s Happens:
The (Long-Dormant) Relational-Adaptation Theory of the Firm

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Abstract

We revisit (and seek to resuscitate) one of the earliest arguments in the theory of the firm: Williamson’s (1975) use of Simon’s (1951) conception of an employment relationship to argue that integration is the efficient governance structure for transactions that require adaptive, sequential decision-making. We contend that this relational-adaptation argument is distinct from later work by Klein, Crawford, and Alchian (1978), Williamson (1979, 1985), and Grossman and Hart (1986) that emphasizes hold-up motivated by specific investments. Furthermore, we argue that, while the relational-adaptation argument was informal and incomplete in 1975, it can now be formalized and completed, and that doing so delivers both theoretical and empirical insights.

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by

George Baker, Robert Gibbons, and Kevin J. Murphy

We revisit one of the earliest arguments in the theory of the firm: Williamson’s (1975) use of Simon’s (1951) conception of an employment relationship to argue that integration is the efficient governance structure for transactions that require “adaptive, sequential decision-making” (Williamson 1975: 40). Quite unusually (at least for an economics paper), we begin with a line-by-line analysis of key passages and citations from these classic works. This foray into intellectual history suggests that the informal relational-adaptation theory of the firm developed by Simon and Williamson is distinct from later work by Klein, Crawford, and Alchian (1978), Williamson (1979, 1985), and Grossman and Hart (1986) that emphasizes hold-up motivated by specific investments.

To prove that the informal Simon-Williamson theory is distinct from the subsequent specific-investment theories, we develop a formal theory of the firm that has no specific investments. Instead, the relational-adaptation theory of the firm analyzes the incentives for adaptation as uncertainty is resolved. We do not argue that great effort or ingenuity was required to develop this formal theory. To the contrary, the theoretical section of this paper defines a simple model and analyzes it using familiar techniques. Indeed, the simplicity of this resuscitation of the relational-adaptation theory of the firm presents something of a puzzle: why was the theory dormant for so long?

Having revisited and resuscitated the basic relational-adaptation theory of the firm, we then ask how this theory can be extended, applied, and tested. We describe extensions

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2. Krugman (1995: 27) may provide part of the answer: “Like it or not, the influence of ideas that have not been embalmed in models soon decays.” But Coase (1937) is a counter-example to Krugman’s rule, so we may need more than its informality to explain the long dormancy of the relational-adaptation theory of the firm.
to richer settings than the classic make-or-buy problem we consider here, such as the “hybrid” governance structures we consider in Baker, Gibbons, and Murphy (2002a). As we discuss in that paper, there is already empirical work motivated by an informal relational-adaptation theory of the firm, such as Gulati (1995) and Robinson and Stuart (2002). Thus, while the basic relational-adaptation theory is being formalized only now, it is also being extended and applied at the same time.

Finally, discussing these extensions and applications of the relational-adaptation theory of the firm leads naturally to a broader discussion of relational contracts in the theory of the firm, such as in property-rights models and agency models. We explain that, in contrast to these property-rights and agency streams of research, the relational-adaptation approach we develop here has no ex ante actions, so relationships have no role to play in improving ex ante incentives. More broadly, we discuss these complementary property-rights and agency models, in an effort to organize the burgeoning theoretical and empirical literature on relational contracts in the theory of the firm.

In sum, we believe it is possible to separate the core argument in the relational-adaptation theory initiated by Simon (1951) and Williamson (1975) from the core arguments in the specific-investments theories initiated by Klein, Crawford, and Alchian (1978), Williamson (1979, 1985), and Grossman and Hart (1986). We also believe it is useful to separate these arguments. For example, clarifying these arguments may allow us to understand their boundary conditions, to test their competing predictions, and to integrate their elements into a richer theory. But so far the specific-investment arguments have received much more attention. Thus, in this paper, we seek to resuscitate the long-dormant relational-adaptation theory of the firm. We present intellectual history in Section 1 and theory in Section 2. We then discuss extensions and evidence in Section 3 and the broader literature on relational contracts and the theory of the firm in Section 4.

1. Intellectual History

In this section we undertake a detailed analysis of key passages and citations from Simon (1951) and Williamson (1971, 1975, 1979).

