

**AN ECONOMIC MEASUREMENT APPROACH TO UNDERSTAND THE NATURE
OF GOODWILL: PRELIMINARY TEST THROUGH A CASE STUDY****Paulo Roberto Barbosa Lustosa***Universidade De Brasília***Kleber Vasconcellos De Oliveira***Universidade De Brasília***Resumo**

This paper presents a new approach to understand the nature of goodwill and how it should be accounted for. RIV-Residual Income Valuation model is derived at the transaction level. We show that the firm's economic value is made up of two states of wealth. The first (second) is the present value of expected residual profits that arise from implemented (still to be implemented) management decisions. We name the first Physical Equity-PE, and the second Intangible Equity-IE. IE is the goodwill. PE increases as IE decreases, but it grows back with the renewal of plans of the concern. We conclude that acquired goodwill: (i) is a latent state of wealth, not yet an asset. Accordingly, what it is currently treated as non-separable intangible assets aggregated in acquired goodwill are competitive advantages or the forces that make residual profits possible in individual transactions; its monetary effect would be incorporated in PE and IE if these figures were measured by their fair values; and (ii) should be amortized according to the speed and proportion in which IE converts to PE. Through a case study we tracked the aggregate acquired goodwill of a corporation. We control to ensure that the corporation PE changes only as a result of its operations. Imposing a reasonable rate of return, we have found that in just 4 years that goodwill was totally converted into physical equity. If confirmed with further studies, the ideas of this paper will deeply affect the theoretical and empirical literature of goodwill, and the accounting regulation on the topic as well.

Palavras-chave: Goodwill; Intangible Equity; Physical Equity; Gecon.

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ABSTRACT

This paper presents a new approach to understand the nature of goodwill and how it should be accounted for. *RIV-Residual Income Valuation* model is derived at the transaction level. We show that the firm's economic value is made up of two states of wealth. The first (second) is the present value of expected residual profits that arise from implemented (still to be implemented) management decisions. We name the first Physical Equity-PE, and the second Intangible Equity-IE. IE is the goodwill. PE increases as IE decreases, but it grows back with the renewal of plans of the concern. We conclude that acquired goodwill: (i) is a latent state of wealth, not yet an asset. Accordingly, what it is currently treated as non-separable intangible assets aggregated in acquired goodwill are competitive advantages or the forces that make residual profits possible in individual transactions; its monetary effect would be incorporated in PE and IE if these figures were measured by their fair values; and (ii) should be amortized according to the speed and proportion in which IE converts to PE. Through a case study we tracked the aggregate acquired goodwill of a corporation. We control to ensure that the corporation PE changes only as a result of its operations. Imposing a reasonable rate of return, we have found that in just 4 years that goodwill was totally converted into physical equity. If confirmed with further studies, the ideas of this paper will deeply affect the theoretical and empirical literature of goodwill, and the accounting regulation on the topic as well.

Keywords: Goodwill; Intangible Equity; Physical Equity; Gecon.

1 INTRODUCTION

Academic literature has long reached a consensus that the value of accounting goodwill is the expected present value of the going business future residual profits (Leake 1921; Martins 1972; Tearney 1973). This consensus, however, does not exist when it comes to understand the nature of goodwill, which in turn defines how it should be accounted in financial statements. Andrews (1981, p. 37) regarded this issue as "one of the most difficult and delicate problems," and Hughes (1982), after reviewing nearly 1,000 works, stated that "the jury is still out" about accounting for goodwill.

The main objective of this research is to demonstrate that the intangible elements that forms goodwill cannot be represented as assets neither in isolation nor grouped as goodwill. They are the forces that drive future sales and residual profits. The monetary effect of these forces would be incorporated both into the value of existing physical assets and of those that will exist in the future, if they were measured by economic criteria. Goodwill, which we name intangible equity in this study, is a state of latent wealth that is equal, as uncontroversial in the literature (Martins, 1972), to the present value of the concern's expected future residual profits. This potential wealth progressively transforms into real wealth, or physical equity, as time passes by and new asset's exchange transactions with the external environment are carried out by the company in the form of purchasing, sales, production and environmental changes.

The above thesis will be demonstrated through mathematical elaboration on Gecon's decision and measurement models (Guerreiro, 1989; Catelli, 2001). Gecon is an economic accounting system in which each managerial decision that implies in exchanging assets with the market is measured by the opportunity costs of the resources involved, which in turn defines the economic value of the asset obtained in the decision. Consequently, the value of the asset obtained, its opportunity cost, equals the costs directly sacrificed plus the residual margin or

economic profit of the decision. In other words, in Gecon the measurement of assets fully preserves its definition as a net flow of benefits (Iudicibus, 2015). Each asset, and consequently the company as a whole, is measured at the present value of expected future residual profits, as if the company's well-known Residual Income Valuation model (Edwards and Bell, 1961; Ohlson, 1995) were applied at the level of each asset exchange transaction. Using this approach, it will be possible to realize that intangible competitive advantages should not be valued separately as goodwill, since their effects are the residual profits that are incorporated into the economic value of assets obtained in external management decisions.

We know, however, that the firm, assumed as a single asset, is economically worth the present value of its expected future residual profits, which is the same as the amount already recorded in book value of equity, whatever number it be, plus the present value of expected future residual profits recursively calculated on that equity (Ohlson, 1995). From this it will be possible to conclude, based on Gecon, that economically the company is an aggregate of residual profits consisting of two closely related categories. The first is the present value of expected future residual profits of all net assets represented in the balance sheet, derived from management decisions already implemented. The second is the present value of future residual profits that will come from decisions still to be implemented in the future. Following Lustosa (2009), we will call the first category shareholder's *physical equity* – PE, and the second shareholder's *intangible equity* – IE. As time passes by in a going business concern, IE converts to PE and is simultaneously renewed by new expectations about the future.

We have preliminarily tested the central theory of this paper through a case study. Hypermarcas S.A., the biggest Brazilian pharmaceutical corporation, acquired nine companies in years 2010 and 2011, each with their own goodwill, totaling almost R\$ 3.0 billion. We calculated the group's annual residual income from 2011 to 2018 by the difference between actual and projected adjusted physical net assets, the later remunerated at a risk-adjusted market rate of return. We found that in just 4 years, all this acquired goodwill was converted into physical wealth.

