On the role of investments and the nature of residual control rights

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ABSTRACT

Using the transaction as originally formulated by John R. Commons as the unit of analysis (Oliver Williamson recognizes that Commons' notion of transaction is the basic unit of analysis of transaction cost economics), in this paper I illustrate three results: (i) how specific investments can be a safeguard from, rather than the cause of, opportunistic behaviors, (ii) if and when residual control rights can reduce, rather than increase, incentives to invest, and (iii) why the standard definition of residual control right as right *in personam* is too narrow.

1. Introduction

In incomplete contract exchanges, the owner of specific assets is locked in a relationship and potentially exposed to adverse renegotiation (*hold-up*) of the original terms agreed upon. In this framework, contractual parties have reasons to underinvest in asset specificity, namely investments that have little or no value outside a relationship but great value inside (e.g., Williamson 1975, 1985). In accordance with Grossman & Hart (1986), Hart & Moore (1990), and Hart (1995), hereinafter GHM, a second[1] best solution is gained by the re-allocation of residual rights of control. In this paper I revisited these two main results—the underinvestment, which stems from asset specificity and opportunism, and the residual control right as a means to safeguard and encourage investments—using as the unit of analysis the transaction as formulated by John Commons.

Oliver Williamson (1985: 3, 6; 1996: 12, 45, 234-5) affirms that the basic unit of transaction cost analysis is the transaction as defined by Old Institutionalist John Rogers Commons. A transaction *à la* Commons involves (at least) five parties: the buyer (B1) and the seller (S1) who are actually engaged in the transaction, the next best alternatives for each (B2 and S2), and the state or its representatives (Commons [1924] 2007: 88). The inclusion in the unit of analysis of the best two potential opportunities available (B2 and S2) is needed to examine opportunity costs of a transaction because the best alternative parties represent the sacrifice forgone by choosing one option over another. In this way, transaction is shaped not only by actions and promises of two parties, the actual buyer and the actual seller, but also by the expected actions held by two further parties, the potential buyer and the potential seller, given the effective enforcement power of the legal system. This article shows that the role of alternatives B2 and S2 is undermined in the study of hold-up phenomena and neglected in the significance and the allocation of residual control rights.

The main argument developed here is the following. The opportunism depends not only on the incompleteness of the contract between parties, say B1 and S1, but also on the competitiveness outside the contract, that is on alternatives B2 and S2. For instance, the threat of switching on outside options unless the investor does not renegotiate contractual terms is not credible if alternatives are not available (i.e., in a bilateral monopoly). The ex-post market configuration, rather than the ex-ante contractual arrangement, may provide parties with a certain safeguard for specific investments and moderate the problem of under-investment, which arises from hold-up. The idea is that specific investments may

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[1] According to GHM, property rights represent a safeguard against hold-up. However, while it encourages owner's incentives, the assignment of property rights will decrease non-owners' incentives to invest. Then, only second best outcomes are possible.

reduce the field of available alternatives from a large number, i.e., the ex-ante bargaining situation, to a small number, i.e., the ex-post bidding bilateral monopoly. And, as a result, the *transformed* market with a small number of alternatives should decrease risks of opportunistic behaviors and, by product, increase parties' incentives to invest. Hence, parties may be led to invest or over-invest in asset specificity to create a market structure that can make the opportunistic behavior extremely costly.

Oliver Williamson describes this circumstance by the notion of Fundamental Transformation (FT): a process through which a market configuration characterized by large numbers bidding at the outset will evolve, thanks to the parties' durable investments in transaction-specific assets, into an ex-post market configuration characterized by a bilateral monopoly (e.g., Williamson 1975, 1979, 1985, 2005; see also Klein 1996). Hence, in the case of FT, specific investments play the role of safeguards for own specific investments because they increase the opportunity costs in the case of leaving a specific relationship.

"This fundamental transformation has pervasive contracting consequences" (Williamson 1985: 62). One consequence is that the allocation of residual control rights, which for the GHM model is a means to reduce opportunistic behavior, should take into account this role of investments in transforming the market for protecting own investments; but, as I will show, the GHM approach undermines this issue. Moreover, the paper sheds light also on the nature of residual control rights: the residual control right is not only the right to govern resources in a certain bilateral relationship, but it entails also the power to exclude all other people. For instance, if B1 acquires S1 (that is, B1 acquires the residual control right over assets of S1), then B2 will be excluded from the widget supplied by S1 unless B2 does not find an agreement with her competitor B1. Later in the paper I prove that this exclusion was the main reason for the acquisition of Fisher Body by General Motors. Moreover, due to its effects of the exclusion for alternative parties B2 and S2, the paper advocates the idea that the meaning of residual control right has to go beyond the view (supposed by New Institutional Economics literature) of right *in personam*, which is a right concerning solely two parties B1 and S1.[2]

In particular, by Commons' transaction I show the following three issues. First, specific investments may protect own specific investments, even in a context of incomplete contracts. Second, when investments are able to transform the market configuration, the assignment of a certain ownership structure could become unnecessary or even undesirable. Lastly, the residual control right, in general, and the vertical integration, in particular, are not dyadic; in reality they always involve triadic relationships.

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[2] Rights *in personam*, rights on person or contract rights are enforceable against a specific person, *inter partes*. They are different from rights *in rem* (rem comes from the Latin word res, thing), rights on assets or "property rights", which are claimable against the asset itself and therefore valid against all persons, *erga omnes*. For excellent analysis on the distinction between rights *in personam* and rights *in rem* see Arruñada (2003, 2012A, 2012B), and Merrill & Smith (2001, 2011).

Hart & Moore (2008) argue that a contract provides a reference point which encourages investments—even if they do not explicitly speak about specific investments; but they do not investigate if and how investments can support own investments. Moreover, my article is related to the contribution of Rajan & Zingales (1998), in which authors identify a mechanism to allocate power, the access to a critical resource, which is alternative to the ownership mechanism of GHM.[3] This new mechanism is introduced because ownership may reduce outside options—this effect is, using the words of Rajan & Zingales, "the dark side of ownership" (p. 390; cf. also pp. 460 ff.). Unlike Rajan & Zingales, I propose to extend the notion of transaction, including outside options and reconsidering the meaning of residual control rights, rather than introducing an alternative mechanism of power, such as Rajan & Zingales' access. Finally, in a recent article, Geoff Hodgson (2015) shows that the *economics of property rights* devalues property and legal rights.[4] In my paper I add that the economics of property rights devalues even market, for at least two reasons. First, the GHM approach undermines the role of residual control rights on outside-market parties (B2 and S2). Second, though in the FT specific investments transform the market configuration from a competitive situation to a bilateral context, Williamson does not study the consequences of FT in terms of property rights. Both aspects have a relevant significance in terms of social welfare.

