THE ADAPTATION COST THEORY OF THE FIRM

AND THE RESOURCE-BASED VIEW[1]

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Abstract

The Adaptation Cost Theory of the firm compares employment and markets for labor services based on a tradeoff between two forces: (1) Sub-additive bargaining costs make it cheaper to negotiate a fixed wage in return for which a worker will follow orders and perform any element in a large set of possible services, and less cheap to sequentially negotiate prices for each service. (2) Advantages of specialization means that the costs of repeatedly performing the same service, or working for the same entrepreneur, are lower than those of switching between different services or entrepreneurs. The Resource-Based View of the firm is based on the same two forces but applies them to a wider set of productive factors, such as brand names, productive experience, intellectual property, reputations, relationships, etc.. Sub-additive bargaining costs imply that it is hard to trade these factors in fractions such that excess capacity, which many of these factors tend to have or develop, is best used inside the firm. If a factor is scarce, the firm can leverage the excess capacity to earn Ricardian rents in markets in which the factor is important. The theory shows that large firms, like markets, enable specialization.

Key Words: THEORY OF THE FIRM; ADAPTATION COSTS; RESOURCE-BASED VIEW OF THE FIRM

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I. INTRODUCTION

The chapters in this volume present many different theories of the firm. In the present chapter, we define the firm by the employment relationship and define the latter as an equilibrium of a dynamic game in which human asset services are traded.[2] In particular, a player is an "employee" if he, in response to an order from another player – his "boss" - will supply any service in a predefined set at a previously agreed upon price that applies to any element of the set. Phrased in less precise terms, the employee has agreed to follow orders without trying to renegotiate the price every time a new service is demanded.[3] In the presence of bargaining costs, the Employment equilibrium is a low-cost way to adapt a trading relationship to changes in the entrepreneur's needs. In spite of this, Employment is not always the most efficient equilibrium. While employees gain from being "entrepreneur-specialized" and not having to switch back and forth between entrepreneurs, they often perform a sequence of different services, and therefore fail to take advantage of "service-specialization". As observed by Adam Smith, service-specialization is a major advantage of the labor market equilibrium, and this explains why we see both that and employment. There is, however, also another way to enable service-specialization: large firms. In such firms, some individual services, or groups of similar services, (plumbing, patent litigation, operation of machinery, tax accounting,..) are needed so frequently that the firm can hire one or more full-time employees to perform them on a consistent basis. Such doubly specialized employees are, of course, very efficient.[4]

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[2] Alternatively, one could define things such that what here are different equilibria of a single game appear as equilibria of different game forms.
[3] This definition is in the spirit of Simon (1951).
[4] Just like smaller towns find it harder to sustain a market for specialized services, smaller firms cannot utilize employees in fully specialized positions.

We will relate this theory of the firm to the Resource-Based View of the firm (RBV) which is very influential in several branches of the management literature (e. g. strategy, human resources, and marketing). The RBV is a theory about Ricardian rents and therefore looks at productive assets that are scarce and likely to remain scarce, for example because they are hard to imitate and trade in fractions. Since the rent-earning potential is larger for assets that are non-rival or tend to develop excess capacity, the RBV is often applied to things like brand names, IP, know how, production experience, corporate culture, relationships, reputations, loyal customers, and the like. The theory then suggests that firms should enter segments/markets in which they can earn rents by leveraging their scarce assets, the firm's so-called "resources". So while the Adaptation Cost Theory of the firm predicts that firms assign some of their employees to specialized services, the RBV takes the logic further and suggests that firms apply their "resources" to specialized services. Intuitively, we can think of the relationship between the two theories in terms of the ways they define the scope of the firm. The Adaptation Cost Theory defines it as the set of employees who share the same ultimate boss, and the RBV defines it as the sets of all productive assets, human or not, that the firm owns or controls.[5]

In Section II, we will describe a repeated game, define an "Employment" equilibrium in that context. and characterize the region of the parameter space in which it dominates other equilibria. Markets and large firms are introduced in Section III, and non-human productive assets in Section IV. Section V contains a brief summary.

[5] The extension to ownership should not be controversial. As in Grossman and Hart (1986) the owner of an asset can "order" it to perform any service not prohibited by other contracts.