This article makes important contributions to academia, literature, and accounting practice. This is, to our knowledge, the first study that extend the firm's residual income valuation model to the level of each individual asset exchange transaction, using Gecon's information system decision and measurement models as a starting point. We consider this an important contribution to academia because it allows us to view goodwill as a stock of latent wealth that progressively turns into productive physical wealth, while being continually renewed by expectations of new residual profits. This means that keeping acquired goodwill on a firm's balance sheet after it has been turned into physical net assets is the same as recognizing an internal goodwill for companies in such conditions, with all the problems it brings, an issue that had been observed by Nelson (1953, p. 493) over 65 years ago.

We also envision important contributions to the theoretical and empirical literature of goodwill. The theoretical literature has long consolidated the understanding that goodwill is worth the present value of the company's expected future residual profits (Martins, 1972). But it still dominates, in this literature, the vision that goodwill is not the stock of intangible wealth itself, but the intangible “assets” that cause future residual profits. The contribution of this paper is to show that the monetary effect of reputation, credibility, managerial flexibility, technological processes, diverse competitive advantages, intellectual and organizational capital, etc., which is the marginal result of management decisions, is embedded in the economic value of physical assets and it is inappropriate to consider them separately, even if aggregated as goodwill. As for the empirical literature, this article opens up many large avenues for testing the theory presented here, some of which will be listed in the concluding section.

Finally, this article also brings important contributions to accounting practice. Accepting the nature of goodwill as a latent wealth (intangible equity) that converts into physical equity

means that the write off of acquired goodwill is an ex post and objective event. All we have to do is to track the growing of the physical net assets after controlling for the capital transactions between the corporation and its shareholders. The speed of this conversion will depend on the characteristics of the business and the external economic environment.

2 THEORY

2.1 Foundations of the New Approach on Accounting Goodwill

Since the nineteenth century, court decisions in the United Kingdom and the United States (Leake, 1921; Preinreich, 1936) involving the attribution of value to companies upon litigation, had set the understanding that a going-concern business is worth what could be received selling its existing net assets plus a portion associated to the business expected future sales. As early as the twentieth century, Leake (1921) conditioned the future portion to what he called "super profits," a measure of excess, so that the future can effectively add something more to the value of the company. By this time, according to Young (1999) and Lo and Lys (2000), the idea of super profits was already used under the heading of "residual profits", defined as the excess profit obtained after operating income covers the cost of the capital that finances the assets, a concept also known as "abnormal profit" or "economic profit", among others.

Accountants called "goodwill" to the future gains that add value to the company, implicitly recognizing that there would be residual profits only if the willingness (management) that sets the company in motion into the future is good (efficient)¹. Since money has a value over time, the current economic amount of goodwill has now been formally quantified as the present value of expected future residual profits (Martins, 1972), a definition that is almost centenary in the literature (Ohlson, 1995).

It is interesting to note that "the present value of expected future residual profits" is precisely the definition of the economic value of any asset because it equals the known textbooks' present value of expected net benefits (Hendriksen and Van Breda, 1991; Iudicibus, 2015). We conclude from this perception that the economic value of the concern has two components of residual profits. The first is the present value of expected future residual profits of the existing net assets (assets less liabilities). The second is the present value of residual profits coming from the assets that do not physically exist yet, goodwill, as they will only exist in the future. For this reason, goodwill can also be calculated as a residue (Martins, 1972) by the difference between the value of the company as a single asset (measured by the present value of expected future residual profits) and that of its existing individual net assets.

On the other hand, the existing consensus in the literature about the economic value of goodwill is dissipated when it comes to its accounting. In this realm lies the greatest criticism, doubt, and controversy among academics, regulators, and accounting professionals (Hughes, 1982; Davis, 1992; Johnson and Tearney, 1993). Since accounting regulation prohibits the recognition of internal goodwill, the problem exists only in business combination situations, when the acquiring company pays the acquiree more than the fair value of its net assets, including any individualizable intangibles. The premium paid is recognized in the acquirer's consolidated balance sheet as an intangible asset called purchased or acquired goodwill². The prevailing understanding among scholars, embraced by regulators, is that expected future residual profits are due to the company's intangible competitive advantages, such as a strong institutional and product brand, differentiated managerial and technological capacity,

¹ A badwill would result instead if the expected future residual profits were negative. In such case, the permanence of the company in the market would only be justified if it is possible to revert the negative expectation on the future, since the going concern is worth less than it would be received selling its physical net assets by market prices.

² Lev et al. (2009) suggest that accounting regulation should allow also the recognition of internal goodwill.

intellectual capital, and employee motivation, organizational capital, customer satisfaction and loyalty, etc.

The problem is that the literature tends to recognize these competitive advantages as intangible assets of indefinite useful life (Tearney, 1973; Lev, 2004). In this regard, Martins (1972) states that if it were possible to assign separate economic value to each of the intangible elements that contribute to future residual profits, there would be no need to recognize the acquired goodwill. Accordingly, current accounting standards assume that goodwill is an intangible asset that represents other intangibles that cannot be recognized separately. From this understanding follows the recommendation for the acquirer to try to separately identify, value and recognize the intangibles of the acquiree that can be individualized, before recognition of goodwill³. As a result, prevailing in the current literature is the understanding that goodwill does not exist separately from business and physical assets (Henning, Lewis and Shaw, 2000). As said by Johnson and Tearney (1993), “if the assets that make up goodwill could be recognized separately, they would be anything but goodwill”.