The remainder of the paper is structured as follows. The next section illustrates the significance of transaction from Coase to Commons, including Williamsonian FT. In Section 3, I re-examine the most important textbook case of holdup—the acquisition of Fisher Body by General Motors—and show that the allocation of residual control rights depended on and affected the outside options. In Sections 4, I revisit the GHM model and its results—in some cases, I reverse their findings. Section 5 proposes a broader definition of residual control rights. Section 6 is dedicated to remarks.

2. Commons' multilateral transaction: Going beyond Coase's bilateral transaction and including Williamson's Fundamental Transformation

By illustrating the famous Rancher-Farmer's example, Coase writes that

> [i]f the crop was obviously sold in conditions of *perfect competition*, marginal cost was equal to price for the amount of planting undertaken and any expansion would have reduced the profits of the farmer. […] Of course, if cattle-raising commonly involved the destruction of crops, the coming into existence of a cattle-raising industry might

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[3] Rajan and Zingales (1998: 388) define the access as "the ability to use, or work with, a critical resource".

[4] Although economists have long been interested in property rights (Alchian & Demsetz 1973, Barzel 1989, Libecap 1989, Eggertsson 1990), for Hodgson (2014) the concept of property is inadequately defined in economics; it is very often conflated with an idea of possession as a *de facto* use and control of a resource, without reference to, and imputation of, any kind of legal or moral right (Hodgson 2014).

raise the price of the crops involved and farmers would then extend their planting. But I wish to *confine* my attention to the individual farmer.

<div align="right">R.H. Coase (1960:3-4, emphasis added)</div>

In Coase (1960), the attention on the problem of externality is "confined" to effects on two actual parties, the Rancher and the Farmer,[5] for conditions of perfect competition—price-taking agents cannot affect or be affected by third parties, such as alternative Farmers and alternative Ranchers.[6] That is the idea that the alternative agents (B2 and S2) are already, still and always in equilibrium. In doing so, Coase (1960) neglects the role played by third parties in externality, in particular, and in shaping the transaction, in general. Moreover, the focus on two parties implied to imagine property as right *in personam* and undermines the effects of rights on outside parties (B2 and S2): for instance, Coase does not investigate the fact that the definition of right between actual parties implies exclusion, avoidance, and non-interference for all potential parties.

Consider the following extension of the Rancher-Farmer example, by relaxing the assumption of perfect competition, Assume that after the agreement between B1 and S1—which, for instance, parties decide to allow the Rancher B1's cattle to pass over the Farmer S1's field for a contracted price—the Rancher B2 starts to invade the field of S1 with her cattle. As a result, B2 and S1 have to bargain an agreement, say B2's cattle can pass over S1's field for a contracted price. Moreover, this agreement should not "invade" the previous agreement between B1 and S1—the pass over the field of B2's cattle can affect the pass of B1's cattle. Finally, assume that after these agreements, and supposing that there is not externality between them, the Farmer S2 proposes a lower price for passing over her field to two Ranchers. These actual and potential occurrences may create uncertainty on the choices of the Farmer S1 (if and what farms in her field) as well as on the choices of two Ranchers; in the case of specific investments and positive transaction costs, it leads to the standard problem of underinvestment.

Contracts between each pair of agents should be stipulated and enforced. Note that while the (dis-)agreement between S1 and two Ranchers involves the *exploitation* of a resource (S1's field), the conflict between S1 and S2 concerns the *access* to a resource (Ranchers' cattle).[7] However, in both cases the rule maker should define and enforce costly (because contracts are incomplete) rights *in personam*. An alternative is represented by the definition of rights *in rem*, which are more valuable than corresponding rights *in personam* (even when both allocate to the holder the same set of asset uses) because the former are easier to

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[5] Coase confined his examples to two-party disputes, not only the farmer and the rancher, but also the railway emitting sparks and the owner of an adjacent woodlot, the keeper of coney-burrows and the farmer, and the parties in the nineteenth-century nuisances cases (see Merrill & Smith 2001: 371).

[6] The assumption of perfect competition is permanent over all his theorem; in fact, Stigler in the first version of Coase theorem made clear this assumption: "the Coase theorem thus asserts that under perfect competition, private and social costs will be equal" (Stigler 1966: 113).

[7] Henry Smith (2002) refers to these two dimensions of transaction respectively as governance and exclusion. Vatiero (2009) investigates the meaning of power along with the dimensions of exploitation and exclusion.

define and enforce than the latter. But, even if rights *in rem* offer stronger enforcement, they are harder to contract over, given that they affect and therefore require the consent of everybody (including B2 and S2).[8] In contrast, rights *in personam* offer less enforcement but are easier to contract over, given that they only affect the actual parties (B1 and S1).

There is a further means to reduce these transaction costs: the vertical integration.[9] For instance, S1 can acquire B1's activity. It leads to two main results: (i) S1 will not have the necessity to bargain with B2 if an increasing of exploitation of field would be efficient— she will be able to increase "internally" the cattle by her branch B1, (ii) S1 will be safeguarded by interference of S2 in the sense that S2 would be excluded by B1's cattle without the consent of S1. The vertical integration produces "privately" the same legal outcome of rights *in rem*. In this perspective, the rise of the firm as integration of two independent activities depends on both benefits and costs within and outside the relationship concerning the actual parties.

In 1937 Coase seems to express a similar perspective. He writes, quoting Maurice Dobb on Adam Smith's conception of the capitalist, that:

> [i]t began to be seen that there was something more important than the relations inside each factory or unit captained by an undertaker; there were the relations of the undertaker with the rest of the economic world *outside* his immediate sphere...the undertaker busies himself with the division of labour inside each firm and he plans and organises consciously […but…] he is related to the much larger economic specialisation, of which he himself is merely one specialised unit. Here, he plays his part as a single cell in a larger organism, mainly unconscious of the wider role he fills.
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> <div align="right">Coase (1937:389, quoting Maurice Dobb, emphasis added)</div>

Coase stresses that agents involved in a firm must take into account not only their relations within the enterprise, but also the outside market relations. In particular, the employer in his activity of organization of the firm has to manage forces coming from the inside and from the outside:

> [i]n view of the fact that while economists treat the price mechanism as a co-ordinating instrument, they also admit the co-ordinating function of the "entrepreneur", it is surely important to enquire why co-ordination is the work of the *price mechanism in one case and of the entrepreneur in another*.
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> <div align="right">Coase (1937:389, emphasis added)</div>

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[8] Benito Arruñada (2003: 406) describes the trade-off as follows:
> On the one hand, they [rights *in rem*] facilitate specialization by ensuring enforcement, given that right-holders' consent is required to affect them. However, for the same reason, their survival after conveyance of the asset or any other transformation of rights requires costly institutions [e.g., public registries, see Arruñada 2012B] and resources in order to organize the process of searching, bargaining, and contracting for consent […] [The latter] may in turn hamper investment, trade, and specialization.