II. THE EMPLOYMENT EQUILIBRIUM IN A TWO-PERSON GAME [6]

We aim to explain why agents agree to follow orders in return for a fixed wage with no ex post renegotiation. To that end, we consider a trading game between a worker and an entrepreneur in infinite horizon discrete time $t = 1, 2, 3,\ldots$ The periods are generated by changes in the entrepreneur's needs such that the players have to adapt to a new situation each period.

In each period, the worker can supply any service in a possibly very large set S with representative element s. The worker incurs private costs $c_s \in \{c_l, c_h\}$ if he performs s and only he knows c_s, though both players know that $c_s = c_l$ with probability λ. At each t, only one element of S, s_t, has positive private value $v_t \in \{v_l, v_h\}$ for the entrepreneur. She knows s_t and v_t, but the worker knows neither. On the other hand both players know that $v_t = v_h$ with probability π. So there is two-sided incomplete information. We assume that $c_l < v_l < c_h < v_h$ such that trade is efficient unless $c_s = c_h$ and $v_t = v_l$. If both players discount future payoffs at the rate $r > 0$ per adaptation/period and are risk-neutral, the highest achievable gains from trade are $G^* \equiv \{\pi\lambda[v_h - c_l] + \pi(1 - \lambda)[v_h - c_h] + (1 - \pi)\lambda[v_l - c_l]\}/r$. More generally, we denote the gains from trade by $G(e)$, where e refers to a specific equilibrium. To keep the exposition simple, we assume that the players split the gains from trade in the same proportions in all equilibria.

We will portray several common trading institutions as alternative equilibria of a single master game. The game includes a bargaining step and will make the reasonable, though non-standard, assumption that it is costly to negotiate. We furthermore assume that negotiation is subject to economies of scale in the sense that the cost of negotiating a single price for any one

[6] This formalization is largely based on Wernerfelt (1987; 1988), early versions of Wernerfelt (1997).

of several services in a subset of S is sub-additive in the cardinality of that subset.[7] This means, for example, that the total cost of negotiating a different price for each element of S, $|S|n(1)$, is higher than, $n(S)$, the cost of agreeing on a single (the same) price for all elements. For simplicity, we assume that the cost is shared equally between the parties.

The master game consists of an infinitely repeated stage game with seven steps:

At each $t = 1, 2, \ldots$,

1. The entrepreneur learns the identity (s_t) and value (v_t) of the service she needs in period t and tells the worker what s_t is.
2. The worker learns his cost of s_t.
3. The parties may agree on a contract. A feasible contract specifies a partitioning of S and a price for at least one of the subsets in the partition. It is binding for one period but will be extended on a period-by-period basis unless one of the players asks to renegotiate. If no previously agreed upon contract covers s_t and the parties cannot agree on a new one, there is no trade in period t.
4. The worker may announce C_h, thereby claiming that his costs of s_t are c_h,
5. The entrepreneur decides whether she does or does not ask the worker to perform s_t.
6. If the entrepreneur asked the worker to perform s_t, he decides whether to do it.
7. The entrepreneur decides whether to pay the agreed upon price to the worker.

While our main interest is in what we will call the "Employment equilibrium", it is helpful to first take a brief look at two prominent alternatives. A particularly simple equilibrium is that in

[7] It is often assumed that negotiation costs grow with the quasi-rents being negotiated over, but to keep things simple we will here and later assume that the costs are constant.

which the players negotiate a complete price list in period *1* and stay with it forever. If we make the reasonable assumption that these negotiations are efficient, the net surplus implemented in the "Price List equilibrium" is $G^* - |S|n(1)$.

Alternatively, the players can negotiate a new price, covering just s_t, at the start of each period. Compared to the Price List equilibrium, this "Sequential Negotiation equilibrium" allows the players to spread several one-item negotiations over long periods of time thereby postponing some of them far into the (heavily discounted) future. On the assumption that also these negotiations are efficient, the net surplus implemented in the Sequential Negotiation equilibrium is $G^* - n(1)/r$.