The thesis defended in this article, which will be better demonstrated in section 3, is: (i) the intangible elements that make up goodwill, even though they may be valued separately, are not assets⁴; they are the forces, or value drivers, that make possible the existence of residual profits; (ii) these intangible forces exist neither physically nor economically separate from the physical assets; (iii) the total economic value of the company is composed of a) a physical portion, which we will call Physical Equity – PE. Physical Equity is the present value of expected future residual profits of all net assets that are represented in the balance sheet, resulting from management decisions already made or implemented; and b) an intangible portion, which we will call Intangible Equity – IE, associated with managerial decisions yet to be implemented. IE is the present value of expected residual profits of net assets that will exist only in the future, but which is currently latent in the minds of the company's senior managers in the form of ideas, intentions and strategies; (iv) IE is the true nature of goodwill; it is not an asset, but a state of potential wealth that will (or will not) be converted to real wealth in the future; (v) in a going concern business, IE is both realized by its transformation into PE and is simultaneously renewed by new ideas and strategies, so that a company is born only with IE and dies only with PE.

The fair value of the acquired company's net assets, including those sellable intangible assets with indefinite useful lives, is a reasonable proxy for their economic value⁵. Consequently, the residual profits provided by the acquired company's intangible forces is already incorporated in the initial recognition of its assets in the acquirer's consolidated balance sheet, for each asset is economically worth its acquisition cost plus the present value of its expected future residual profits⁶. Accordingly, the premium paid in a business combination

³ As a consequence of this regulation, the asset group “other intangibles with undefined useful lives”, that result from business combinations, are increasing faster than the acquired goodwill itself.

⁴ That is not the case of the identified intangibles which can be sold separately from the business, e.g., the list of customers in a commercial bank.

⁵ Fair value is a reasonable proxy of economic value, since represents the receipts that could have been obtained in each asset sold or the expected payments to liquidate each liability. For in-use assets, it is expected that their economic value are bigger than sell prices, as the business' managers expect to gain more extracting the services of such assets than selling them.

⁶ As we will demonstrate in section 3, the same logic of residual income valuation model [$p_t = y_t + \sum_{\tau=1}^{\infty} R^{-\tau} E_t(x_{t+\tau}^a)$], (Ohlson, 1995), where p_t is firm Market price at time t ; y_t is the book value of equity as measured by any accounting rules; $R^{-\tau}$ is the inverse of $(1+r)$, r is the risk free rate of discount; and $E_t(x_{t+\tau}^a)$ is the expectation of future residual profits, which is valid to value the business as a whole, may be applied to each individual transaction of asset exchange. For example, if because of the expertise of her purchase department's manager, a company acquires a certain good paying \$ 100 in cash while the market price of this same product is \$ 110, then the “residual profit” of \$ 10 in this transaction came from the intangible force “manager's skill to

transaction is not intended for the acquisition of the non-individualizable intangible elements of the acquiree. Representing them as goodwill in the assets of the acquiring group, as prescribed by the current accounting standard, means double counting because, as we said, the economic effects of these intangibles have already been captured in the acquiree's physical net assets transferred at fair value to the acquirer.

What, then, is the goodwill paid on a transaction of business combination? We understand it to be the prospect of future profitability of the acquired business, a wealth that is only potential at the present time. In assessing this potentiality to reason the size of goodwill to pay, the acquirer weighs the competitive differentials or intangible forces in the acquiring business and how it will interact with its own value drivers. Whatever the amount of goodwill paid, and assuming only economic reasons, it should be lower than the acquirer expects to earn. Unlike an investment in a physical asset, which can be sold if the business fails, what is being acquired in the form of goodwill is only a potential wealth whose transformation into real wealth is uncertain. Ultimately, the goodwill paid by the acquirer represents a partial waiver of the expected future residual profits that he expects to derive from the acquired business.

The above conclusions are based on the extensive literature that discusses the concepts of wealth and profit in the economic sense, examples being Fisher (1906), Canning (1929) and Hicks (1946). Prior to the mastery of the positivist paradigm in accounting research, it was not uncommon to see published papers advocating that accounting measurement of transactions should come close to economics, such as MacNeal, 1939; Edwards and Bell, 1961; Solomons, 1961; and Revsine, 1973. A more emphatic defense of this approach came from Coase (1990), who in the 1930s published several short non-academic weekly articles in *The Accountant*, a journal linked to the London School of Economics, illustrating with numerical examples the importance of the accounting system measures transactions based on the opportunity cost of resources rather than historical cost. In the late 1970s, Catelli (1990) developed, in the University of Sao Paulo's graduate program in accounting and controllership, an information system for economic management that he named by the acronym GECON. Gecon is a prototype of what Coase (1990, p. 12) had devised, for whom "the accounting system theory is part of the firm theory".

3 GECON – INFORMATION SYSTEM FOR ECONOMIC MANAGEMENT

3.1 Fundamentals of Gecon

Gecon means information system for economic management. Although the end product is an information system, Gecon is much more than that. It is an economic accounting information system that is conceptually submitted to firm theory (Coase, 1990). The company is modeled in its constituent macrosystems or dimensions. The economic income is assumed as the best indicator of the company's effectiveness, which occurs in the physical-operating subsystem since it is in this subsystem that resources are consumed in exchange of products and services that are generated through the operating activities mobilized to carry out the transactions. Six other intangible subsystems cause the effects that become visible in the physical-operating subsystem, so each of these are also conveniently modeled with their inputs, outputs, and output requirements so that each one fulfills its role fully to ensure company's effectiveness. Guerreiro (1989) synthesizes the integration among the company's macro dimensions or subsystems in affirming that "in every organization, people (social subsystem), endowed with power and authority (formal or organizational subsystem) and conditioned by certain principles (management model or corporate governance subsystem), with the support of information (information subsystem), exchange resources (physical operating subsystem), with the objective of fulfilling the mission of the company (institutional subsystem)".

negotiate". The economic value of such inventory (\$ 110) equals its cost (\$ 100) plus the residual profit obtained (\$ 10).

