of Existing Members	Expected change in Net Income = (2) x (3) x (4)
AA	$84	9.22	-350	($271,068)
MA	$84	9.22	-275	($212,982)
LA	$84	9.22	-75	($58,086)
USFFCU-LA ($0)				
Independence’s Response	Mean Annual Contribution to Net Income	Average Tenure of Membership (in years)	Change in Number of Existing Members	Expected change in Net Income = (2) x (3) x (4)
AA	$84	9.22	-500	($387,240)
MA	$84	9.22	-375	($290,430)
LA	$84	9.22	-50	($38,724)

Table 2. Independence Bank Options and Outcomes

Independence Bank-AA				
(1)	**(2)**	**(3)**	**(5)**	**(6)**
USFFCU's Response	(a) Mean Annual Contribution to Net Income	(b) Average Tenure of Membership (in years)	Number of New Customers at Independence	Expected change in Net Income = (2) x (3) x (4)
AA	$54	5.41	650	$189,891
MA	$54	5.41	900	$262,926
LA	$54	5.41	1250	$365,175
Independence Bank-MA				
USFFCU's Response	(a) Mean Annual Contribution to Net Income	(b) Average Tenure of Membership (in years)	Number of New Customers at Independence	Expected change in Net Income = (2) x (3) x (4)
AA	$54	5.41	350	$102,249
MA	$54	5.41	500	$146,070
LA	$54	5.41	650	$189,891
Independence Bank-LA				
USFFCU's Response	(a) Mean Annual Contribution to Net Income	(b) Average Tenure of Membership (in years)	Number of New Customers at Independence	Expected change in Net Income = (2) x (3) x (4)
AA	$54	5.41	150	$43,821
MA	$54	5.41	200	$58,428
LA	$54	5.41	250	$73,035

Note:(a) Based on USFFCU data, the average mean annual contribution to net income for a new customer is $45 plus 20% additional income due to the for-profit nature of Independence Bank makes this figure equals to $54.(b) Based on USFFCU data, average tenure of membership for new customers is 5.41 years.

Figure 1: Decision Tree for Independence Bank and USFFCU