The first step in Williamson’s (1975) argument is now familiar: formal contracts (i.e., those that can be enforced in a court) are incomplete. This is not to say that all contracts are useless: some one-shot transactions can be efficiently governed by spot contracts, some long-run transactions in stationary environments can be efficiently
governed by long-term contracts, and other long-run transactions in fluctuating environments can be efficiently governed by sequences of spot contracts. But there remains an important class of transactions that cannot be well governed by sole reliance on any formal contract.

Simon’s model of an employment relationship analyzes a labor transaction that cannot be well governed by sole reliance on a formal contract. In Simon’s model, a limited version of adaptive, sequential decision-making can be achieved by giving the boss decision-making authority. More specifically, Simon solved for the subgame-perfect equilibrium of a two-stage game, and showed that the boss’s self-interested state-dependent decision ex post might be superior to a state-independent decision negotiated ex ante. But Simon also informally discussed how a repeated game could improve on this one-shot outcome (p. 302), perhaps achieving first-best adaptive, sequential decision-making. In this sense, Simon’s conception of an employment relationship, including the possibility of a repeated game, was richer than his formal model of an employment relationship.

The second step of Williamson’s (1975) argument involves something akin to Simon’s richer conception of an employment relationship. This second step is by analogy: if certain labor transactions should be governed by giving the boss authority, then analogous transactions between firms should be governed by giving one of the firms authority (i.e., by integration). To see this analogy in more detail, consider Chapters 4 and 5 of *Markets and Hierarchies*. In Chapter 4, Williamson gives a detailed discussion of how real employment relationships, such as those in internal labor markets, may deliver “consummate” adaptive, sequential decision-making. Chapter 5 then focuses on intermediate products rather than labor transactions, and contains probably the most important paragraph in the book:

“The argument here really parallels that of Chapter 4 in most essential respects. What one wants to devise is a contractual relation that promises fair (competitive) returns [and] promotes adaptive efficiency… Inside contracting is deficient … Shifting inside contractors from a quasi-autonomous bargaining status to an employment relation has advantages…” (1975:99).

In short, the second step of Williamson’s (1975) argument asserts that what works for people will work for divisions: to achieve adaptive, sequential decision-making without a formal contract, aggregate units of the firm should be governed by employment
relationships (*i.e.*, their authority should be taken away and given to a boss; they should be run as divisions rather than independent contractors).

In partial contrast to *Markets and Hierarchies*, Williamson (1979, 1985) emphasized an equally important but ultimately distinct argument. This second argument again begins by observing that formal contracts are incomplete, but its second step is new: specific investments generate appropriable quasi-rents, which inspire socially counterproductive rent-seeking; integration is the efficient governance structure if it can eliminate such rent-seeking. As is well known, Klein, Crawford, and Alchian (1978) also forcefully articulated this “hold-up” argument, and it has been further developed by Klein (1991, 2000).

It may be less well known that the seeds of this argument can also be found in Williamson (1971). Thus, we are not suggesting that in 1975 Williamson knew nothing of specific investments and hold-up. Instead, we are asserting that these issues were not crucial to the main argument in *Markets and Hierarchies*: Chapter 4 (and hence Chapter 5) of that book gives a prominent role to Simon’s conception of an employment relationship; in contrast, Simon’s paper is not even cited in Williamson (1971, 1979) and receives only scant mention in Williamson (1985).

### 2. The Relational-Adaptation Theory of the Firm

In this section we develop first the static- and then the relational-adaptation theory of the firm. Our agenda owes much to Simon: he informally provided the repeated-game conception of an employment relationship, and he also posed the make-or-buy problem for employment transactions by asking when decision rights should be allocated to the worker instead of to the boss (p. 304). But Simon’s formal model implicitly assumes that not only decision rights but also decisions themselves are contractible. As we discuss below, one cannot construct a relational-adaptation theory of the firm from this assumption, so we motivate and impose an alternative assumption.