The focus of the information subsystem is the information needs of the manager. The role of the manager is to create value for the company, and this is done when he moves the company from a state of wealth X_1 , in t_1 , to another state X_2 , in t_2 , so that X_2 is economically greater than or equal to X_1 . The changes in the state of wealth arise from three types of events: exchange of resources (assets) with the external environment, passage of time, and changes of conjuncture through occurrences as phenomena of nature and changes in prices in the economy (inflation, relative prices of products, interest and exchange rates, etc.). The first type of event – asset exchange transactions – arises from manager’s decision, so he has a direct control over it; the last two, grouped in a single class called time-conjuncture, are "decisions of nature" over which the manager's control is indirect. Therefore, the information system must ensure the veracity of the company’s economic wealth. This must be done from every transaction, whether initiated by the manager or from nature. This implies that the areas of the company are treated as profit centers through the market-based transfer price mechanism, since the efficiency of the whole presupposes the efficiency of the parties and that those are harmonically planned according to the company. Consequently, the design of the information system in Gecon contemplates three models: (i) transaction decision model, which is the object of manager or nature decision; (ii) transaction measurement model, considering all the concepts that ensure the correct measurement of the decision model’s variables; and (iii) information model, designed both to ensure that information is communicated in a proper way and to preserve other qualitative characteristics of information, such as timeliness, decentralization and uniformity of planned and realized concepts. For purposes of this study, we will focus on the transaction decision model and some elements of the measurement model.

3.2 Decision Model

The decision model is related with the event. The manager chooses whether to decide or not, based on the result returned by the event’s decision model. Event is a class of transactions of the same nature; and transaction is any occurrence that modifies the firm’s state of economic wealth. Although there are thousands of different transactions, they can be grouped into four categories or events: (i) purchase; (ii) sale; (iii) transformation (manufacture); and (iv) time-conjuncture. The manager decides on the first three events and indirectly controls the effects of the latter. For example, the manager does not control rain, but s(he) can construct mechanisms that prevent rain from damaging the building or factory inventory.

A common feature of transactions is the exchange of assets. In buying, selling and manufacturing this exchange is evident and in this case the wealth is created or destroyed punctually in every management decision by the confrontation of the economic value of the asset obtained with the economic value of the sacrificed assets. Apart from the loss in cash due to the effect of inflation and the remuneration of owner’s capital, the passage of time itself does not change the state of wealth in economic terms, because it is a return back to the future that had previously been discounted to the present. The change in conjuncture is a transaction that produces a punctual effect of increasing or decreasing the state of wealth, so it is similar to the transactions that the manager decides. Since the passage of time does not change economic wealth, but only the change of the conjuncture, these two transactions are grouped into a single type of event, called "time-conjuncture event". Finally, it should also be considered that a purchase or sale can be a credit transaction. In this case, it will be necessary in informative terms to separate the economic and financial impact of the decision, since the latter is associated only with the financing and not with the operating dimension of the transaction.

The decision model of the transaction, event or any other segment has the structure of exhibit 1:

Exhibit 1 - Decision Model (Gecon): applies to any segment - individual transaction, event, activity, area, division, customer, product, company as a whole

	Operating Revenue (OR) = a	\$	
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Σ	Operating Cost (OC) = b	\$	
	Operating Contribution Margin (OCM) = (a-b) = c		\$
	Financial Revenue (FR) = d	\$	
	Financial Cost (FC) = e	\$	
	Financial Contribution Margin (FCM) = (d-e) = f		\$
	Total Contribution Margin (TCM) = (c + f) = g		\$
	(-) Fixed Costs = h		\$
	Economic Result (event, activity, area, division, company, etc.) = (Σg - h)		\$

The summation symbol to the left of the decision model variables, until the row of the total contribution margin, is to indicate that the fixed costs in the penultimate row are traced only with the total margin of a segment over a period of time. The segment can be an event (set of transactions), activity (set of events), area (set of activities), division (set of areas) and company as a whole (set of divisions). More generally, as in Garrison and Noreen (2009), segment can be any entity (product, product line, customer, geographic region, etc.) for which management wish to know how profitable the segment is.

Individually, the decision model returns the contribution margin of managerial decision over a specific transaction. The contribution margin is the marginal result of the decision, it represents the contribution of a specific decision to the economic result of the segment and, consequently, of the company as a whole. It is a measure of residual profit, since there will be a positive (negative) margin when in the exchange represented by the transaction the economic value of the asset received is higher (lower) than the value of the asset sacrificed. Therefore, it is necessary to define a counterfactual to compare the value of the benefit with its cost. This aspect will be discussed in the following subsection dealing with the transaction measurement model.

3.3 Measurement Model

Catelli (1991) defined measurement model as the set of concepts used to measure the variables of the decision model. In Gecon information system such concepts are all those that affect the economic value of the transaction, since this is the main object of management decision, the origin of the change in company's wealth. The concepts of measurement include: opportunity cost, transfer price based on opportunity cost; capital equivalence (time value of money); conjuncture adjustments ("nature" decisions); inflation; cost of equity capital; reposicion cost for inventories valuation; firm's real borrowing and lending rates applied to assets and liabilities-equity numbers, respectively; financial area treated as an internal bank profit center; direct costing; etc.

Of all the measurement concepts, the most important is opportunity cost. Gecon operationalizes the concept of opportunity cost as defined by Coase (1938): "the value of a resource in its best alternative use". In Gecon there is no historical cost, since the cost is in fact the economic value of the resource, i.e., the best forgone alternative on the market in deciding to use the resources in a specific decision. This depends on each choice and forces the manager to pursue marginal gains in every decision s(he) makes, since economically it only pays to use an asset in any decision if the gain is at least equal to what would be received in the best alternative use of the asset. In any decision, there will always be alternatives available in the market for use of the resource being sacrificed. The counterfactual is the second best alternative neglected to use the resource, since it is assumed that the first alternative, which was chosen, is better than the second. Gecon information system, based on the opportunity cost for internal and external management decision, leads the company to be a planned society (Coase, 1938), reducing the transaction costs of the market itself and contributing to a better allocation of resources internally. Market price system optimizes allocation of resources externally; and

planning does the same internally in the firm. The existence of an internal area, for example, the human resources department, would only make sense economically if the resources used to carry out its activity generated more value than what would be paid in outsourcing these services to a company in the market⁷.

