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IT-Enabled Incentive Schemes in Telephone Banking

by

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Abstract

In this paper we show that an IT-enabled suitable design of incentives improves the competitiveness of new marketing and distribution channels like telephone banking. Using and extending a framework developed by Nault and Dexter [8] for franchising, we show that an IT-enabled "ownership of customers" increases the effort of telephone consultants to establish ongoing customer relationships, leading to higher income for the consultants and higher profits for the banking firm. Moreover, it can be shown that the bank can optimize incentive parameters in such a way to achieve a first-best solution.

1. Introduction

The increasing number of competitors in the European financial services market has forced traditional banking and insurance companies to establish new distribution channels. In reaction to increasing costs of branch systems they have pursued a strategy of diversifying into direct banking via telephone. Recent experience with discount banking has shown that selling banking products without customer consulting at discount prices attracts price-sensitive high-income customers [4]. Although this works well for less complex and standardized distinct financial products, customers increasingly ask for complete solutions to their individual financial needs. As individual solutions often require the combination of several complementary products [2] this implies the need to offer a wide range of financial services (products and customer consulting). Customer consulting becomes the key to successful implementation of the cross-selling-strategy because of interdependencies between different products and the complex know-how involved [1]. Thus, the focus of direct banking shifts away from a discount strategy towards the 7-days-a-week-at-24-hours-availability of consultants via telephone. Generally speaking, customer consultants need not only to become more sales and service oriented, but - due to the recent shift away from discount banking - more proactive and consultative in selling than being only efficient in order taking. To stay competitive, such a strategic reorientation has to be accompanied by a suitable assignment of decision rights to the telephone consultants (ranging from time allocation among different tasks to deciding on the order of customers to be contacted via outbound sales calls) and an appropriate redesign of reward systems and incentive schemes for the consultants. Ensuring the compatibility of individual activities of consultants with the objectives of the firm is crucial for the successful operationalization of the new strategy.

When designing efficient reward systems the banking firm needs to solve several problems stemming from the principal/agent-relationship between the bank (principal) and the consultants (agents). While the bank wants the consultants to choose effort (i.e., investing in ongoing customer relationships) such as to maximize its total net profits, the consultants try to maximize their individual utility. Customers' demand for individual solutions requires the disclosure of detailed information about personal and financial background. Empirical evidence in German banking shows that customers prefer to provide this information to a personal consultant rather than to an anonymous banking institution represented by several contact persons [5]. Thus, a close and trusting customer-consultant relationship generates reputation and is key for solving an individual customer's problem. This leads to an increased customer satisfaction (and profitability of the ongoing customer relationship) on the one hand and to private information of the consultant about the different sales potential and needs of his customers on the other hand. Achieving the former is strategically important to ensure the ongoing competitiveness of the firm in the market while the latter implies an information asymmetry between consultants and bank.

Since there are conflicting objectives and information asymmetries the individual consultant may not always use this information in the best interest of the banking firm. Generally there are two alternatives for the bank to influence the effort level of the consultant and his time

allocation among different tasks: *monitoring* and *incentives*.

Monitoring is feasible if the bank is able to centrally determine a time allocation among tasks for the consultants (e.g., time to invest into any customer relationship), to force them to pursue these actions (e.g., through a contract) and to observe the consultants' activities. IT-enhanced control systems can improve monitoring via reducing information asymmetries [3].

Incentives require that results can be attributed to the consultants. Here, IT can serve as an enabling technology. Incentives can be applied if the quality of decisions or the effort to invest in ongoing customer relationships are not readily observable and thus monitoring is infeasible. In these cases incentives based on output allow the decision maker to use his individual expertise about spending total effort and time for each of his customers in an optimal manner.

Most banking firms pursuing a direct banking strategy apply reward systems based on monitoring. Within a framework of subjective performance evaluation systems a supervisor (service team manager) monitors the telephone consultants' efforts (e.g., when talking to customers or keeping track of customer reports). A set of such goals for the year is agreed on with each consultant; bonus payments are based on the extent to which the goals are achieved. If only a small range of standardized products is offered via telephone and consulting is negligible, this kind of performance evaluation and reward system may be sufficient to induce a certain level of effort and to maintain a certain service standard. Focusing on efficient order taking the set of alternative actions of the individual telephone consultant is comparatively small and his local expertise is negligible.