We intend our model to be canonical – a base case that can be extended and tailored to various applications, rather than a second-generation model that explains stylized facts or delivers testable predictions for a specific environment. We therefore keep the model simple but abstract: there are only two parties and one asset, but the states, decisions, and payoffs are quite general. Hart and Holmstrom (2002) and Aghion, Dewatripont, and Rey (2002) present richer static adaptation models; we emphasize relational adaptation.
2.A The One-Shot Game

In a model of adaptation, uncertainty must be resolved and then a decision must be taken. Let s denote the state, drawn from the finite set S according to the probability density f(s), and let D denote the set of feasible decisions, with generic element d. Let \( \pi_A(d, s) \) denote the payoff to the owner of the asset, A, if decisions d are taken in state s; similarly, let \( \pi_i(d, s) \) denote the private benefit to party i (= 1,2) if decisions d are taken in state s. The state, the decision, and the payoffs are observable but not verifiable.3

In the tradition of Grossman-Hart-Moore (GHM), we assume that the owner of the asset controls the decision (say, over the way the asset will be used), and we assume that asset ownership is contractible. Maskin and Tirole (1999) propose a reinterpretation of this GHM framework: there is no asset, but the decision right can be allocated to one party or the other via contract. As we describe in Section 3, we envision applications of the relational-adaptation theory under each interpretation – asset ownership and contractible decision rights. In both cases, we intend our model to capture something like Simon’s notion of a boss’s authority: control over a specified set of feasible decisions, D.

While our focus on asset ownership is in the GHM tradition, we depart from their framework by imposing the following assumption: decision rights (i.e., who makes the decision) are contractible, but decisions (i.e., what decision is made) are not, even ex post. (In the asset-ownership interpretation, our assumption can be restated as: asset ownership is contractible, but asset utilization is not, even ex post.) We discuss this departure from the GHM framework below, but to clarify this discussion, we turn first to the timing and analysis of our one-shot game.

The timing of the one-shot game is as follows: (a) asset ownership is determined; (b) the state is publicly revealed; (c) the asset owner chooses a decision; and (d) payoffs are received. The parties are risk-neutral. In this environment, the first-best asset-utilization decision \( d_{FB}(s) \) solves

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3 The assumption that the state, the decision, and the payoffs are not verifiable allows us to omit court-enforceable contracts from our analysis. The usual argument given for this omission is that the asset-ownership analysis pertains to the inevitable gaps in the court-enforceable contracts. But this argument ignores the possibility that the effects of asset ownership may interact with the terms of court-enforceable contracts, as in our (1994) paper. Thus, a superior approach would include the court-enforceable contracts in the analysis, along with asset ownership and relational contracts, as we began to do in a simple setting in our (2001) paper. We hope to pursue this approach in future work.
\[ \max_{d \in D} \pi_1(d,s) + \pi_2(d,s) + \pi_A(d,s), \]
so
\[ V_{FB} = E_s \{ \pi_1(d_{FB}(s),s) + \pi_2(d_{FB}(s),s) + \pi_A(d_{FB}(s),s) \}. \]
is the expected total payoff from first-best decisions.

Unfortunately, first-best decisions are typically not in the (short-run) self-interest of either party. If party i owns asset A then i’s payoff is

\[ U_i(d,s) \equiv \pi_i(d,s) + \pi_A(d,s), \]
so i’s optimal decision \( d_i(s) \) solves

\[ \max_{d \in D} U_i(d,s), \]
so the expected total payoff when party i owns asset A is

\[ V^i = E_s \{ \pi_1(d_i(s),s) + \pi_2(d_i(s),s) + \pi_A(d_i(s),s) \}. \]

In the efficient static governance structure, party i owns asset A if \( V^i > V^j \). Let \( V^{ST} \) denote the expected total payoff from this efficient static governance structure, and \( V^{ST}_i \) the expected payoff to party i under this governance structure. That is,

\[ V^{ST} = \max \{ V^1, V^2 \} \]
and \( V^{ST}_1 + V^{ST}_2 = V^{ST} \). We assume that neither party’s optimal decision rule \( d_i(s) \) is identical to the first-best decision rule \( d_{FB}(s) \), so \( V^{ST} < V^{FB} \).

Given this analysis of the one-shot case, we now return to the discussion above, concerning how and why this model departs from the GHM framework. To repeat, we depart from the GHM framework by assuming that decisions are not contractible, even ex post. We impose this assumption for two complementary reasons.