[9] In a world with null transaction costs, the distinction between rights *in rem* and *in personam* would not be relevant. And also the allocation of residual rights does not matter.

Hence, in 1937 Coase suggests that the economic outcome is the result of actions of agents within the firm *and* in the market.[10] That is, the domain of contractual arrangements (whose the firm is a special case) concerning actual parties B1 and S1 relates to the domain of market outside options B2 and S2, and vice-versa. I prove that such a *bridge* between market and non-market (i.e., firm) domains can be helpful based on the Commonsian transaction.

In the objective to reframe Hohfeld's system of jural relations,[11] Commons defined the term "transaction" in chapter IV of his *Legal Foundations of Capitalism*. He writes that, in a transaction, each agent ought to consider

> the alternatives open to himself, the existence of actual, potential, possible or impossible rivals, and the degree of power which he can exert within the limits of these alternatives. A transaction, then, involving a minimum of five persons, and not an isolated individual, *nor even only two individuals*, is the ultimate unit of economics, ethics and law. It is the ultimate but complex relationship, the social electrolysis, that makes possible the choice of opportunities, the exercise of power and the association of men into families, clans, nations, business, unions and other going concerns. The social unit is not an individual seeking his own pleasure: it is five individuals doing something to each other within the limits of working rules laid down by those who determine how disputes shall be decided.
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> <div align="right">Commons ([1924] 2007: 68-69, emphasis added)</div>

In this way, transaction is shaped not only by actions and promises of two parties, the actual buyer and the actual seller, but also by the expected actions held by two further parties, the potential buyer and the potential seller, given the effective enforcement power of the legal system.[12] As pointed out by Commons, the inclusion among participants of a transaction of the best two potential opportunities available (B2 and S2) is decisive to assess economic costs of transaction because these two alternatives define the opportunity costs, as the sacrifice forgone by choosing one option over an alternative that may be equally accessible (Commons [1924] 2007: 67).

In particular, the Commonsian transaction rests on three dimensions: performance, forbearance, and avoidance. In a transaction, the performance is what parties do actually, forbearance is the limit placed on performance, and avoidance is the alternative, which parties do not perform. Performance, forbearance, and avoidance depend on working rules regulating the relationship between actual parties (B1 and S1), *and* working rules involving outside parties (B2 and S2).

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[10] See also Pagano & Vatiero (2015).
[11] For an illustration of the influence of Wesley N. Hohfeld on Commons' thought, in particular, and on Institutionalism, in general, see respectively Vatiero (2010) and Fiorito & Vatiero (2011).
[12] Which guarantees a perfect fit between the entitlements of the different agents (see Pagano 2007).

For the purpose of this paper, I can offer here the following example on specific relationships. Consider two parties, B1 and S1, and both parties are involved in deciding on investing in asset-specificity. In Figure 1, when the agent B1 invests in the specific relationship with S1, B1 obtains a certain return, which is a share of the relational surplus (the black line), but she can/could not obtain S1's share of surplus (the grey line in the figure). The former is a performance, while the latter represents a forbearance. It is worthy to underline that Coase and the New Institutional Economics focus on efficient legal mechanisms, which are able to encourage specific investments (performance) and "regulate" re-negotiations or opportunistic behaviors (forbearance). However, B1's incentive in investing or in behaving opportunistically depends also on conditions of alternative potential relationships (the dotted line in the figure) on which B1 can switch, i.e., the agent S2. When B1 has no alternatives (or they are irrelevant) because working rules (e.g., there is an exclusive dealing between S2 and B2) do not permit to switch on S2, B1 will be locked in the specific relationship. Such a lock-in renders non-credible or very costly the possibility for B1 to switch on alternative relationships—that is to behave opportunistically. On the other hand, the fact that B1 has no alternatives decreases risks for S1 of B1's opportunistic behaviors and, therefore, increases S1's incentives to invest.
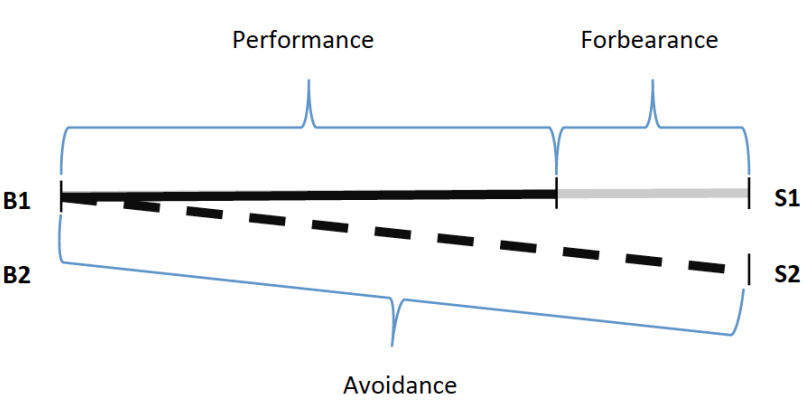

Figure 1: Performance, forbearance and avoidance in a transaction

One consequence is that institutional remedies for safeguarding S1's investments would not find a robust justification because B1's opportunism is already discouraged by the outside conditions, i.e., the absence of alternatives for B1. Taking into account also the avoidance dimension means that both parties may invest in transforming the transaction, that is in setting a credible commitment or diminishing the credibility of post-opportunism. If so, contractual and legal remedies to hold-up may be redundant or even wasteful. This intuition can be clearly derived from the notion of FT, which is the most notable example involving the transaction of Commons.

The Williamsonian FT is the process according to which investments in asset specificity may attain the transformation of the transactional environment from an ex-ante competitive

market to a bilateral monopoly. The idea of Williamson is that specific investments may reduce the field of available alternatives[13] from a large number, i.e., the ex-ante bargaining situation, to a small number, i.e., the ex-post bidding bilateral monopoly.[14]

In this respect durable specific investments lead to the evolution of transaction from a context with many agents (competitors and counterparties of each agent) through a bilateral monopoly. The FT is

> the *transformation* of a large numbers bidding competition at the outset into a small numbers supply relation during contract implementation and at contract renewal intervals for transactions that are supported by significant *investments in transaction specific assets*.
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> <div align="right">Williamson (2010: 15, italics added)</div>

In the FT, an initial transaction between exchange partners creates a "transaction residual" that favors a continued bilateral trading relationship. In doing so, parties seek to expand "the contractual relation beyond its "natural limits", thereby creating mutual reliance relation" (Williamson 1985: 190).[15] Hence, an ongoing dependency relation ("common destiny", Williamson 1985: 121) is obtained between a buyer and a supplier when one or both have made specific investments in support of the other.

In the FT, specific investments have a double role:
1. They are the origin of problem of hold-up. The standard literature shows that the

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[13] There are several works that explore, in various settings, the role of outside options on the bargaining outcome (e.g., Osborne & Rubinstein 1990).