With an increasing range of products offered and the corresponding demand for individual consulting, the effective use of local expertise is crucial for the competitiveness of the banking firm. In contrast to discount banking, the customers' needs differ greatly and hence require individual solutions with non-standardized products, providing the consultant with a much broader scope of decision alternatives. As a whole, due to limited time of any single consultant, the key decision a consultant makes is the allocation of effort and scarce time among different customers (e.g., based on their individual potential) and among different tasks such as

- recruiting new customers via outbound calls,
- intensifying existing customer relationships,
- updating customer files,
- presales planning,
- after sales marketing.

It is straightforward that the choice of the different effort levels and the corresponding quality of consulting determines the profitability of the bank via both immediate sales and customer satisfaction resulting in subsequent sales. The design of an incentive scheme hence has to focus on encouraging an appropriate mix of selling activities and servicing investments and thus on inducing the consultants to allocate their effort and scarce time such as to maximize the banking firm's total profits.

In telephone banking, due to a 24-hours-availability of the bank on the one hand and limited working time of the single consultant on the other, customer contacts with several consultants are inevitable. To illustrate the problem consider the following scenario. A given consultant invests effort in recruiting and understanding a given customer's needs. After providing this customer with information the customer ponders his/her decision, contacting the bank by telephone when ready to make a purchase. If the consultant that orginally recruited the customer is not rewarded for the purchase, then the consultant has no incentive to recruit and understand customer needs. The only incentives are for consultants to wait for calls and take purchase orders, and as a result there is underinvestment in customer recruitment. Therefore, as consultants are not rewarded for the beneficial horizontal externalities generated by their investments, underinvestment occurs. In this paper we investigate ways to solve this problem.

We show that a *monitoring*-based reward system becomes more and more inefficient with increasing information asymmetry, for example, an asymmetry due to an increasing range and complexity of the services offered. Output-based *incentives* become more advantageous by inducing use of private information by the individual consultant. To solve the problem at hand, we use the concept of IT-enabled *"ownership of customers"* ([7], [8]) for an appropriate design of the incentive system yielding a larger overall level of strategically important servicing investments.

We present the model in the five subsections of Section 2 with our key results presented in Section 2.5. We conclude the paper with Section 3 by summarizing the results, discussing the limitations of the model, and outlining prospects for further research.

2. The Model

2.1. Assumptions

Our model is constituted by the following assumptions:

(A1) We consider the organization of a (European) telephone banking firm consisting of a central authority, referred to as bank, and k telephone consultants i = 1,...,k.

(A2) The banking firm offers a range of financial services and products distributed and sold by the consultants. r represents the strictly positive return to the organization per unit of sales volume. For sake of simplicity of illustration, we assume r to be identical for all products. In the case of incentives the bank pays the

consultants a strictly positive margin m per unit of sales volume generated; m is also assumed identical for all products. The bank also pays each consultant i a fixed salary $F_i > 0$ to cover his reservation utility. Total fixed salary payments are thus $F = \sum_{i=1}^{k} F_i$. All payments are assumed deterministic.

(A3) Consultant i exerts effort e_i to generate sales volume. Effort level e_i ranges over the interval $\left[\underline{e}, \bar{e}\right]$. Thus, $\underline{e}$ and $\bar{e}$ are the lowest and highest effort levels possible. e_i represents effort in servicing customers via outbound calls, recruiting new customers, presales planning and other activities. Total effort of the organization is represented by an effort vector $\vec{e} = (e_1, e_2, ..., e_k)$.

(A4) The consultants have perfect information about the relationship between their efforts and volumes generated. The bank has incomplete information about the relationship between the effort of the consultants and volumes generated by that effort.

(A5) We use the function $C(e_i)$ to represent the costs generated by effort e_i of consultant i. These consist of variable labor costs, telephone costs for outbound calls and other.