The first reason for this new assumption is theoretical: one cannot construct a (static- or relational-) adaptation theory of the firm based on the standard GHM assumption that asset utilization is contractible ex post. In that case, …

The second reason for this new assumption is empirical: we were led to this assumption in our related work on “hybrid” governance structures (Baker, Gibbons, and
As an input to that work, we conducted a series of detailed interviews with practitioners who design, implement, consult to, and negotiate terms for these governance structures. Several important ideas arose during these discussions—some familiar from the organizational-economics literature, but others more novel. The most novel, at least to us, was the need for governance structures to induce efficient behavior ex post, because contracts cannot. To paraphrase one practitioner, “No contract will persuade an unwilling partner to do what you really want him to do.”

Our assumption that asset utilization is non-contractible ex post rules out bargaining over asset utilization after the state has been observed (because implementing the bargained utilization of an asset would require a contract, unless the bargained utilization coincides with the utilization preferred by the asset’s owner). Even without ex post contracts, however, one could imagine bargaining over asset ownership ex post. That is, because it is not possible to enforce a contract that directly influences the utilization decision by an asset’s current owner, one could imagine selling the asset to a new owner whose self-interested utilization decision is preferable to the original owner’s self-interested decision.

To us, such ex post renegotiation of asset ownership seems unrealistic. For example, we know of no settings where asset ownership (or formal control over decision rights) flips back and forth repeatedly over time. We therefore analyze the polar case in which ex post renegotiation of asset ownership is impossible—perhaps because the opportunity to use asset A is fleeting, and transferring ownership would take some time. But even if we allowed such renegotiation, we still could not achieve the first-best in this one-shot analysis, because neither party’s self-interested decision rule is identical to the first-best decision rule. Therefore, it would be possible to construct a parallel theory of relational adaptation in which asset ownership can be renegotiated ex post (perhaps at a cost, so that ex ante asset ownership continues to play some role), but we do not do so here.

1.B The Repeated Game

As is now standard, we model an ongoing relationship as a repeated game. Following a large literature, we interpret an equilibrium in the repeated game as a “relational contract” (i.e., an agreement between the parties that is so rooted in their shared experience that it cannot be enforced by a court, and so must be enforced by the parties’ concerns for their reputations). Macaulay (1963) and Macneil (1978) introduced the idea of a relational
contract to the sociological and legal literatures, respectively; early economic models of relational contracts include Klein and Leffler (1981), Telser (1981), and Bull (1987).

In this paper, we restrict attention to first-best relational contracts, in which the asset-utilization decisions are $d^{FB}(s)$. The task is then to ascertain whether there exist payment schemes that induce first-best decision-making. These payments can occur at three times, regardless of who owns the asset. First, the payments might be “efficiency wages,” denoted by $t$ and paid before the state or the decision is observed. Second, the payments might be “bribes,” denoted by $\tau(s)$ and paid after the state is observed but before the decision is made. Third, the payments might be “subjective bonuses,” denoted by $T(d, s)$ and paid depending on whether the decision was appropriately tailored to the state. More generally, the payments could include any combination of these three possibilities.

We analyze trigger-strategy equilibria: if any firm reneges (on a payment or a utilization decision), the firms engage in static transactions thereafter. We view the punishment phase of trigger strategies as reflecting a reasonable tradeoff between the theoretical appeal of renegotiation and the intuitive appeal of spite. We impose another form of renegotiation by assuming that if reneging occurs then the parties engage in efficient static governance in all future periods. (Achieving efficient static governance may require a change in asset ownership at the end of the present period, with an accompanying side-payment.) Thus, after reneging, the total expected payoff will be $V^{ST}$ in (6).  

There are many reneging constraints that must be satisfied if a relational contract is to be a repeated-game equilibrium. First, either party could refuse to pay or to accept an efficiency-wage payment, $t$. Second, either party could refuse to pay or to accept a bribe, $\tau(s)$. Third, whichever party owns asset $A$ could deviate from the first-best decision, $d^{FB}(s)$. And finally, either party could refuse to pay or to accept a bonus, $T(d, s)$.