[14] Putting it differently, the FT relies on three periods—note that, in each period, contracts continue to be incomplete.
- Pre-Transformation: Parties in an ex-ante competitive market agree to realize some transaction that involves specific investments.
- Transforming the setting: Specific investments are performed and transaction residual is created. An anonymous market exchange is transformed in a bilateral monopoly with non-anonymous parties.
- The transformed setting: A post-opportunistic behavior risks to loss such a transaction residual gains. The hold-up problem may be mitigated or even solved.

[15] More in detail,
> [t]he Fundamental Transformation applies to that subset of transactions for which large numbers of qualified suppliers at the outset are *transformed into* what, in effect, is a *bilateral* exchange relation during contract execution and at the contract renewal interval. […] The key factor in determining whether a large numbers supply condition will *evolve* into a bilateral exchange relation is the degree to which the transaction in question *is supported by durable investments in transaction-specific assets*" (Williamson 2005, italics added).

Thus, "[f]aceless contracting is thereby supplanted by contracting in which the pairwise identity of the parties matters" (Williamson 1985:62). For instance, if a firm acquires specialized assets (e.g., capital, knowledge, or skills) through reiterated transaction, that firm is better prepared than others for further transactions. Williamson (1985: 197 ff., 1996: 124 ff.) offers the case of petroleum exchanges as an application of the notion of FT. The case of hostages as a means to support transactions is also consistent with this view (see Williamson 1985, 1996).

specificity of investments is needed to create the conditions for post-opportunistic behavior. If the investment is not specific, i.e., it is a general-purpose investment, alternatives to specific relationships are not costly, and therefore the renegotiation by the non-investor is not a credible strategy.

2. They are the origin of the mitigation of hold-up. Each transaction among parties creates a "transaction residual" that favors a continued bilateral trading relationship. Indeed, the FT by specific investments transforms the ex-ante competitive bargaining into an ex-post bilateral monopoly and such ex-post market configuration of bilateral relationship may provide a certain safeguard for specific investments, by preventing parties from freely switching on alternatives.

In a bilateral monopoly, the post-opportunistic behavior is extremely costly because there are no alternatives to a specific relationship. Hence, the threat of opportunistic behavior is not credible, while there is a credible commitment by both parties. As Williamson (1985: 167) notes

> [c]redible commitments and credible threats share this common attribute: Both appear in conjunction with irreversible, specialized investments. But whereas credible commitments are undertaken in support of alliance and to promote exchange, credible threats appear in the context of conflict and rivalry.

This means that the specific investment, on the one hand, generates the conditions for locking in the investor and, on the other hand, produces a credible commitment by determining the so-called transactional residual. Moreover, both a credible threat and a credible commitment rest on outside-market options and on the avoidance dimension of Commons' transaction: the threat is credible if there are many outside options, while the commitment is credible if there are not those alternatives.

Thus, agents may select a specific investment in order to improve their ex-post contractual power and to minimize the probability of a counterparty's hold-up: specific investments, when they are able to reduce relevantly alternative-to-specific relationships, may protect own specific investments from opportunistic behaviors. This result is analytically formulated in Section IV. The next section re-assesses the acquisition of Fisher Body by General Motors in conjunction with this perspective.

3. *Once again* the case of General Motors and Fisher Body

The main results of the analysis are best illustrated through a reappraisal of the canonical example of General Motors (GM) and Fisher Body (FB).[16] According to Klein et al. (1978),

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[16] The 1926 GM and FB vertical integration is the most extensively discussed textbook case study in economic literature of vertical integration due to a hold-up (cf. Coase 2006). In 1919, FB signed with GM a

FB held GM by adopting inefficient production arrangements and by refusing to locate its plants near the GM assembly plants. The tension between GM and FB became "intolerable" (Crocker & Masten 1996) and by 1925, GM had acquired FB. Coase (2006) advanced a quite different perspective: the FB-GM merger was induced by rigid contractual clauses[17] (previously defined against potential GM's hold-up) rather than by refusal of FB to move the plant.

In contrast, our claim is that such vertical integration was the result of FB's efficacious strategy to increase its outside options and of GM's vain attempt to transform the market configuration. Indeed, there is a further part of the story which has to be narrated: GM required FB to build a new body plant near a GM assembly plant in Michigan (Flint) *and*, as Coase (2000) adds, to close the FB plant in Detroit. Thanks to skills of the Fisher brothers,[18] FB was able to fulfill the terms of contract with GM (hence, an additional plant was not needed to be built) and also to supply other auto-manufacturer firms, such as Ford. As a result, investments in relationship-specific know-how by FB would have made it difficult for GM to find another supplier in the downstream if FB had tried to engage in hold-up, while these investments have made it possible for FB to transact with GM's competitors or even to consider getting into the upstream. GM's main objective was the *avoidance* of an important (the most important for that time) supplier for competitors of GM rather than the *forbearance* of FB's potential opportunistic behaviors.

In a similar vein, Oliver Hart writes:

> I have supposed that any contract [agents] enter into, including a change in ownership, has a negligible impact on any other parties […] In practice, of course, not all integration decisions are made for efficiency reasons. Firms integrate vertically to

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10-year contract for the supply of closed metal auto bodies, containing several provisions aimed at protecting FB against hold-up by GM. The contract, among other things, defined a pricing formula for auto bodies based on a cost-plus rule according to which the final price was determined by labor and transportation costs-plus a mark-up to cover capital costs. But, in the 1920s the car market registered a huge and unforeseen rise in demand of closed car bodies, a demand that was unexpected by manufacturers such as Henry Ford. Referring to closed car bodies, he said, "No one in his right mind would ride behind that much glass" (cf. Lamm 1978).

[17] The contract between GM and FB defined an exclusivity clause that obliged GM to buy all of its closed metal auto bodies from FB, a most-favored nation clause that stipulated that FB would be prevented from charging GM a higher price than that charged to other customers, and a meeting-competition clause that prevented FB from charging GM a price higher than the average market price for their auto bodies (see Nicita & Sepe 2012).

[18] Lamm (1978) writes: "the manufacturing techniques pioneered by the Fishers included precision woodworking on a mass-production scale. Wooden components would interchange from one body to another and no longer had to be hand-fitted, as in carriage making. Fisher also pioneered sheet-metal stamping in a very crude but effective way." Moreover, Lamm (1978) notes,

> Fisher Body flourished not only by the virtue of the people involved, but also because of […] the staging: being in the right place at the right time. Detroit at the turn of the century happened to be a small city where everyone interested in automobiles knew everyone else. The Fishers soon became acquainted with all the important industry pioneers—these movers and shakers whose automotive nameplates still survive today: Henry Ford, Walter Chrysler, Ransom E. Olds, the Dodge Brothers, Alfred P. Sloan, Jr., Henry Leland, Charlie Nash and others.

foreclose on rival purchases and suppliers. The theory developed in this book should be a useful ingredient in future work in this area.