The bank has complete information about the costs generated by effort e_i of consultant i: Contrary to branch banking the consultants do not exert their effort geographically distributed but they are centrally located in a call center. Therefore, all costs resulting from their activities accrue at the call center. They mainly consist of telephone costs and variable labour costs. Due to the technical infrastructure of such call centers both types of costs can easily be attributed to the individual consultant. The costs of outbound sales calls are directly related to the calling consultant, while the costs of charge-free (or -reduced) inbound calls can be assigned to the calling customer or to the call-taking consultant, respectively. For similar reasons attendance recording for the individual consultant is also feasible: Since the telephone consultant's main activities require technical equipment like computer and telephone, he/she depends on his/her working place to perform the tasks assigned. Thus, attendance (including overtime) is perfectly observable leading to unbiased recording of the quantity structure of (variable) labour costs. The sketched observability of consultants' effort induced costs (but not necessarily his effort itself) enables the bank to decide upon a cost share the consultant has to bear.

Hence, a fraction n is the part of the costs the bank decides the consultant has to bear with $n \in [0,1]$. Thus, costs assigned to the consultant i are $n\,C(e_i)$. The residual costs (1-n) $C(e_i)$ are left to the bank. Total costs generated by the effort of all consultants within the organization are $C(\vec{e}) = \sum_{i=1}^{k} C(e_i)$.

(A6) Marginal costs of effort are strictly positive and assumed identical for all consultants. The cost function is assumed convex (due to e.g. higher wages for working overtime):

$$\frac{dC(e_i)}{de_i} > 0, \frac{d^2C(e_i)}{de_i^2} \geq 0, e_i \in \left[\underline{e}, \bar{e}\right], i = 1,...,k$$

For the introduction and analysis of ownership of customers as well as for the comparison with alternative arrangements we need additional assumptions (based on [8], Assumptions D3 and D4):

(A7) Each customer is owned by a single consultant (referred to as "owning consultant") but may be serviced by other consultants (referred to as "foreign consultant"). Thus, each consultant i faces three mutually exclusive sales volumes:

Domestic volume: $V_i^D(\vec{e})$, volume generated by own customers serviced by himself,

Exported volume: $V_i^E(\vec{e})$, volume generated by own customers serviced by foreign consultant,

Imported volume: $V_i^I(\vec{e})$, volume generated by foreign customers serviced by himself.

(A8) Domestic and exported volumes are increasing and concave w.r.t. consultant's i effort, and are not affected by other consultants' efforts ($e_{\setminus i}$):

$$\frac{\partial V_i^j(\vec{e})}{\partial e_i} > 0, \frac{\partial^2 V_i^j(\vec{e})}{\partial e_i^2} < 0 \; and \; \frac{\partial V_i^j(\vec{e})}{\partial e_{\setminus i}} = 0,$$

$$e_i \in \left[\underline{e}, \bar{e}\right], i = 1,...,k \; and \; j \in \{D, E\}$$

(A9) Imported volume is unaffected by the (importing) consultant's effort and is increasing in the effort of any other consultant:

$$\frac{\partial V_i^I(\vec{e})}{\partial e_i} = 0 and \frac{\partial V_i^I(\vec{e})}{\partial e_{\setminus i}} > 0, e_i \in \left[\underline{e}, \bar{e}\right] i = 1,...,k$$

2.2. The First-best Solution

In this section we do not invoke Assumption (A4) and suppose that first-best (FB) effort levels can be selected by the perfectly informed bank, which has access to local expertise and can mandate effort levels to consultants without additional costs. Costs of effort are borne by the bank. The total surplus function is given by

(1) $\Pi^{FB}(\vec{e}) = \sum_{i=1}^{k} \left\{ r\left[V_i^D(\vec{e}) + V_i^E(\vec{e}) \right] \right\} - C(\vec{e}) - F$

Due to the independence of costs generated by the consultants' effort (Assumption (A5)), total surplus maximization w.r.t. the optimal effort levels of the consultants yields the k first-order conditions

(2) $\frac{\partial \Pi^{FB}(\vec{e})}{\partial e_i} = r\left[\frac{\partial V_i^D(\vec{e})}{\partial e_i} + \frac{\partial V_i^E(\vec{e})}{\partial e_i} \right] - \frac{dC(e_i)}{de_i} \overset{!}{=} 0,$

$e_i \in \left[\underline{e}, \bar{e} \right], \; i = 1, \ldots, k$

By assigning customers to single consultants, total surplus maximization can be obtained by optimizing surplus for each consultant separately. Hence the first-best optimal solution is characterized by k first-order conditions, one for each consultant i.