In the "Employment equilibrium", the players start in period *1* by once and for all agreeing on a single price to be paid in any period, whether or not the worker has performed a service.[8] They do not negotiate in any later periods, the worker tells the truth in step 4, and the entrepreneur does not ask the worker to perform s_t iff the worker has claimed C_h and $v_t = v_l$. (So by issuing an order after receiving C_h, the entrepreneur is effectively claiming that $v_t = v_h$.) Since the cost and values are unverifiable, the most efficient equilibrium relies on the law of large numbers.[9] The idea is that the players divide time into blocks of length $\tau \in Z_+$ and allow the opponent to claim the expected number of high costs or low values within each block. So the worker's quota allows him to claim C_h a total of $\tau(1 - \lambda)$ times in a block and if he does that, the entrepreneur's quota allows her to issue an order a fraction π of the times after the worker has claimed C_h. Both players will use up their quotas in each block even if that requires some inefficient play at the end of each block. As soon as a player has violated their quota, play reverts

[8] This can be changed to an equilibrium in which the worker is paid per service performed rather than per period.
[9] This is used in two working papers by Wernerfelt (1987; 1988) and independently by Jackson and Sonnenschein (2007).

to the myopic Sequential Negotiation equilibrium. We can prove the following folk theorem (where $\hat{e}$ is a subgame perfect Employment equilibrium and $G(\hat{e})$ are the expected gains from trade it implements):

Proposition 1: $\forall\, \varepsilon > 0\ \exists\, \hat{r} > 0\ \forall\, r < \hat{r}\ \exists\, \hat{e}: G(\hat{e}) + \varepsilon > G^*$.[10]

Proof: We first show that the postulated equilibrium strategies have the desired limiting properties and then that they constitute a subgame perfect equilibrium. The idea in the proof is that the expected efficiency loss from random fluctuations goes to zero as the block length τ goes to infinity. At the same time, the temptation to cheat grows with τ. However, as r goes to zero, the punishments become more severe and the temptation decreases. While the Proposition is focused on the critical interest rate $\hat{r}$, we actually prove that we can find a $(\tau', \hat{r})$ pair such that the desired equilibrium exists: $\forall\, \varepsilon > 0\ \exists\, \hat{r} > 0\ \forall\, r < \hat{r}\ \exists\, \tau' > 0\ \forall\, \tau > \tau'\ \exists\, \hat{e}: G(\hat{e}) + \varepsilon > G^*$.

We need a few more symbols for the purpose of the proof. In particular, we use $x^t \equiv (x_1, x_2, \ldots x_{t-1})$ to denote the history of the variable x and define three dummy variables $(a_t, b_t, d_t) \in \{1, 0\}^3$ to indicate whether the entrepreneur does or does not ask the worker to perform s_t, whether the worker does or does not obey the order, and whether the entrepreneur does or does not pay the worker as agreed, respectively. With this notation a strategy for the entrepreneur is $a_t(v^t\ C^t, a^t, b^t, d^t)$, $d_t(v^t\ C^t, a^t, b^t, d^t)$ *for* $t = 1, 2, ..$ and a strategy for the worker is $C_t(c^t, C^t, a^t, b^t, d^t)$, $b_t(c^t, C^t, a^t, b^t, d^t)$ *for* $t = 01, 2, \ldots$ We finally use p as the agreed upon price.

[10] It is easy to show that this holds for more general distributions of costs and values than the binary ones used here.

Assume first that players follow the postulated equilibrium strategies: They do not violate their quotas and will revert to Sequential Negotiation if the worker claims C_h more than $(1 - \lambda)\tau$ times in a block or if the entrepreneur responds with $a_t = 1$ more than π of those times. From the perspective of the entrepreneur, the worst thing the worker can do is to claim C_h on the first $\tau(1 - \lambda)$ periods of a block (when it is worth the most to him). Suppose that the entrepreneur plays the postulated equilibrium strategy and responds to C_h by not issuing an order when $v_t = v_h$ until the last few periods in which she will issue just enough orders to make sure that the total equal to $\pi\tau(1 - \lambda)$.The resulting expected discounted average per period payoff is a lower bound on what the entrepreneur can expect to get in a perfect equilibrium. This equals the probability weighted sum of payoffs when she has to issue too few orders in the end and those when she has to end by issuing too many orders. As $\tau \rightarrow \infty$ the per block realizations of v_t go to their expected values and the per-period loss from inefficient end-of-block play goes to zero.[11] So her expected average per period payoff goes to $\pi v_h + (1 - \pi)\lambda v_l - p$ as τ goes to infinity.