<div align="right">Hart (1995: 55, fn. 36).</div>

This work is, in this sense, an extension of Hart's (1995). Indeed, the acquisition of GM determined two consequences: 1) it enhanced the specific relationship, as supposed by Hart, but also 2) it raised GM's rivals' costs.[19] Freeland (2000: 40) in particular, stresses the relevance of "GM's desire to prevent competitors from using Fishers' services" as one of the main factors inducing the complete acquisition:

> These fears were magnified in mid-1919, when Fisher obtained its largest order for closed [bodies] ever from Ford. Fearing that Ford was experimenting with closed bodies on the inexpensive Model T, GM management worried that they were about to fall further behind their primary competitors in an important strategic area.
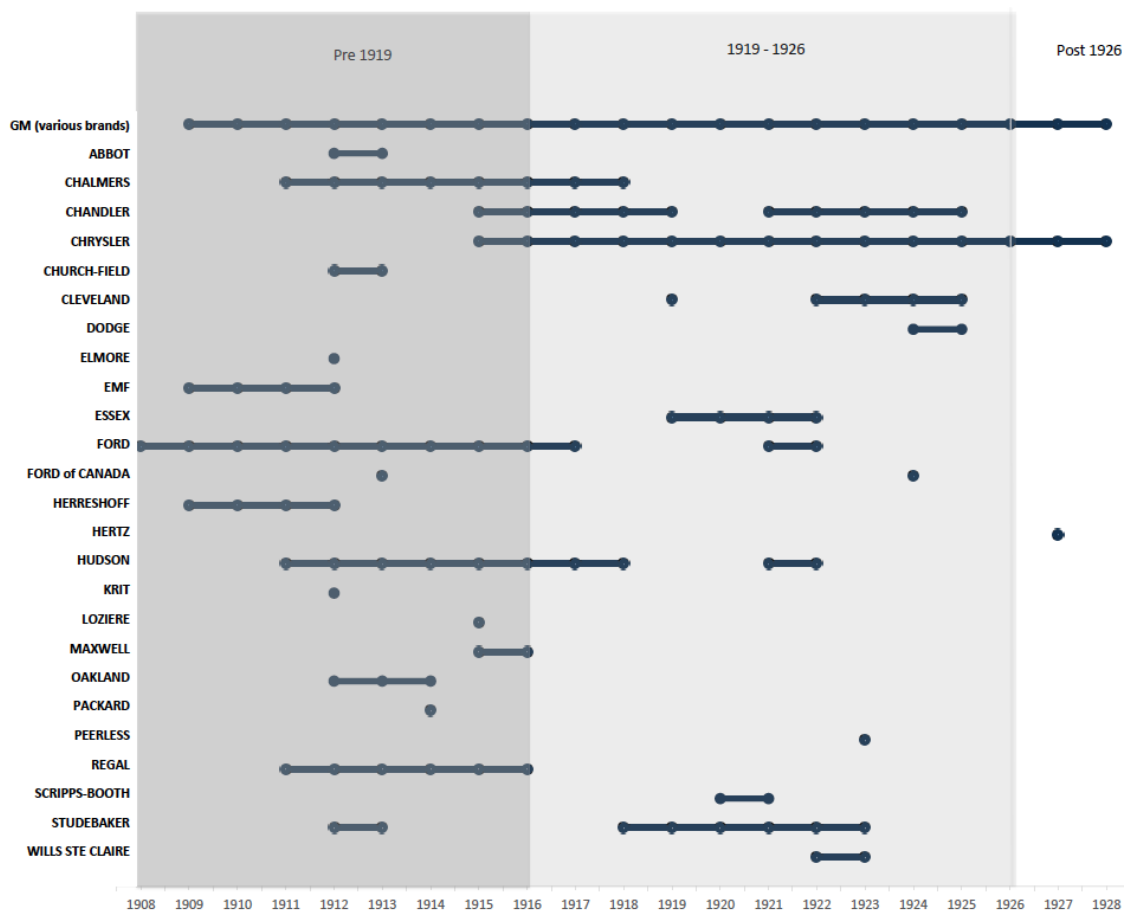
<div align="right">Freeland (2000:41).</div>

Figure 2: Clients of FB (1908-1928), source: Lamm (1978), and Nicita & Sepe (2012)

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[19] On raising rivals' costs strategies, cf. Salop & Scheffman (1983).

It can be helpful to consider the configuration of the FB-GM transaction before and after 1926 as shown in Figure 2. Before 1919, FB supplied a number of notable automakers (including GM). In 1919, GM bought a majority interest, but FB supplied bodies to any number of non-GM automakers, including Ford, Chrysler, and Studebaker.[20] By 1928, no contract is reported between FB and non-GM automakers (see Lamm 1978).
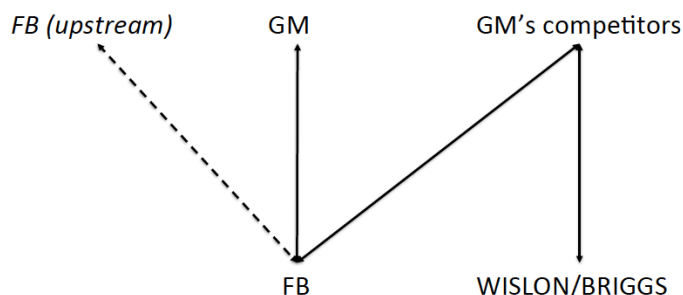

Figure 3: FB-GM's transaction (adapted by Nicita & Sepe 2012)

Moreover, between 1919-1926, FB wanted to vertically integrate upstream or to vertically integrate with automakers (e.g., Ford and Studebaker).

> There have been rumours for the past few years that the Fisher Body organization was intending to get into manufacture of the total car instead of just selling bodies to other car manufacturers. There were also persistent rumours that two other auto builders, Ford Motor Co. and Studebaker, have been attempting to buy out the Fisher brothers.
>
> Lamm (1978)

In a simple scheme, as in Figure 3, the transaction before the 1926 merger included FB, GM, and GM's competitors (because FB was able to supply closed bodies to them), but did not include FB's competitors (because the exclusive dealing with FB implied that GM could not buy from such alternative sellers as Wilson and Briggs). Moreover, there were rumors that FB wanted to get into the upstream (dotted line) or integrate with Ford or Studebaker. Such transaction configuration, and not (only) FB's potential opportunistic behaviors, induced FB to acquire GM. While FB wanted to continue to sell its closed bodies at a competitive price also to GM's competitors and "it would have been less costly to supply them from Detroit rather than from Flint" (Coase 2000:29), GM wanted to "transform" the initial market configuration in a bilateral monopoly, by closing FB's plant in Detroit.[21] FB's "resistance" to transform the transaction in a bilateral monopoly induced GM to buy FB.