Due to Assumptions (A6) and (A8) the second-order conditions for maximizing the total surplus function are satisfied for $e_i \in \left[\underline{e}, \bar{e} \right]$. In the remainder of this section these first-best levels of effort will be compared with one monitoring and two incentive approaches.

2.3. Monitoring

Monitoring is one alternative for the bank to influence the consultant's time allocation among different tasks and effort. Monitoring consists of two basic elements:

- The bank determines specific actions and effort for each consultant which the bank believes to be optimal w.r.t. its net profit.
- The bank forces the consultants to pursue these actions through a contract, e.g., by agreeing on a set of goals for the year and a contract promising payments based on the extent to which the goals are achieved.

We do not deal with problems concerning the bank's ability to force the consultants to behave in the way it assumes to be optimal, for example, the incompleteness of contracts. Instead, we concentrate on the first point: In our formulation, actions and effort is modeled by effort levels. In determining effort levels, the bank faces the problem of incomplete information (Assumption (A4)) about the suitable allocation of scarce time among different customers or among different tasks. Thus, the bank is unable to determine the first-best levels of effort to be spent on different types of customers or tasks. The relevant information for efficient decision making is held by the consultant who usually knows best about the different sales potentials and needs of his/her customers. Therefore, without information from the consultants, the (expected and realized) return of a unit of centrally selected effort is less than of one unit chosen by the consultant. Measured in terms of sales volume, we denote the effectiveness of centrally selected effort with $\hat{V}_i^j(\cdot)$. We apply a multiplicative relation between $\hat{V}_i^j(\cdot)$ and the sales volumes $V_i^j(\cdot)$ resulting from effort chosen by the consultants themselves (with $\alpha \in (0,1)$):

(3) $\hat{V}_i^j(\vec{e}) = \alpha V_i^j(\vec{e}), \; j \in \{D, I, E\}$.

α can be regarded as a measure for the existing level of information asymmetry. If the information asymmetry did not exist, then the bank's choice of effort level would be as efficient as the one chosen by the consultant (α = 1).

In the case of monitoring (Mon) the bank centrally selects the effort levels. No decision rights regarding effort are left to the consultants. The consultants pursue the centrally determined actions and produce the sales volumes $\hat{V}_i^j(\cdot)$ expected by the bank. The bank bears all the costs $C(\vec{e})$, thus n = 0. Monitoring the consultants induces additional costs of M > 0, in addition to the fixed salaries F > 0; both are assumed to be independent of effort. The bank's profit function is thus given by

(4) $\Pi_{Bank}^{Mon}(\vec{e}) = \sum_{i=1}^{k} \left\{ r\left[\hat{V}_i^D(\vec{e}) + \hat{V}_i^E(\vec{e}) \right] \right\} - C(\vec{e}) - F - M$

Compared to the total profit function for first-best it only differs in the reduced effectiveness of effort via $\hat{V}_i^j(\cdot)$ and the additional costs of monitoring the consultants, M. Maximizing profits by the choice of the elements of $\vec{e}$ and using (3) yields the first-order conditions

(5) $\frac{\partial \Pi_{Bank}^{Mon}(\vec{e})}{\partial e_i} = r\alpha\left[\frac{\partial V_i^D(\vec{e})}{\partial e_i} + \frac{\partial V_i^E(\vec{e})}{\partial e_i} \right] - \frac{dC(e_i)}{de_i} \overset{!}{=} 0,$

$e_i \in \left[\underline{e}, \bar{e} \right], i = 1, \ldots, k$

By comparing these conditions with the ones for first-best, it is straightforward that the monitoring approach leads to lower effort levels relative to first-best because of reduced volume generated by each consultant due to imperfect information of the bank. With decreasing α, i.e., increasing information asymmetry, the effort levels induced by a monitoring-based reward system increasingly deviate from first-best. As we have argued above, for strategic reasons many direct banks are extending their range of products offered and are thus providing their consultants with a much broader scope of decision alternatives and heterogeneous customer groups. For simple discount banking α may be close to 1, but it decreases with increased consulting and product complexity.