Similarly, from the perspective of the worker, the worst thing the entrepreneur can do is to issue an order ("claim" v_h) the first π times the worker claims C_h. If the worker responds by playing the postulated equilibrium strategy and only claims C_h when it is true, except the last few periods in which he will make just enough claims to ensure that the total equals $\tau(1 - \lambda)$. In this case the resulting expected discounted average per period payoff is a lower bound on what the worker can expect to get in a perfect equilibrium. Using the same argument as for the entrepreneur, we see that the worker's expected average per period payoff goes to $-\lambda c_l$ - $(1 -$

[11] Since the standard error on a sum of τ binomial variables is proportional to $\sqrt{\tau}$, the expected error per period is of the order $1/\sqrt{\tau}$ per period.

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$\lambda)\pi c_h + p$ as τ goes to infinity. It is now a matter of trivial algebra to show that the sum of the two limits equal rG^*.

It is obvious that we can find a block length τ' such that the expected per period efficiency loss, if the postulated strategies are played, will be smaller than Ɛ.

To show that the postulated strategies constitute a subgame perfect equilibrium, we need to establish that we can find a critical interest rate $\hat{r}$ such that the players will obey their quotas for any interest rate below that. Recall that the players will revert to the Sequential Negotiation equilibrium as soon as one of them violates their quota and note that said equilibrium is subgame perfect. Recalling that the net payoffs from the Sequential Negotiation equilibrium is $G^* - n(1)/r$, we first look at the worker. If he claims C_h in each of the first $\tau(1 - \lambda) + 1$ periods, his expected cost is $\pi\lambda c_l + \pi[1 - \lambda]c_h$ in each of the those and he incurs negotiation cost $n(1)/2$ in each period starting at $t = \tau(1 - \lambda) + 1$. If he does not violate his quota his expected per period costs are $\lambda c_l + \pi[1 - \lambda]c_h$. So quota violation gives short-term cost savings are $\pi(1 - \lambda)c_l$ in each of $\tau(1 - \lambda)$ periods and a loss of $n(1)/[2r](1 + r)^{-[\tau(1 - \lambda) + 1]}$. Since the net present value of the gain is bounded by $\tau(1 - \lambda)^2\pi c_l$ and the loss goes to infinity as r goes to zero, the worker will not violate his quota for sufficiently small r. Similarly, if the entrepreneur violates her quota, her expected value will be $(1 - \lambda)(1 - \pi)v_l$ bigger for $\tau(1 - \lambda)\pi$ periods and she has to incur negotiation costs $n(1)/2$ in each period starting at $t = \tau(1 - \lambda)\pi + 1$. So if she violation gives her a short-term gain of be $(1 - \lambda)(1 - \pi)v_l$ in each of $\tau(1 - \lambda)\pi$ periods and a loss of $n(1)/[2r](1 + r)^{-[\tau(1 - \lambda)\pi + 1]}$. By the same reasoning as that used for the worker we conclude that the entrepreneur will respect her quota for sufficiently small r.

QED

To interpret the Employment equilibrium, note that the entrepreneur has better information in the sense that she knows what should be done as the environment changes. She therefore takes the role of "boss" and tells the worker what to do. The worker has ex ante agreed to follow orders in return for a constant wage that is determined by the average cost and value of the services he is to perform. His agreement is subject to two caveats. First, the services have to be elements of the set S; the boss cannot ask him to do something that is outside the job description. Secondly, since the worker has a greater dislike for some services, the wage reflects that it is efficient for him to still do some of these. However, if an unpleasant service has low value, the boss should refrain from insisting that it be done. The power of the boss is limited by the equilibrium punishment strategies. For future reference, we note that the net surplus implemented by Employment is $G(\hat{e}) - n(S)$ and that this goes to $G^* - n(S)$ as $r \rightarrow 0$. We also note that the equilibrium only exists if adaptations are needed very frequently such that the per period discount rate is very small.