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[20] There were still many clients of FB even after 1919, when GM acquired 60% of FB shares—it was due to the fact that, though GM owned 60% of the shares, its level of control (i.e., residual control right) was limited (see Coase 2006).
[21] Moreover, FB worried that once it has built its new plant in Michigan *and* closed the plant in Detroit, GM would have used its bargaining power to set the price of car bodies close to FB's variable production costs, thus causing FB to take a loss on its initial fixed investment (i.e., hold-up).

After the 100% acquisition, transactions with GM's competitors were nulled (as well as the possibility that FB get into the upstream). The FB-GM merger dramatically changed the transaction configuration. It transformed not only the relationship between GM and FB (which became a GM branch), but also the conditions of competition in the market as underlined in Figure 2.

The effects and consequences in terms of investments of vertical integration over outside options are well-illustrated by this passage of Freeland on FB-GM case:

> Almost immediately after the purchase, Ford, Hudson, Chrysler, Studebaker, and others stopped buying bodies from Fisher […] Competitors' lack of access to Fisher played an important role in allowing GM to vanquish Ford and defeat the challenge posed by upstarts like Chrysler and Hudson. […] By the fall of 1925, Ford was offering a closed-body version of the Model T, but its production was limited by both a lack of capacity and continuing difficulties in manufacture. General Motors' purchase of Fisher constrained Ford's closed-body capacity even further, contributing to Ford's decision to shut down its River Rouge plant in 1927 and to convert it to production of the closed-body Model A. The Fisher purchase had an even greater impact on independents like Hudson and Chrysler, both of which relied on Fisher for closed-body design and production. These firms were forced to purchase plants to manufacture their own closed bodies, and start-up problems prevented them from significantly increasing production. […] General Motors, on the other hand, increased output by one-third and after-tax profits by over 60 percent […] *The purchase of Fisher thus had a dramatic impact on GM's position, providing at least a temporary advantage over its major competitors*.
>
> Freeland (2000:55-56, italics added)

Hence, on the one hand, the vertical integration enhanced the relationship between FB and GM and, as a by-product, it safeguarded GM's investments; on the other hand, it is very likely that it reduced the competition in the upstream (and downstream) as well as incentives in investing in the outside options. This potential trade-off between incentives in the specific relationships and outside (which is largely neglected by the GHM model) is particularly relevant for antitrust implications concerning contractual remedies (e.g., exclusive dealings) or mergers, which tend to diminish incentives deriving from market competition. Indeed, each antitrust case concerning complementary assets faces a trade-off between the protection of investments and the protection of competition. Both concerns should be analyzed when selecting the optimal ownership structure.

4. When specific investments protect specific investments

Let us consider Hart's (1995) well-known formulation with specific investment by two vertically related parties: e indicates the investment by agent S1, while i the investment for agent B1. Agent S1 furnishes a widget, which is acquired by agent B1. Specific

investments are assumed to increase the surplus of a relationship, that is $\frac{dR(i)}{di} > \frac{dr(i)}{di} > 0$ and $\frac{dC(e)}{de} < \frac{dc(e)}{de} < 0$, where $R(i)$ and $r(i)$ stand for the revenues of the investment i for agent B1, respectively in the specific relationship and in the spot market, while $C(e)$ and $c(e)$ indicate the revenues of the investment e for agent S1, respectively in the specific relationship, and in the spot market. Note that, while R and C are functions that depend on a specific relationship, r and c depend on conditions in the market, namely options which are outside the specific relationship (outside options). The GHM model assumes that specific investments i and e increase not only the value of assets in the relationship $R(i)$ and $C(e)$, respectively, but also the value of these assets in the alternative uses $r(i)$ and $c(e)$. This condition is well-illustrated by Rajan & Zingales (1996: 408).

Under contractual incompleteness, parties' first-order conditions (focs) are:

$$a\frac{dR(i)}{di} + (1-a)\frac{dr(i)}{di} = 1 \qquad [1]$$
$$(1-a)\frac{dC(e)}{de} + a\frac{dc(e)}{de} = -1 \qquad [2]$$

Where a denotes the ex-post Nash-bargaining power of parties on quasi-rents, with $0 \leq a \leq 1$. On the other hand, the focs in a context with complete contracts are given by:

$$\frac{dR(i)}{di} = 1 \qquad [3]$$
$$\frac{dC(e)}{de} = -1 \qquad [4]$$

The comparison between the focs [1] and [2] and the focs [3] and [4] shows the standard result of the literature on hold-up: incomplete contracts reduce the incentives to invest in asset specificity because parties may be motivated to behave opportunistically, appropriating all or part of the quasi-rents of the counterparties.

By this token, the GHM model analyzes the role of property in enhancing this specific relationship in a world with an incomplete contract. Assume a set of assets, $A = (a_1, a_2)$, which are required for the specific transaction. In the GHM model investors' outside options, r and c, are positively correlated with ownership. That is,

$$\frac{dR(i;A)}{di} > \frac{dr(i;a_1,a_2)}{di} \geq \frac{dr(i;a_1)}{di} \geq \frac{dr(i;\emptyset)}{di} \qquad [5]$$
$$\frac{dC(e;A)}{de} < \frac{dc(e;a_1,a_2)}{de} \leq \frac{dc(e;a_1)}{de} \leq \frac{dc(e;\emptyset)}{de} \qquad [6]$$

Since the allocation of property rights on physical assets can affect the degree of investment, the hold-up problem is transformed into the problem of *selecting the ownership structure*, which ensures second best outcomes.

However, the ownership is not the only means to transform the transaction. In accordance with the Williamsonian FT, parties' specific investments can make credible the

commitment in the transaction. With Williamsonian FT in mind, both investments are aimed at transforming market configuration. For instance, FB invested in capacity[22] to also furnish GM's competitors. In theory, also GM's investments may make a similar investment, that is GM may invest to increase GM's potential counterparties; for instance, "GM may decide to develop a car that can use bodies produced by a number of different suppliers, rather than only FB" (Hart 1995: 27). Hart advances this hypothesis but it is not developed.

In formulas, the market configuration is denoted by r and c, that is, revenues and costs which agents, respectively B1 and S1, can obtain by exchanging the widget in the spot market. That is, investment i may also affect the structure of the market, by making the exchange with alternative parties (B2) more costly, namely $\frac{dc(i)}{di} > 0$. Quite analogously, the investments e of the agent S1 may reduce the outside options of the agent B1 with a marginal return such that $\frac{dr(e)}{de} < 0$. So doing, I relax GHM's assumption that specific investment of one party does not impact on alternatives (B2 and S2), namely that $\frac{dc(i;A)}{di} = \frac{dr(e;A)}{de} = 0$. Indeed, except for effects of ownership in [5] and [6], outside options are exogenous in the GHM model.