Thus, due to increasing information asymmetry and the corresponding inefficiency of central determination of

effort levels, monitoring becomes less advantageous. As will be analyzed in the next section, the contrary holds for output-based incentives by inducing the individual consultants to use their local expertise.

2.4. Incentives

Using incentive schemes to induce effort levels requires two stages of decisions. First, the bank sets the incentives for the consultants. Then consultants select individual effort levels. We work backwards solving first for the optimal consultant efforts as a function of the incentives (this section) and then determine the optimal level of incentives from the bank's point of view (Section 2.5).

2.4.1. Sales Based Incentives (SbI). Out of return r the bank pays a margin m to each consultant depending on units of sales volume generated and thus sets an effort incentive for the consultant. Similar to sales commissions, this margin is assigned to the consultant who actually made the sale. Thus, the total income of an individual consultant consists of the margin m received from the bank on domestic and imported volume minus the effort-dependent costs assigned plus a fixed salary:

(6)
$$\Pi_i^{SbI}(\vec{e}) = m\left[V_i^D(\vec{e}) + V_i^I(\vec{e})\right] - nC(e_i) + F_i, i = 1,...,k$$

Solving for the optimal effort level of consultant i we obtain the following first-order condition:

(7)
$$\frac{\partial \Pi_i^{SbI}(\vec{e})}{\partial e_i} = m\frac{\partial V_i^D(\vec{e})}{\partial e_i} - n\frac{dC(e_i)}{de_i} \overset{!}{=} 0,$$
$$e_i \in \left[\underline{e}, \bar{e}\right], i = 1,...,k$$

As imported volume is independent of the consultant's effort, its derivative disappears, resulting in the consultant's share of marginal return from domestic sales generated by his effort being exactly equal to the marginal costs of effort assigned to him. With a strictly positive margin m all second-order derivatives are negative, so that the second order conditions are satisfied.

The effort levels of all consultants make up a supermodular game, because their objective functions are supermodular. Thus, a pure strategy Nash equilibrium exists, defined by the set of e_i for $\left[\underline{e}, \bar{e}\right]$ simultaneously satisfying equation (7) [6]. This results in equilibrium effort levels as a function of the margin and the cost share, $\vec{e}(m,n)$.

Applying the implicit function rule yields with m > 0

(8) $\frac{\partial e_i(m,n)}{\partial m} > 0$ *and* $\frac{\partial e_i(m,n)}{\partial n} < 0, i = 1,...,k$.

Thus, the effort of consultant i increases with increasing margin m and decreasing cost share n.

In certain cases suitable choices of m and n can yield first-best solutions using sales based incentives. Comparing (2) and (7), this requires the condition m > nr, a necessary - but not sufficient - condition.

2.4.2 Ownership of Customers (OoC). In a setting with sales based incentives every sale is rewarded regardless of the assignment of customers to consultants. Hence, as consultants are not rewarded for the beneficial horizontal externalities generated by their servicing investments, underinvestment may occur. Thus, the incentive scheme may be refined by applying the concept of IT-enabled OoC ([7], [8]): Individual customers are assigned to individual consultants having the benefit of getting paid for each transaction of the customer no matter who services the order. IT enables the bank to attribute the business to the owning consultant and possibly transfering part of the proceeds to the consultant that serviced the order. In addition to the refinement of the incentive scheme, the introduction of OoC in telephone banking provides another benefit: Analogous to the strategy of "one face to the customer" from traditional branch banking, the assignment of an individual customer to a single consultant can tighten the relationship between bank and customer via establishing trust and reputation. Providing "one voice to the customer" gives the customer both the impression of being serviced individually and the possibility of establishing a trusting relationship to his/her consultant.