For concreteness, suppose that party 1 owns the asset, and define all payments as from party 2 to party 1 (so that a negative payment is to party 2). The constraints that the parties be willing to pay and to accept the efficiency wage payment $t$ are then

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4 It may seem strange that we rule out renegotiation of asset ownership ex post and yet allow for asset sales after reneging, but there is no inconsistency here. Again, our implicit assumption is that the opportunity to use asset $A$ is fleeting, and transferring ownership would take some time, so this is why there is no renegotiation of ownership ex post. On the other hand, there is plenty of time between periods, so this is what allows an asset sale after reneging.
The lefthand side of (7) is the expected present value of party 2’s payoffs on the equilibrium path. The righthand side of (7) consists of two payoffs this period if party 2 reneges on the efficiency wage payment \( t \) (namely, zero from not making the payment and \( E_s\{\pi_2(d_1(s), s)\} \) from party 1’s optimal decision after 2 reneges) and two payoffs starting next period (namely, \( V_{2ST} \) each period forever after from efficient static governance, but \( p_1 \) paid at the start of the next period if it is necessary for party 1 to sell asset A to achieve efficient static governance in future periods). For party 2 to be willing to pay \( t \), the lefthand side of (7) must exceed the right, and analogously for party 1 in (8).

The constraints that the parties be willing to pay and to accept the bribe \( \tau(s) \) are

\[
(9) \quad \left[ -\tau(s) + \pi_2(d^{FB}(s), s) - T(d^{FB}(s), s) \right] + \frac{1}{r} \left[ -t + E_s\{\pi_2(d^{FB}(s), s) - \tau(s) - T(d^{FB}(s), s)\} \right] \\
\geq 0 + \pi_2(d_1(s), s) + \frac{1}{r} V_{2ST} - \frac{1}{1 + r} p_{1\rightarrow 2}
\]

and

\[
(10) \quad \left[ \tau(s) + U_1(d^{FB}(s), s) + T(d^{FB}(s), s) \right] + \frac{1}{r} \left[ t + E_s\{U_1(d^{FB}(s), s) + \tau(s) + T(d^{FB}(s), s)\} \right] \\
\geq 0 + U_1(d_1(s), s) + \frac{1}{r} V_{1ST} + \frac{1}{1 + r} p_{1\rightarrow 2}
\]

There are two differences between (9) and (7): in (9), \( t \) has already been paid, so it does not appear in the first bracket on the lefthand side, and the state \( s \) has already been realized, so
this period’s payoffs on both sides are contingent on $s$ rather than expectations. Otherwise, (9) and (10) mimic (7) and (8), respectively.

The constraint that party 1 be willing to take the first-best decisions $d_{FB}(s)$ is

\[
U_i(d_{FB}(s), s) + T(d_{FB}(s), s) \geq U_i(d_1(s), s) + \frac{1}{r} V_{i1}^{ST} + \frac{1}{1 + r} p_{1\rightarrow 2}.
\]

This constraint is different than the others, because party 1’s decisions affect total surplus, rather than merely divide a fixed surplus as the payments do. Rearranging (11) yields

\[
\frac{1}{r} \left[ t + E_s \{ U_i(d_{FB}(s), s) + \tau(s) + T(d_{FB}(s), s) \} \right] - \frac{1}{r} V_{i1}^{ST} + \frac{1}{1 + r} p_{1\rightarrow 2} 
\geq U_i(d_1(s), s) - \left[ U_i(d_{FB}(s), s) + T(d_{FB}(s), s) \right],
\]

which says that the present value of party 1’s future payoffs from staying on the equilibrium path (net of the future payoffs after reneging) must exceed the reneging temptation this period, $U_i(d_1(s), s) - U_i(d_{FB}(s), s) - T(d_{FB}(s), s)$. This expression for the reneging temptation this period, on the righthand side of (12), will play a key role below.

Finally, the constraints that the parties be willing to pay and accept the bonus $T(d, s)$ are

\[
-T(d_{FB}(s), s) + \frac{1}{r} \left[ -t + E_s \{ \pi_2(d_{FB}(s), s) - \tau(s) - T(d_{FB}(s), s) \} \right] 
\geq 0 + \frac{1}{r} V_{21}^{ST} - \frac{1}{1 + r} p_{1\rightarrow 2}
\]

and

\[
T(d_{FB}(s), s) + \frac{1}{r} \left[ t + E_s \{ U_i(d_{FB}(s), s) + \tau(s) + T(d_{FB}(s), s) \} \right] 
\geq 0 + \frac{1}{r} V_{i1}^{ST} + \frac{1}{1 + r} p_{1\rightarrow 2}.
\]

There are two differences between (13) and (9): $\tau(s)$ has already been paid, so it does not appear in the first bracket on the lefthand side, and the decisions $d_{FB}(s)$ have already been
taken, so the utility terms also do not appear on either side of (13). Otherwise, (13) and (14) mimic (9) and (10), respectively.