3.4 Gecon and Goodwill

To understand the meaning of goodwill in firm's valuation, we will return to the decision model presented in exhibit 1. There are two defining elements of the contribution margin in each decision: revenue (operating or financial) and cost (operating or financial). Operating income is the economic value or opportunity cost of the asset obtained in the transaction. Financial revenue (cost) is the interest earned by the firm (charged to the firm) on the financing in a credit sale (purchase) transaction. The financial cost in a credit sale of a product is the market opportunity interest forgone by the firm (borrowing rate) in deciding to finance its clients. The financial revenue in a credit purchase of a good is the market opportunity interest rate the firm earn (lending rate) for not buying the good in cash. The total contribution margin of the decision is its residual profit or loss, which is split in operating and financial dimensions if it's a credit transaction. When the operating contribution margin is positive (negative) the opportunity cost of the asset obtained is greater (lesser) than the opportunity cost of the sacrificed assets. When the financial contribution margin is positive (negative), the cost of the financing is greater (lesser) than the firm's opportunity cost of money. Thus, for there to be residual profit in the decision it needs to be efficient. For example, in a decision to purchase raw materials the company must bargain so that the price paid for the product is lower than its market value. In the manufacturing decision, the residual profit would increase the greater the efficiency of the technology to transform raw materials into finished products. In a decision to purchase a machine, the residual profit would increase by the reduction of the price paid and the economic value of the machine, which depends on its use, since the opportunity cost of the machine is what would be received renting it to the market over its expected useful life. So, the more efficient a company is in technology, ability and flexibility of management, training and motivation of employees, institutional and product image, market share, etc., the greater the residual profits that would be generated in the managerial decisions of buying, selling, manufacturing, passage of time, and changes in the environment. In other words, these intangible forces are present in the residual profits of each decision and, consequently, in the economic value of the assets and liabilities that form the physical book value of equity, named "physical equity" in this paper.

However, we know that the firm's total economic value may be greater than the value of its physical equity, even if it is measured economically. What is the origin of this difference? To answer this question, we will explore mathematically the decision model of exhibit 1, which we reproduce in a horizontal format:

$$TCM = OCM + FCM \rightarrow TCM = OR - OC + (FR - FC) = OR - OC - FR + FC \quad (1)$$

where:

TCM = total contribution margin; OCM = operating contribution margin; FCM = financial contribution margin; OR = operating revenue; OC = operating cost; FR = financial revenue; and FC = financial cost.

Total contribution margin (TCM) is the residual profit of the decision; and operating income (RO) is the economic value of the asset obtained. Let us isolate the value of the asset and use the notation of the residual income valuation model (Ohlson, 1995) for cost (y_t) and abnormal profit (x_t^a):

$$AEV_{it} = AOC_{it} = OC_t + (FCM + x_{t0}^a) \rightarrow AEV_t = y_t + x_t^a \quad (2)$$

⁷ Disregarding other strategies and focusing only on economic rationalism.

In (2), the subscript i and t in AEV (asset's economic value) or AOC (asset's opportunity cost) is to characterize the value of the asset originated in a specific management decision i , taken at time t . The portion in brackets in the equation, $(FCM + x_{t0}^a)$, is the financial contribution margin (FCM) plus the operating contribution margin (x_{t0}^a) of the decision, assuming that it's a credit transaction. Since FCM is also a residue of the decision, restricted only to the comparison of the interest charged on the financing with the forgone opportunity to borrow (credit sale) or to lend (credit purchase) money from (to) the market, it can be added to x_{t0}^a to form the total residual profit of the decision (x_t^a). Finally, y_t is the operational cost of the decision, i.e., the economic value of the assets sacrificed in the exchange.

Note that equation (2), restricted to a specific decision, is similar to the known residual income valuation model (Ohlson, 1995), used to value the firm as a whole. It could not be different, since it is the very representation of the conceptual economic value of an asset. We know that any asset is worth the present value of its expected future net benefits (Hendriksen, 2001). In monetary terms, "net benefits" is identical to "residual profits". This definition is the same as considering investment cost recovery (y_t) as part of future profits and adding just the abnormal residue (x_t^a) above or below y_t .

Equation 2 refers to a specific decision. To accumulate the result of all past decisions, from the start of the firm to the current moment, t , we will have to add the residual profits and the specific costs of all the previous decisions. In addition, we must consider the fixed costs that are not in equation (2) but are part of the decision model presented in exhibit 1. As in equation (3) below:

$$EVPE_t = \sum_{t_0}^t CFC_t^{id} + \sum_{t_0}^t y_t^{id} + \sum_{t_0}^t x_t^a = y_t^{PE} \quad (3)$$

In equation (3), $EVPE_t$ is the economic value (or opportunity cost) of the physical equity that results from all managerial decisions taken since the beginning of the firm, at t_0 , until the current moment t . CFC_t^{id} is the cumulative fixed cost of the structure (basically, capital and labor) used to perform the operating activities that carry out the transactions. This cost is also accumulated from t_0 to t , so the superscript id to characterize that these are management decisions already implemented. Similarly, y_t^{id} is the direct cost accumulated from t_0 to t of the resources that were exchanged in the transactions, also referring to the decisions already implemented. And $\sum_{t_0}^t x_t^a$ is the cumulative residual (or abnormal) profit, from t_0 to t , resulting from all decisions implemented. In the balance sheet presented by Gecon's measurement criteria, all the parcels on the right-hand side of equation (3) are within shareholders' equity, since they totalize the economic value of all past management decisions. The last part, $\sum_{t_0}^t x_t^a$, corresponds to the retained earnings account. In other words, $EVPE_t = y_t^{PE}$, where y_t^{PE} is the opportunity cost or economic value of all decisions implemented, resulting in physical assets and liabilities represented in the balance sheet, in this paper called physical equity (or physical wealth).