Under OoC, each consultant i maximizes an objective function

(9)
$$\Pi_i^{OoC}(\vec{e}) = mV_i^D(\vec{e}) + (m-t)V_i^E(\vec{e}) + tV_i^I(\vec{e}) - nC(e_i) + F_i$$

where $t \in [0, m]$ represents the transfer per unit of exported sales volume. The owning consultant has to pay this transfer t to the servicing "foreign" consultant generating this volume. Thus, transfer t is paid on exported sales volume and received on imported volume. The margin m, cost share n, and transfer t are set by the bank.

The individual consultant maximizes profit by choice of own effort level, e_i. The necessary first-order condition for consultant i is

(10)
$$\frac{\partial \Pi_i^{OoC}(\vec{e})}{\partial e_i} = m\frac{\partial V_i^D(\vec{e})}{\partial e_i} + (m-t)\frac{\partial V_i^E(\vec{e})}{\partial e_i} - n\frac{dC(e_i)}{de_i} \overset{!}{=} 0, e_i \in \left[\underline{e}, \bar{e}\right], i = 1,...,k$$

The second-order conditions are satisfied for $0 < t \leq m$ or $0 \leq t < m$. Similar to sales based incentives, the simultaneous set of first-order conditions, for $\left[\underline{e}, \bar{e}\right]$,

defines a Nash equilibrium in consultants' effort levels. The resulting equilibrium vector of effort levels is now a function of the margin, the cost share and, in addition, the transfer t, i.e., $\vec{e} = \vec{e}(m,n,t)$.

Given n, for t = m (i.e., the margin is completely transfered to the serving consultant), the incentive scheme under OoC leads to the same optimality conditions as the sales based incentive scheme. Hence, the sales based incentive solution can be regarded as a special case of OoC where t = m. For $0 \leq t < m$, OoC leads to a larger effort of consultant i than sales based incentives, since

$$\frac{\partial e_i}{\partial t} < 0, i = 1,..., k \quad (11)$$

which can be easily shown. Furthermore, comparing (2) and (10), OoC yields the same effort level as the first-best solution if t = 0 and m = nr. Here, t = 0 and m = nr is sufficient for first-best, but not necessary. Parameters can also be chosen in such a way that t > 0 and m > nr lead to first-best effort of the consultants: a lower effort level resulting from an increase of t can be compensated by providing an additional incentive to increase the effort via increasing m or decreasing n.

The comparisons of monitoring and the two incentive scheme approaches with first-best yield the following result: when there is an information asymmetry ($\alpha < 1$) monitoring never leads to first-best, whereas sales based incentives and OoC can induce first-best effort levels.

2.5 Net Profit of the Bank

In the previous sections we concentrated on the problem of achieving first-best effort levels rather than of profit maximization for the bank. We analyzed monitoring and the two incentive schemes. For sales based incentives, m > nr is a necessary condition for inducing the consultants' choice of first-best effort levels. Under OoC we have shown, that for t = 0 and m = nr the consultants choose the first-best effort levels by maximizing their incentive income. It is important to observe that, contrary to sales based incentives, these conditions are sufficient, but not necessary. Under these conditions (or that incentive structure) this decentralized form of decision making leads to a maximum total surplus (the maximum "size of the pie"). With t = 0 and m = nr (under OoC) both horizontal and vertical externalities are internalized. As argued above, horizontal externalities arise from the fact that foreign consultants benefit from efforts by owning consultants. With t = 0, these benefits are completely accounted for in the owning consultants decision of choosing effort levels. Vertical externalities occur when the consultant privately bears the fraction n of the costs of his effort $C(e_i)$, but receives only part of the benefits (m < nr) generated by his effort. When choosing an effort level, the consultant equates marginal private costs not to the marginal social benefit, but to his own marginal private benefit, i.e. the margin received from the bank. With m = nr, the consultant takes into account the positive externality imposed on the bank when choosing his own effort level. Thus, setting m = nr and t = 0 implies maximum total surplus.