The Employment equilibrium only implements the first best asymptotically and requires a small discount rate. However, even if the equilibrium exists, if the periods are very long, the discount rate per block may be substantial and the gap between the first best and the equilibrium payoffs could be quite large. In such cases the Sequential Negotiation equilibrium might do better. Since the net surplus implemented by Sequential Negotiation is $G^* - n(1)/r$, we get:

Proposition 2: $\exists\, \hat{r} > 0\ \forall\, r > \hat{r}$: *Sequential Negotiation is more efficient than Employment.*

It is an advantage of the Employment equilibrium that it can cover a very large number of services. However, if the cardinality of S is small, it may be more efficient to play the Price List equilibrium. Since the net surplus implemented by the Price List is $G^* - |S|n(1)$, we get:

Proposition 3: *$\forall\, r > 0\ \exists\, k \in Z_+\ \forall\, |S| \leq k$: The Price List is more efficient than Employment.*[12]

Collecting the results so far, we get that Employment is more attractive when adaptations are needed more frequently and when the number of different adaptations is larger.

III. MARKETS AND LARGE FIRMS

Instead of a single worker-entrepreneur pair, we now assume that there are large sets of workers and entrepreneurs. This allows us to introduce advantages of specialization, an important force that does not make any sense in a one-worker model. Specifically, we will look at the advantages of two kinds of specialization. If a worker stays with the same entrepreneur over time, he will know how she likes her services done, which services she received in the past, where her things are, etc... He also does not have to incur any set up costs (travel, billing arrangements, etc.) associated with changing from one entrepreneur to another. We denote the sum of these cost savings by η and think of them as additional to c_s such that a worker who does have to incur these costs will face $c_s + \eta$ in each period. Conversely, if a worker performs the same service (or one of a small set of services) in every period, he will benefit from learning and

[12] Observe that this is true for $k = 1$ even as $r \rightarrow 0$.

scale effects. To avoid introducing another parameter, we model this by assuming that such a worker will incur costs of c_l in every period (rather than sometimes c_l and sometimes c_h) and say that he is "specialized" in the service in question.[13]

It is a bit tricky to model inefficient trades in contexts with specialization.

To keep the exposition simple we assume that the labor market is in equilibrium such that (i) the set of workers and the set of entrepreneurs have the same cardinality, (ii) in each period, the number of entrepreneurs who need a specific service is equal to the number of workers who are specialized in that service, and (iii) the number of players is large relative to $|S|$ (such that markets can be sufficiently thick).

Since we now have more players, the game is a slightly different from that in Section II. First, we add a stage $t = 0$ in which all workers learn the service in which they are specialized, and workers (entrepreneurs) can volunteer to be randomly but permanently matched with an entrepreneur (a worker). Second, while pairs that are bilaterally matched will engage in negotiations at step 3, all other players will commit to trade at market prices.

In this environment the Employment, Sequential Negotiation, and Price List equilibria work exactly as in the two-player case. So the per-worker net surplus from these three equilibria is $G(\hat{e}) - n(S)$, $G^* - n(1)/r$, and $G^* - |S|n(1)$, respectively, where $G(\hat{e})$ and G^* refer to the game analyzed in the present section (rather than the slightly different one in Section II).

[13] To keep things simple we assume that a worker is born with a specific expertise, but in a richer model, it should obviously be thought of a result of practice and education.

In the "Market equilibrium", every period t starts with $|S|$ markets, one for each $s \in S$. In each of these markets, all entrepreneurs who need s meet all the workers who are specialized in s and a market price emerges. Each worker is then randomly and costlessly paired with an entrepreneur. Since the needs of entrepreneurs change, workers can expect to work for a new entrepreneur in every period, thus incurring costs η. On the other hand, service specialization gets him the benefit of having costs c_l in every period.