Miraculously, these seven reneging constraints can be reduced to a single inequality! (This result depends crucially on two elements of the model: risk-neutrality and the existence of the side-payment, t.) To sketch the proof of this result, consider the following specifications of the bonus, efficiency wage, and bribe:

\[
T(d^b, s) = U_1(d(s), s) - U_1(d^b(s), s)
\]

and \(T(d, s) = 0\) otherwise;

\[
t = V^{ST} + \frac{r}{1 + r} p_{1 \rightarrow 2} - E_s\{U_1(d(s), s)\};
\]

and \(\tau(s) = 0\) for all \(s\). These payments cause an enormous simplification of the seven reneging constraints. In particular, (12) becomes \(0 \geq 0\) and (13) becomes

\[
U_1(d_1(s), s) - U_1(d^{FB}(s), s) \geq \frac{1}{r} (V^{FB} - V^{ST}),
\]

where \(V^{FB} = E_s\{U_1(d^{FB}(s), s) + \pi_2(d^{FB}(s), s)\}\), and all the remaining constraints are tediously satisfied.

This derivation establishes sufficiency: if (17) holds then the payments defined in (15) and (16) imply that all seven reneging constraints hold. But (17) is also necessary, because adding (11) and (13) yields (17). Thus, the feasibility condition (17) becomes the central constraint in our repeated-game analysis.

To be completed.

3. Extensions, Applications, and Evidence

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4. Relational Contracts and the Theory of the Firm

Discussing these extensions and applications of the relational-adaptation theory of the firm leads naturally to a broader discussion of relational contracts in the theory of the firm, such as in property-rights models and agency models, where relational contracts
perform different functions than they do in adaptation models. Regarding property rights, Garvey (1995), Baker, Gibbons, and Murphy (2002b), and Halonen (2002) enriched static models in the tradition of Grossman and Hart (1986), Hart and Moore (1990), and Hart (1995) by adding ongoing relationships to static property-rights models. In the static models, ex post surplus shares create ex ante incentives for non-contractible specific investments. Adding relationships to the static property-rights models enriches the feasible set of ex post surplus shares, and so improves ex ante incentives (and often also changes the efficient structure of asset ownership, compared to the static model).

Regarding agency theory, Baker, Gibbons, and Murphy (1994), Che and Yoo (2001), and Rayo (2002) enriched static models in the tradition of Holmstrom (1982), Holmstrom and Milgrom (1991), and Baker (1992), again by adding ongoing relationships to the static models. Adding relationships to the static agency models enriches the set of feasible incentive contracts, this time by allowing relational incentive contracts to link pay to subjective performance measures (i.e., variables that are observable but not verifiable). The feasibility of such relational incentive contracts changes the role, and hence typically also the efficient design, of incentive contracts based on objective performance measures, compared to the static agency models.

At a theoretical level, the relational-adaptation approach differs from both the property-rights and the agency streams of research, because the relational-adaptation approach has no ex ante actions, so relationships have no role to play in improving ex ante incentives. But at an empirical level, all three streams have recently made contributions to the theory of the firm, and to organizational economics more generally. We therefore make a brief attempt to organize this burgeoning literature.

In this section we address two questions about relational contracts: do they matter? and do they interact? When we ask whether relational contracts matter, we mean: Can performance be improved by paying appropriate attention to the structure and management of relational contracts? We intend this question to be empirical. As we describe below, in many settings, the answer is an overwhelming “Yes.”

When we ask whether relational contracts interact, we mean: Does paying appropriate attention to the structure and management of relational contracts require that other decisions be taken differently than they would in the absence of relationships? So far, this question is largely theoretical, but on these terms, the answer again is an overwhelming “Yes.”
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