Using its net profit function

$$\Pi_{Bank}^{OoC}(\vec{e}) = \sum_{i=1}^{k} \left\{ (r-m)\left[V_i^D(\vec{e}) + V_i^E(\vec{e})\right] \right\} - (1-n)C(\vec{e}) - F \quad (12)$$

the bank can vary the value of its objective function by selecting m, n and t, recognizing that these operate through $\vec{e}(m,n,t)$. If the bank chooses m, n and t to maximize total surplus as mentioned above, the resulting effort levels via optimization through the consultants are identical to the effort levels that maximize the bank's profit. In other words, the bank's first-order condition with respect to $\vec{e}$ is identical to the first-order condition of the consultant for m = nr and t = 0. Again, this is sufficient, but not necessary:

$$\frac{\partial \Pi_{Bank}^{OoC}(\vec{e})}{\partial e_i} = (r-m)\left[\frac{\partial V_i^D(\vec{e})}{\partial e_i} + \frac{\partial V_i^E(\vec{e})}{\partial e_i}\right] - (1-n)\frac{dC(e_i)}{de_i} \overset{!}{=} 0, \quad (13)$$

$$e_i \in \left[\underline{e}, \bar{e}\right], i = 1,..., k$$

Considering (13) with the additional equality of the consultants' first-order conditions (10) and first-best (2), we can state the following: An equilibrium effort vector $\vec{e}^*$ exists, which simultaneously maximizes the objective functions of the bank and the consultants yielding the first-best solution.

From the consultants' point of view, for a given n, t = 0 and m = nr is just one possible incentive combination (m, t) leading to the first-best choice of effort. A suitable combined increase of both, t and m, would also yield first-best effort levels. We now address how the bank can maximize its share of the total benefit through its choice of m, n, and t subject to maintaining the first-best solution. In other words, how can the bank optimize its "piece" of the "maximum pie"?

Varying the transfer t is not feasible, as t = 0 and m = nr are necessary conditions for simultaneously achieving first-best and congruence of the banks and consultants objectives. This can be seen by the following argument: Starting with t = 0 and m = nr, increasing t encourages the consultant to lower his effort level. Thus to maintain the first-best effort level, this effect has to be compensated by providing an additional incentive to increase the effort via increasing m and/or decreasing n. An increase of m as well as a decrease of n reduces the value of the bank's net profit

function while the effort levels chosen by the consultants remain unchanged. Thus, from the bank's point of view any transfer $t > 0$ is not optimal.

Using this result we can compare OoC with sales based incentives: The necessary condition for first-best using sales based incentives is $m > nr$. Therefore, under OoC the bank can induce first-best effort levels with a lower margin ($m = nr$) and thus gain higher net profit.

This means that within our model the refined incentive-based solution can always produce higher net profit for the bank and total surplus than a monitoring-based approach. That is, the incentive-based approach is pareto superior. Even without information asymmetry ($\vartheta = 1$) between the bank and consultant net profit is lower under monitoring because of the strictly positive monitoring costs.

Now we are able to evaluate the *impact of IT* on incentives versus monitoring. On the one hand, IT is a tool for the principal to reduce the information asymmetry, with the objective of contracting more directly on the previously unobservable effort of the agent. Therefore, IT is used as monitoring device to benchmark performance and gather information for management decision-making. Thus, the application of IT is suitable to improve monitoring. On the other hand IT works as an enabler of incentive schemes allowing concepts like OoC to be implemented. Under the assumption that the existing managerial accounting system can easily be extended to support OoC, the resulting IT-costs can be expected to be lower than monitoring costs (e.g. salaries of supervisors). Furthermore, the fixed IT-costs from implementing OoC are one-time costs opposed to fixed monitoring costs which continue over time.

Thus, because monitoring is dominated by the refined IT-enabled incentive scheme in terms of net profit of the bank and total surplus, IT more strongly promotes the application of incentives relative to monitoring.