The per-worker net surplus from this equilibrium is $\{\pi[v_h - c_l] + (1 - \pi)[v_l - c_l] - \eta\}/r$, so the attractiveness of the Market equilibrium depends on the relative magnitudes of a worker's benefits from specializing in a single entrepreneur η versus a single service $\pi(1 - \lambda)(c_h - c_l)$ as well as the advantages of more efficient trades $(1 - \pi)(1 - \lambda)[v_l - c_l]$ and the costs of negotiating an employment contract $n(S)r$. We therefore get:

Proposition 4: *If $\eta - n(S)r < \pi(1 - \lambda)(c_h - c_l) + (1 - \pi)(1 - \lambda)[v_l - c_l]$, the Market is more efficient than the Employment equilibrium, but $\forall\, \varepsilon > 0\ \exists\, \hat{r} > 0\ \forall\, r < \hat{r}$: if $\eta - n(S)r > \pi(1 - \lambda)(c_h - c_l) + (1 - \pi)(1 - \lambda)[v_l - c_l] + \varepsilon$, Employment is more efficient than the Market.*

Summarizing, the Employment equilibrium is comparatively more efficient than the Market if adaptations are more frequent, if the negotiation costs are smaller, if the gains from entrepreneur specialization are larger, and if the advantages of service specialization are smaller.

Proposition 4 looked at a tradeoff between workers' benefits from always providing the same service versus doing all their work for a single entrepreneur. This does, however, not have to be a tradeoff: If we allow entrepreneurs to have larger firms, they might be able to utilize full-time service specialists. To develop some intuition, it is helpful to think about landlords of different sizes. If the landlord only has a few apartments, she will likely manage repairs through the market by calling on independent tradesmen, who then have to charge for time used to travel and collect information. Alternatively, she can hire a superintendent who can perform several different repairs as long as they are not too complicated. In contrast, a large landlord, like a university, can hire her own electricians, plumbers, etc., simply because her needs are so large that she can utilize each of them in their area of specialization on a full-time basis. These workers are then doubly specialized and can therefore be very efficient. Just like markets make specialization possible (as originally observed by Adam Smith), firms can do so as well.

To make the argument more precise, make the reasonable assumption that negotiation, if a large firm hires a single employee to perform a single service on a continuous basis, is efficient. This means that the per-worker net surplus in the "Large Firm equilibrium" would be $\{\pi[v_h - c_l] + (1 - \pi)[v_l - c_l]\}/r - n(1)$. Now recall that the per-worker net surplus from the Market equilibrium is $\{\pi[v_h - c_l] + (1 - \pi)[v_l - c_l]\}/r - \eta/r$. This implies:

Proposition 5: *If $\eta < rn(1)$, the Market is more efficient than Large Firms, but $\forall\, \varepsilon > 0\ \exists\, \hat{r} > 0\ \forall\, r < \hat{r}$: if $\eta > rn(1) + \varepsilon$, large firms are more efficient than the Market.*

Summarizing, Large Firms are comparatively more efficient than the Market if adaptations are more frequent, if the negotiation costs are smaller, and if the gains from entrepreneur specialization are larger.

As stated, Proposition 5 has the obviously untrue implication that firms can be infinitely large. A complete theory of firms has to explain what bounds their size, and we will now turn to that question. Two forces limit the scope of firms. First, suppose that an entrepreneur wants to expand her firm such that she can take advantage of double specialization. As the firm enters more and more new industries (segments) it runs into the fact that there typically are very few, if any, other industries with labor needs that are truly identical to those in the entrepreneur's original industry. After a while, the differences start to pile up and the advantages from having a worker specialize in a single entrepreneur (η) are smaller for more distant industries.[14] In terms of our model, this means that η declines as the firm diversifies more. So rather than a single η we have a declining sequence $\eta_1, \eta_2, ..\eta_n$…where η_i describes the saved labor costs when the original worker works for the a firm that is owned by the original entrepreneur but operates in the *i*'th closest industry.[15] Second, as soon as a hypothetical expansion yields less than the maximum gains from specialization, the firm has to worry that other firms, with larger gains from specialization, could enter the same industry (or already be in it).