To get the total economic value of the firm, we must add to equation (3) the portion related with the intangible equity (or intangible wealth), y_t^{IE} , assuming the firm is in a going concern status. This portion is a latent asset, which does not yet exist physically, but only in the minds of the firm's owners and senior executives. Its economic value corresponds to the present value of the expected residual profits of the future managerial decisions still to be implemented. It has a close relationship with the physical equity, because the same intangible forces or firm's virtues that provided the residual profits of the implemented decisions will be supporting the confidence that intangible equity will become physical equity. Equation (4) represents the intangible equity in mathematical form, where r is the cost of capital and $E_t(x_{t+\tau}^a)$ is the expectation at the current moment of future abnormal profits throughout the life of the company, which we represent generically with the symbol of infinity (∞).

$$y_t^{IE} = \sum_{\tau=1}^{\infty} \frac{1}{(1+r)^\tau} E_t(x_{t+\tau}^a) \quad (4)$$

The total economic value of the firm at time t , $FETV_t$, will be the sum of both physical and intangible equities. If we define $R = (1 + r)$, we obtain what is shown in equation (5) below:

$$FETV_t = y_t^{PE} + \sum_{\tau=1}^{\infty} R^{-\tau} E_t(x_{t+\tau}^a) \quad (5)$$

The second term of the right-hand side of equation (5), intangible equity (y_t^{IE}), is the essence of goodwill. The first term of the right-hand side, y_t^{PE} , is the present value of the expectation of future residual profits of all managerial decisions implemented until t . It is the past measured over a finite future $t + T$ ($T = 0, 2, \dots, T$). For example, for inventories, $T=0$, since its economic value is the market cost of reposition at current time t ; for the accounts payable, receivable, bank loans and debt issued, T is the maturity date defined in each of these contracts; for fixed assets, T is the expected future service time of each asset. y_t^{PE} incorporates all the information available on t . Past inflation and current expectation of future inflation, inventory market prices, current borrowing and lending market interest rates, foreign exchange rates, natural phenomena already occurred, firm strengths and weaknesses, the effect of information from nearby and remote environments on expectations, etc., everything is "priced" in y_t^{PE} . But in the going concern there are also expectations about the new y_{t+k}^{PE} ($k = 1, 2, \dots, \infty$) which will be built in the future. y_t^{IE} is the present value of expected y_{t+k}^{PE} ($k = 1, 2, \dots, \infty$). y_t^{IE} is the firm's internal goodwill. y_t^{IE} is continually renewed as it becomes y_{t+k}^{PE} . y_t^{PE} had been y_{t-k}^{IE} ($k = 1, 2, \dots$) in the past just like y_t^{IE} of the present will be y_{t+k}^{PE} in the future. In subsection 3.4.3, we will show that, from the point of view of the acquired accounting goodwill, the second term of the right-hand side in equation (5) is realized at a finite future time T and not at infinity.

3.4.1 *The idea PP-IP and the Accounting Goodwill*

When a company acquires another, accounting standards require that all tangible and intangible assets of the acquiree be identified, including those that are not currently represented in the balance sheet. The extensive list of intangibles provided by the standard includes: trademarks and trade names; non-competition agreements; contracted orders; contracts and other relationships with clients; customer list; leasing agreements; brands; licensing, royalties and suspended agreements; rights of use (e.g., subsoil, water, wood, etc.); patented technology; secrets (formulas, recipes, processes, etc.). The acquirer shall measure at fair value all identifiable tangible and intangible assets⁸ of the acquiree. The acquired or accounting goodwill recognized in the acquirer's balance sheet is the residual between the price paid on acquisition and the fair value of all identified net assets. The FASB (ASC-805-20-20) characterizes such residue or goodwill as "an asset that represents the future economic benefits derived from other assets acquired in a business combination that are not individually identified and separately recognized". Therefore, the other assets that comprise goodwill are those that do not exist separate from the firm or, as Johnson and Tearney (1993) pointed out, they can only be sold together with the whole business.

Since all the net assets of the acquiree are revalued at fair value, including identified intangibles that might not previously be in the balance sheet, we can assume that the acquiree's physical equity is measured by economic criteria⁹. It seems incorrect to represent the intangible

⁸ According to the FASB (ASC 805-20-25-30), an intangible asset is identifiable if it meets one of two criteria: separability; and contractual legal rights described in the definition of identifiable. In turn, ASC 805-20-20 states that an asset is identifiable if it: (a) is separable, that is, capable of being separated or split from the entity and sold, transferred, licensed, leased or exchanged, either individually or as part of a related contract, identifiable asset or liability, regardless of whether the entity intends to do so; and (b) derive from a contract or other legal rights, regardless of whether those rights are transferable or separable from the entity or other rights and obligations.

⁹ Fair value is a rough measurement of the economic value of physical equity. It is not an accurate measure, since some measurement concepts are omitted or misused, e.g., inflation; return on equity; valuation of in-use PPE at replacement cost and not at opportunity cost (how much it could have been obtained in the market by renting the

elements in aggregate form as an asset called “acquired goodwill”, since its value has already been captured in acquiree’s net assets measured at fair value. Moreover, as these intangibles exist only in conjunction with the business, representing them separately as goodwill, as if they had their own existence, may violate this principle. A more reasonable approach to this question seems to be the one addressed in this paper that points to the segregation of firm’s wealth in physical and intangible equities the former derived from the later. By this approach, the intangible elements that are part of the accounting goodwill are not separate assets neither physically nor economically. They are the competitive advantages of the firm that, as such, express themselves in the efficiency of assets exchange transactions. Residual profit thus arises in every decision to buy, sell, manufacture, passage of time and change of environment. It is captured by the current economic value or opportunity cost of the asset that come out from each of these decisions.

3.4.2 Numerical Example

Assume Company X enters in a credit purchase of an equipment in time t_0 , two instalment payments of \$17,000, due at the beginning of t_1 and t_2 . Management expects that the machine will service the company for 3 periods, 200 hours at the beginning of periods t_1 and t_2 , and 100 hours at the beginning of the third period t_3 , after which it would be discarded as scrap for a price of \$ 2,000. The market price of a service-hour of this same equipment is \$ 80/h. The company would be able to raise money from the market, by the two periods of use of the equipment, at 10% time-period. Had the machine been bought in cash, the price paid would be \$ 31,000. The opportunity cost for the company to lend money to the banking system is 7% period. Assume, for ease of calculation, an economy without inflation. Compute the total contribution margin of this decision and split it in its operating and financial dimensions. Show also the opportunity cost of both the equipment and the liability incurred and represent them in the balance sheet.