3 Summary and Discussion

We showed that - due to increasing information asymmetries and the corresponding inefficiency of central determination of certain effort levels - output-based incentives become more and more advantageous (compared to a monitoring-based reward system) by inducing use of private information by the individual consultant. Given the choice of incentives by the bank the consultant can determine the optimal level of effort to expend on different customers. The appropriate choice of incentives must overcome the tendency to underinvest in consulting activities with long-term effects, e.g., updating customer files or increasing the customers' satisfaction. From the banking firm's point of view, such investments are vital to ensure an ongoing (and profitable) relationship with any single customer. We showed that in telephone banking externalities occur implying disincentives for the consultants to invest in ongoing customer relationships: Due to a 24-hours-availability of the bank and limited working time of the single consultant, customer contacts with several consultants are inevitable. Hence, as consultants are not rewarded for the beneficial horizontal externalities generated by their servicing investments, underinvestment occurs.

We used the concept of IT-enabled "ownership of customers" (OoC) for an appropriate design of the incentive system yielding a larger overall level of strategically important servicing investments. However, establishing this concept requires that customers and sales volume can be attributed to consultants, i.e,.:

- The assignment of a customer to a single consultant is feasible,
- each unit of sales volume can be attributed to the purchasing customer, and
- each unit of sales volume can be attributed to the servicing consultant. The internal accounting and reward systems provide the possibility for internal transfers.

OoC can be applied in any environment where these three generic conditions can be met. In a technology-based business like telephone banking - dealing with immaterial financial services - all three requirements can easily be met. Other industries such as commercial fueling and professional service firms make use of OoC [7].

Using the OoC mechanism gives individual consultants the benefit of getting paid for each transaction of their "owned" customers no matter who takes the order. In our model we analyzed whether (partial) transfers of benefits from the "owning" consultant to the "foreign" consultant were optimal. Strictly positive transfers may be optimal when only the consultants are to be induced to achieve a first-best optimal effort level; but it could also be shown that in the set of first-best incentive choices there exists a zero-transfer solution. Considering the bank's net profits, this zero-transfer, together with suitable levels of the other incentive variables, yields first-best effort levels that are simultaneously optimal for the consultants and the banking firm. Hence, a cooperative first-best solution can be achieved when no transfers are payed.

In our model, we made an implicit distinction between effort generating willingness to buy (marketing and sales effort) on the one hand and effort necessary to actually service a sale (order taking) on the other hand. To enable a focused analysis of the former, the latter was assumed to be zero (implicitly expressed by Assumption (A9)). However, in telephone banking such effort is necessary, and with a zero-transfer, there is no incentive for the consultants to take orders from foreign customers. This aspect of the problem vanishes, however, if jobs are designed in such a way, that order-taking activities are not assigned to consultants, but left to another group of employees. In fact, OoC just enables such division of

labor. Since the proceeds of the actual sale are attributed to the owning consultant, simple order taking could be left to another category of personnel. As a result, all the efforts of high-qualified (and thus expensive) consultants could be geared towards selling products and generating volume, while less qualified employees perform the monitorable subtask of order taking. Although not explicitly analyzed in the model, the bank should consider allocating pure order-taking activities to other internal (or external) staff, enabling high-qualified customer consultants to invest their effort and time completely in the ongoing customer relationship. In telephone banking this specialization is observed in practice as various providers use different telephone codes for servicing and order taking.

Another interesting extension of our model could result from relaxing Assumption (A4). It states that consultants have perfect information on the relationship between volume and effort, while the bank only holds incomplete information on that relationship. This assumption may not hold in a dynamic environment as the monitoring solution could allow the bank to learn, and progressively identify the true relationship. Therefore, after a learning period, the only remaining drawback of the monitoring solution is the cost of monitoring. Furthermore, consultants may not hold perfect knowledge on the relationship between volume and effort, especially if they are new in the job. In case of incentives, inexperienced consultants may choose levels of effort that deviate from the first-best solution. This should be accounted for in an extension of our analysis, e.g., by doing sensitivity analysis with respect to the effort level selected by the consultant. In this case, an additional advantage of monitoring is that it prevents inexperienced consultants from selecting inefficient levels of effort.

Another limitation of the current analysis is that the distinction between consultants investing time in either establishing profitable ongoing relationships or in provision-oriented short-term selling is not really reflected in our model, where only the levels of effort are optimized. Extending the model in that respect is subject of ongoing research.

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