To combine these two concerns, we can measure the extent to which a focal firm has a competitive advantage in a specific neighboring industry as the difference between (1) the advantage of specialization (η_i) that would be realized if the focal firm expanded into the

[14] Continuing with the landlord example; if she has more apartments, they tend to differ more: they are not all in the same place, the architecture might differ a bit, they were built in different years, their maintenance and repair histories differ, etc., etc... This means that the benefits from working for a single entrepreneur, initially η, shrink as that entrepreneur operates a bigger firm.

[15] A more general model is solved in Wernerfelt (2022)

neighboring industry and (2) the highest such advantage that can be realized by any firm.[16] This then allows us to label all neighboring industries by $i \in \{1, 2, 3, \ldots\}$ such that the focal firm has a bigger competitive advantage in neighbors that are "closer" in the sense that they have lower i. There exists a critical i, call i_o, such that the focal firm profitably can enter all neighbors with $i < i_o$ and no others. So we have:

Proposition 6: *If firms expand to save on labor cost, they enter neighboring industries that are sufficiently close, and stop when there are no further such neighbors.*

So the scope of the firm is bounded by the availability of similar industries into which it can transfer its specialized labor more efficiently than other firms. Readers who are familiar with the RBV may see this as an application to human resources. We will now generalize it to the full set of productive assets covered by the RBV.

IV. OTHER PRODUCTIVE ASSETS AND THE RBV

According to the Adaptation Cost Theory of the firm one of the defining characteristics of an employee is that he follows orders without bargaining about compensation as long as the order is in an agreed-upon set. If an employee is particularly good at providing a specific type of service and the firm does not need such a service all the time, it effectively has excess capacity which it can leverage by expanding into other industries in which the service is

[16] Depending on the technology this could, and should, be refined to include more than one potential competitor.

needed. It is typically not efficient to rent out the worker's time to another company since he is an employee in the first place because it is too expensive to negotiate a new price for every service - the excess capacity has to be used inside the firm.

Consider now a non-human productive asset such as a brand name, IP, know how, production experience, corporate culture, relationships, reputations, or a group of loyal customers. All of these, and many others, "follow orders" in the sense that whoever has rights of control over them, often the owner, can decide how to use them without negotiating with anybody. They also tend to have or develop excess capacity and are, because of sub-additive negotiation costs, hard to trade in fractions. So these assets are semi-permanently tied to the firm and their excess capacity is often best used inside the firm. They are what the RBV defines as the "resources" of the firm.

Since these productive assets share all the properties of employees, we could generalize the Adaptation-Cost Theory and define the scope of the firm by all of them, rather than just the employees. Furthermore, if we were to tell a manager how to maximize the profitability of her firm, we would suggest that she look at the resources and enter industries in which the resources would make the firm more efficient than competitors.[17] We would also suggest that her gains would be smaller as she enters more new industries.[18] So the RBV states the normative implications of a generalized version of the Adaptation-Cost Theory of the firm.

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[17] Note that this theory does not treat vertical and horizontal integration differently. There may be some regularities depending on the resources being leveraged: If it is a brand name integration is probably more likely to be horizontal or forward and if it is manufacturing skills horizontal or backward seem more plausible.

[18] Montgomery and Hariharan (1991), Montgomery and Wernerfelt (1988) and Wernerfelt and Montgomery (1988) provides evidence of this.

V. SUMMARY

The Adaptation-Cost Theory defines the firm based on an employment relationship, which in turn is modeled as an equilibrium of a repeated game in which one party agrees to take orders in return for an ex-ante agreed upon average price. Adaptation costs are portrayed as negotiation costs and the critical assumption is that they are positive and sub-additive in the number of services covered by a price. So it can be comparatively cheaper to agree on a single price for all services and later switch between them without any additional negotiation. As a result, the firm adapts faster and more cheaply than alternative equilibria.

To expand the theory beyond a two-person game we introduce advantages of specialization. Unless a firm has enough “internal” demand for a particular service, it will have excess capacity. Since negotiation costs are sub-additive, it is rarely feasible to sell or rent out the excess capacity and the firm therefore has an incentive to expand in the direction that eliminates the excess. The same incentive applies to many other productive assets that are hard to trade in fractions and prone to develop excess capacity. These are the “resources” of the firm and the RBV suggests that it should base its strategy on them.

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