Solution:

a) Economic effect of the decision in the Company X’s physical wealth:

Variables of the decision model			Economic concepts, according to Gecon’s measurement model
OR – operating revenue	35,282		$200*80/[(1+0.10)]^1 + 200*80/[(1+0.10)]^2 + 100*80/[(1+0.10)]^3 + 2,000/[(1+0.10)]^3$
OC – operating cost	(31,000)		31,000
OCM – operating contribution margin		4,282	
FR – financial revenue	2,832		$34,000 - [17,000/(1+0.06) + 17,000/(1+0.06)^2]$
FC – financial cost	(3,000)		$31,000 - 34,000$
FCM – financial contribution margin		(168)	
TCM – total contribution margin		4,114	

b) Statement of financial position at time t_0 , right after the decision to buy the equipment

Assets	\$	Liabilities	\$
.	.	.	.
Equipment	35,282	Account payable – installment purchase of equipment	34,000
.	.	(-) Deferred interest	(2,832)
.	.	Equity (physical)	
.	.	Paid-in Capital	K
.	.	Retained earnings	$x_t^a + 4,114$
.	.	Physical equity + liabilities	$K + x_t^a + 35,282$

At the time of the decision, the economic value of the equipment, considering the expected scrap recovery, is \$ 35,282, amount by which it would be recorded in the balance

capital good over its expected useful life); discount of future cash flows at nominal rates and not at different real opportunity cost rates for assets (borrowing rate) and liabilities and equity (lending rate).

sheet if economic concepts were used to measure the accounting transactions. Since the company would have paid \$ 31,000 had the purchase been made in cash, it would recognize a wealth aggregation of \$ 4,282. But in deciding for a term purchase, the company lost \$ 168 in the financial dimension of the decision, thus the net residual profit of the decision is \$ 4,114. The liability originated from the term purchase has a future value of \$ 34,000, but out of the \$ 3,000 total financial cost ($34,000 - 31,000$) \$ 2,832 is deferred to accrue with the passage of time. See that the economic value of the equipment fits perfectly the RIV model, since $\$ 35,282 = \text{cost} + \sum_{\tau=t_1}^{t_3} R^{-\tau} (x_{t+\tau}^a) = \$ 31,000 + \$ 4,282$. However, the physical equity has grown only by \$ 4,114, because the term purchase decision created a liability whose opportunity cost at the time of the decision is \$ 31,168 ($34,000 - 2,832$), \$ 168 higher than the \$ 31,000 cash market price of the equipment. In other words, RIV model also applies to the liability, since its opportunity cost at time t_0 is \$ 31,000 (cost) + \$ 168 (residual abnormal loss). After the moment of this decision, the asset and the correspondingly liability, as well as the rest of the balance sheet items, would be exposed to time-conjunctural events, which we will not go into details in this paper.

In establishing her expectation that the equipment acquired would generate 200 hours of services in periods 1 and 2 plus 100 hours of services in period 3, the manager responsible for the equipment would be attending the sales budget, which reflects the company's position in the market and its internal intangible forces, such as management flexibility, intellectual capital, motivation of employees, the location it occupies, the strength of its brands, etc. On the other hand, the more efficient a firm is, in a general sense, the lower is its perceived risk, so the less (high) are the interest rates to borrow (lend) money from/to the market and consequently the bigger will be the contribution margin of the decision to buy in-use assets when they are supported by production. Then, the firm's intangible factors are embedded in the tangible assets both physically and economically. The monetary effect of the intangible elements (or value drivers) are captured in the residuals or marginal economic impact of contrasting the opportunity cost of the resources sacrificed and obtained when the firm exchanges assets with the market in management decisions to buy, manufacture and sell assets, as well as from the passage of time and change of conjuncture. That is the meaning of expressing retained earnings as a residual income figure, x_t^a , as shown in the balance sheet of the example above. The rules and conventions of GAAP financial accounting prevent us from perceiving that the firm's aggregate residual income is the summation of the marginal result that emerges out of each management decision which in turn materializes in the economic value of the net assets that form the physical equity of the firm.

According to GAAP rules, the physical equity of the acquired company is revalued to fair value, which is a proxy for economic value, at the moment it is incorporated by the acquirer as part of her consolidated balance sheet. Thus, it seems a double count to represent acquired goodwill as a separate asset that replaces non-individualizable intangible assets with undefined useful lives, since their value is already captured by the fair value of the physical equity. It is more reasonable to think that goodwill represents not the acquisition of the acquiree's non-individualizable intangible assets, rather it refers to a payment for the future residual income expected by the acquirer, which we can consider as a proxy for the "intangible equity" of the acquirer related to an specific business combination transaction. To be more precise in our thinking we would say that goodwill is not totally part of the intangible equity, since even the fair value of the physical equity contains some noise as a representation of its real economic value. Thus, acquired goodwill may contain a portion that is not properly goodwill, rather it is a measurement error, as pointed out by Johnson and Petrone (1998), equal to the difference between the "truly" economic value and the computed fair value of the acquiree's net physical assets. Following the example above, according to GAAP the fair value of the in-use equipment would be its market price, \$ 31,000, but its opportunity cost is \$ 35,282 since the best alternative

use of the resource (Coase, 1937), after its acquisition, would be to rent the equipment to the market for \$ 33,779 (present value of the expected services) and at the end of its useful life to discard the scrap for \$ 1,503 (present value of \$ 2,000). Notice also that with respect to the firm-entity the opportunity cost of assets and liabilities are different, since the former (latter) is the borrowing (lending) rate. In addition, the firm's cost of capital, a key feature of economic measurement, is not considered for computing the acquired goodwill.