Let us insist on this point: As the Williamsonian FT is a process that is supported by parties' specific investments and leads to a bilateral monopoly, so the investment i of agent B1 "produces" a reduction of the outside options available to agent S1, and similarly the investment e of agent S1 "produces" a reduction of the outside options available to agent B1.

Hence, focs are given by:

$$a\left(\frac{dR(i)}{di} + \frac{dc(i)}{di}\right) + (1-a)\frac{dr(i)}{di} = 1 \qquad [7]$$
$$(1-a)\left(\frac{dC(e)}{de} + \frac{dr(e)}{de}\right) + a\frac{dc(e)}{de} = -1 \qquad [8]$$

(Note that assuming that $\frac{dc(i;A)}{di} = \frac{dr(e;A)}{de} = 0$ we re-obtain GHM conditions in [1] and [2]). A higher level of investments with respect to [1] and [2] can be derived from focs [7] and [8]: the possibility to influence counterparty outside options ($\frac{dc(i)}{di}$ and $\frac{dr(e)}{de}$) furnishes a further incentive for agents to invest in transaction-specific assets, beyond the strict revenues coming from the specific relationship ($\frac{dR(i)}{di}$ and $\frac{dC(e)}{de}$).

Moreover, these incentives in investing in asset-specificity may be such that

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$$a\frac{dc(i)}{di} \geq (1-a)\frac{dR(i)}{di} \qquad [9]$$
$$(1-a)\frac{dr(e)}{de} \leq a\frac{dC(e)}{de} \qquad [10]$$

These formulas suggest that the level of investments in asset-specificity in the attempt to produce the FT may be equal or higher than they would be in a context with complete contracts. The economic rationale for having this kind of (over-)investment is that under incomplete contract, investments reduce a counterparty's credible threat to exit the contract. (Over-)investment acts as an endogenous (or private) enforcement device for supporting credible commitment in incomplete contracts (Nicita & Vatiero 2014). To rephrase, incentives that arise out of the FT may compensate or even exceed the reduction of incentives caused by incomplete contracts and hold-up. Accordingly, parties may solve the problem of opportunism by implementing a certain market configuration, i.e., a bilateral monopoly, rather than by agreeing to a certain contractual configuration. This means that transaction-specific assets may be self-enforceable even in a context with incomplete contracts. Investments in asset-specificity under the conditions [9] and [10] may be sufficient to solve contractual failures deriving from investments in asset-specificity.

Moreover, the allocation of ownership can reduce (and not increase) investments in asset-specificity. In a similar vein of assumptions [5] and [6], it can be supposed that a party's chances to reduce the counterparty's outside options increase as the party owns more assets. That is,

$$\frac{dc(i;a_1,a_2)}{di} \geq \frac{dc(i;a_1)}{di} \geq \frac{dc(i;\emptyset)}{di} \qquad [11]$$
$$\frac{dr(e;a_1,a_2)}{de} \leq \frac{dr(e;a_1)}{de} \leq \frac{dr(e;\emptyset)}{de} \qquad [12]$$

It is a reasonable assumption: party's ownership increases party's outside options as in [5] and [6] and reduces counterparty's outside options. It implies that the ownership structure, which is efficient in accordance with the GHM model, may not be efficient when outside options are endogenous.[23]

While in the GHM approach outside options are given and depending only on the allocation of ownership (see [5] and [6]), in the proposed framework here outside options are

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[23] Just to offer an example of a reverse result of GHM, consider the following conditions of *complementarity of assets*; following Hart (1995), it means that for the agent B1, marginal returns are such that $\frac{dr(i;a_1,a_2)}{di} \geq \frac{dr(i;a_1)}{di} = \frac{dr(i;\emptyset)}{di}$, while for the agent S1, they are $\frac{dc(e;a_1,a_2)}{de} = \frac{dc(e;a_1)}{de} = \frac{dc(e;\emptyset)}{de}$. In accordance with the GHM model, the allocation of property rights on both assets to the agent B1 is efficient (see Hart 1995). However, this result does not consider the effects on investments in outside options. In a simple and extreme case, assume for the agent B1 that $\frac{dc(i;a_1,a_2)}{di} = \frac{dc(i;a_1)}{di} = \frac{dc(i;\emptyset)}{di}$ and for the agent S1 that $\frac{dr(e;a_1,a_2)}{de} \leq \frac{dr(e;a_1)}{de} = \frac{dr(e;\emptyset)}{de}$. Under these conditions, the second best solution may be to allocate ownership to the agent S1 (and not B1). In this case, the policy derived from analyzing investments in outside options is the opposite of that derived from GHM.

endogenous, that is they depend also on investments of parties (see [7] and [8]). Since the allocation of ownership affects the investments of parties, it affects also the outside options. The result is hence that the level of investments with endogenous outside options, $\bar{\bar{\imath}}$, is (at least) higher than the level with exogenous outside options, $\bar{\imath}$. And the level of investments with endogenous outside options can be even equal to (or inefficiently higher than) the efficient level i^*, as in Figure 4.
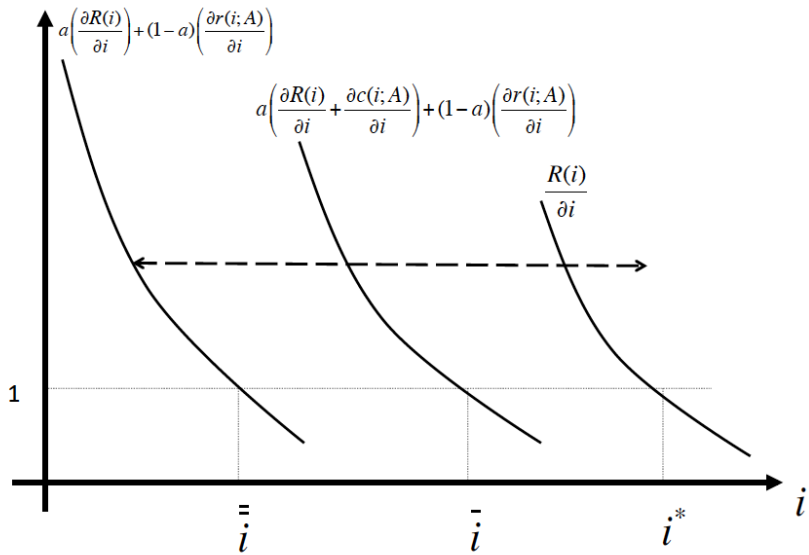

Figure 4: The level of investments with endogenous outside options (extension of Hart 1995)

A similar representation can be proposed for investments of the Seller. In this respect, the allocation of residual control rights A should consider also its effects on this endogenous mechanism of parties to transform the transaction.

5. Residual control rights as rights *in personam*?

In incomplete contracts there are several usages of economic resources that can not be defined ex-ante by parties and/or enforced ex-post by a third party. The allocation of residual control rights implies the specification of (some of) missing resources' usages in an incomplete contract. Moreover, the allocation of residual control rights decreases the risk of hold-up behaviors and fosters relationship-specific investments. According to the GHM model, the economic benefit of the allocation of residual control rights is that the owner will receive a greater function of the ex-post surplus created by a specific relationship.[24] By this token, GHM explains why ownership matters.

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[24] Note that there is no reason why GHM analysis "of the costs and benefits of allocating residual rights of control could not be extended to cover human, as well as physical assets" (Hart 1988: 134).

Residual control right over the asset means "the right to decide all usages of the asset in any way not inconsistent with a prior contract, custom, or law" (Hart 1995: 30). As indicated by Hart (1995: 30, fn. 4) the definition of residual control right is consistent with the standard view of ownership adopted by lawyers. Hart refers in particular to Oliver Wendell Holmes' view, which here I report from Hart (1995: 30, fn. 4, italics added):

> Within the limits prescribed by policy, the owner is allowed to exercise his natural powers over the subject-matter uninterfered with, and is more or less protected in excluding other people from such interference. *The owner is allowed to exclude all*, and is accountable to no one.

Even if Holmes underlines the exclusionary effect of ownership, this effect is largely neglected by the bilateral transaction approach coming from the pioneering works on transaction costs of Ronald Coase. The assumption of null transaction costs (or of perfect competition, as in the original statement of Stigler) of Coase theorem implies the assumption that outside the bilateral transaction under investigation is all given, immutable and un-relevant (see Section 2 above).

For this reason, the bundle of rights, as presupposed by Coase, is a collection of use rights authoritatively prescribed for each resource by the state and that concerns only two parties. In this respect, property is as rights *in personam*. But, before Coase's time a different picture of property prevailed in legal and economic literature. This was the idea of property as a kind of mini-sovereignty (cf. Merril & Smith 2001, 2011). Sir William Blackstone famously defined property as "…that sole and despotic dominion which one man claims and exercises over the external things of the world, in total exclusion of the right of any other individual in the universe" (Blackstone 1766: 2). His definition poses private ownership as an individual's exclusive control over property. This is the picture of property as rights *in rem*— "rights and duties in rem do not refer to person" (Penner 1997: 26)—and captures an important feature of property rights: they create duties of non-interference (that is, exclusion) over all individuals (Merril & Smith 2001, 2011).

Putting it differently, rights *in personam* attach to specific individuals and are paired with duties in other specific individuals. Thus, if S1 promises to deliver a widget to B1 in return for cash, S1 and B1 have specific entitlements that are defined in terms of specific duties that they owe to each other—either to deliver the widget or the cash. Rights *in rem*, on the contrary, are rights that create entitlements in all other persons, not just in specifically identified others. If S1 promises to deliver the widget to B1 in return for cash, there are entitlements concerning the agents B1 and S1, but also other agents; for instance alternative B2 could not acquire that widget. This right excludes from some thing any agent and furnishes to B1 a sovereignty over the widget.

The perspective of property as rights *in personam* is not logically incompatible with the understanding of property as rights *in rem*. For instance, Wesley Hohfeld famously

analyzed rights *in rem* as collections of rights *in personam*. Disciples of Hohfeld defined right as an "enforceable claim to performance (action or forbearance) by another" (Corbin 1919: 167) or as the jural relation in which "the dominus can, with the aid of the law, control an act of the servus" (Kocourek 1920: 48). This perspective,[25] which derives from the works of Savigny ("every jural relation consists in the relation of one person and another person") (1849 in 1978: 60), inspired New Institutional Economists[26] (cf. Merril & Smith 2001, 2011). They tend to regard the institution of property through the lens of rights *in personam* rather than *in rem*. Rights *in rem* are simply aggregations of rights *in personam*. This framework is consistent with an idea that outside the transaction everything is perfect, an idea that is behind the assumption of perfect competition and null transaction costs. But, according to Merril & Smith (2001, 2011), Hohfeld failed to perceive that rights *in rem* are qualitatively different in that they attach to persons insofar as they have a certain relationship to some thing. Rather, Hohfeld suggested that rights *in personam* and rights *in rem* consist of exactly the same types of rights, privileges, duties, and so forth, and differ only in the indefiniteness and the number of the persons who are bound by these relations.

Commons extended Hohfeld's view to a multilateral form of transaction. Using his terminology, a (residual control) right implies a duty, *and* at the same time, an exposure and a liberty on other parties of a transaction. If B1 has the *claim* that S1 produces a widget for her, then S1 has the *duty* to produce that. Claim-duty correlation concerns the exploitation/governance of resource. In addition, at the same time, B2 has a position of *exposure* in the sense that she has no right on what is produced by S1 for B1. Claim-duty correlation concerns the access/exclusion to resource. Finally, S2 has a *liberty*, because B1 cannot claim the production by S2. Hence, the residual control right produces not only a duty on the counterparty as in the imagine of property as right *in personam*, but also legal positions of exposures and liberties on parties outside the specific relationship but within the transaction. And the difference is not only quantitative, but also qualitative in terms of exploitation and exclusion.

More specifically, the main idea of the GHM approach is that residual control right reduces the risks of hold-up by setting duty for the counterparty. The allocation of residual control right to B1 concerns the performance of parties (e.g., investments in asset specificity) and the forbearance of certain their opportunistic behaviors (e.g., the renegotiation of agreement). The residual control right is, in this perspective, a right *in personam*. However, the residual control right also produces entitlements on parties outside the specific relationship but within the transaction. The bundle of rights deriving from residual control right is not a bilateral bundle but a multilateral bundle involving also alternative parties.

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[25] On jural relations of Hohfeld see also Vatiero (2009, 2010) and Fiorito & Vatiero (2011).

[26] Hohfeld did not use the metaphor "bundle of rights" to describe property. But his theory of jural opposites and correlatives, together with his effort to reduce *in rem* rights to clusters of *in personam* rights, provided the intellectual justification for this metaphor, which became popular among the legal realists in the 1920s and 1930s (Cf. Merril & Smith 2001, 2011).

Indeed, alternative parties are avoided by relationship, and such avoidance exlains legal and economic consequences such as in the case of vertical integration between GM and FB.

6. Conclusions

Agents may use the outside market as a discipline device to sanction (and prevent) post-contractual opportunism. That is, parties may be led to invest or over-invest in asset specificity in order to transform a context with credible threats (i.e., opportunistic behaviors) in a context with credible commitments. It implies, on the one hand, that the allocation of residual control rights, as proposed by GHM approach, can be unnecessary or even undesirable. On the other hand, it means that the definition of residual control right should not only concern the relations between actual parties (B1 and S1) but also the importance of potential alternatives (B2 and S2) in terms of incentives to invest in transforming the transaction. That is, the meaning of residual control right has to include also incentives deriving from outside the relationship between actual parties, that is which are depending on and affecting potential parties.

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