4 CASE STUDY

Hypermarcas S.A. is the biggest Brazilian group that operates in the pharmaceutical business. Its characteristics of an oligopolistic market structure make it suitable for our case study, given this is a competitive advantage that make it easy for the group to obtain residual profits in its operations. In addition, Hypermarcas acquired many businesses in our period of analysis, everyone involving a payment of goodwill. We will track the goodwill conversion into physical equity across 2010 to 2018. Table 1 shows that the nine Hypermarcas's business combinations during the period 2010-2018, all concentrated in 2010 and 2011, involved a total goodwill of rough R\$ 2.95 billion, 26.84% (792,801) in 2010 and 73.16% (2,160,713) in 2011. There was no impairment of any goodwill between 2010 and 2018 and all audit opinions for the period were issued without any qualification.

Table 4 – Business Combinations entered by group Hypermarcas S.A., during 2010-2018

	Acquired Company	Type of M&A	Price paid (in thousand of RS)	Goodwill (in thousand of RS)
Painel A: M&A occurred in 2010	Versoix (Jontex)	Acquisition	181,256	155,266
	Luper	Acquisition	52,161	44,051
	Facilit (Sanifil)	Acquisition	79,000	65,083
	Sapeka	Acquisition	602,011	406,793
	Bitufo	Acquisition	80,057	57,192
	York	Acquisition	96,575	64,416
		Total	1,091,060	792,801
Painel B: M&A occurred in 2011	Mabesa	Acquisition	346,903	353,146
	Mantecorp	Acquisition	2,492,346	1,798,470
	Active	Acquisition	35,405	9,097
		Total	2,874,654	2,160,713

There is no publicized available information that allows us to track the conversion of any separated goodwill into physical equity. Thus, we need to look at the global dynamics of conversion. For doing this, we will project the capitalization of the initial physical equity from the beginning of 2011 (end of 2010) until 2018, using for such the risk-adjusted cost of equity capital including the capital impounded in the goodwill itself. We have to compare this figure, at the end of each year, with the existing physical equity for the respective year.

Let $E_t(y_{t+k}^{PE})$ be the projected adjusted physical equity of Hypermarcas for time t+k, expected in time t. Let y_t^{PE} be the real adjusted physical equity existing in time t. So, conversion would occur, in whole or in part, if and only if $y_t^{PE} > E_{t-k}(y_t^{PE})$. In other words, $y_t^{PE} - E_{t-k}(y_t^{PE}) = \alpha GW_t$, where $\alpha = [0, 1]$ is the portion of the time t goodwill (GW_t) balance that could be converted into physical equity in an economically sense. Since goodwill is a stock of expected residual profits, it should only be absorbed into real wealth if the growing of physical equity grows more than the risk-adjusted capitalization of the capital impounded in the business, including the cost of goodwill. If $\alpha=0$, any goodwill is converted; $\alpha=1$, all the balance of existing goodwill can be converted; α between 0 and 1, a portion of the existing goodwill is converted and the remaining balance, $1-\alpha$ is taken as baseline for future capitalization of the physical equity.

Let's apply the above reasoning to the Hypermarcas case. First, we need to calculate the initial balance of the adjusted physical equity to project its expected value at the end of each future year. We need to guarantee that physical equity changes only as a result of the group operating activities. As a result, we must take out from the end-of-2010 BVE – book value of equity any capital transaction between the company and its shareholders. Similarly, all goodwill must also be removed out as it is precisely a proxy of an intangible wealth (or intangible equity) whose conversion into physical equity we will be tracking along. All said, we get: $y_{2010}^{PE} = BVE_{2010} +/ -CT_{2010} - GW_{2010}$. We hand collected the two first parcels from Hypermarcas 2010 financial statements, and $GW_{2010} = R\$ 792,801$ thousand is shown in table 1 above. After all computations, we get $y_{2010}^{PE} = 2,999,424$ thousand, approximately R\$ 3,0 billion. Thus, the 2010 expected risk-adjusted physical equity for the end of 2011 is:

$$E_{2010}(y_{2011}^{PE}) = (y_{2010}^{PE} + GW_{2010})(1 + r)$$

where r is the risk-adjusted cost of equity capital. We will compute r as the average annual Brazilian treasury Selic risk-free rate from 2010 to 2018, plus an 1.2% premium which corresponds to the average market return in B3 stock exchange in the same period. Applying these assumptions, we get $r = 13,00$ for 2011. Thus, $E_{2010}(y_{2011}^{PE}) = (2,999,424 + 792,801) * (1 + 0,13) \rightarrow E_{2010}(y_{2011}^{PE}) = R\$ 4,285,214$ thousand. We then compare this figure with the real adjusted physical equity existing at the end of 2011. If the latter is bigger, goodwill balance is reduced and the process is repeated for the following years. Table 2 below shows the results:

Table 2 – Existing / Projected Adjusted Physical Equity and Acquired Goodwill Recover Dynamics
(monetary values in R\$ thousand)

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Existing adjusted PE	2,999,424	4,534,924	4,720,318	4,819,327	5,136,176	5,407,160	6,400,239	7,318,425	7,821,814
Projected adjusted PE	2,999,424	3,389,349	3,676,374	3,978,263	4,411,790	4,996,715	5,700,176	6,261,096	6,662,328
Residual Profit	0	1,145,575	1,043,944	841,064	724,386	410,445	700,063	1,057,329	1,159,486
Risk-adjusted GW amount balance	792,801	895,865	2,093,886	1,155,566	366,270	0	0	0	0
GW year 2011		2,160,713	0	0	0	0	0	0	0
Remaining GW to be recovered		1,911,003	1,049,942	314,502	0	0	0	0	0
Annual risk-adjusted rate ¹	0.00	13.00	9.57	10.06	16.46	17.50	23.45	18.70	13.38
Cumulative risk-adjusted rate ²	0.00	13.00	22.57	32.63	49.09	66.59	90.04	108.74	122.12

(1) This rate was used to project the remaining goodwill balance to be recovered in the next year;

(2) This rate was used to project the year-2010 initial balance of the adjusted physical equity throughout the following years.

We can see from table 2 that in all eight years of the analysis period, starting in 2011, there were residual annual profits in significant amounts. In four of those years, the residual profit exceeded the figure of R\$ 1+ billion. This is probably due to Hypermarcas' market power, due to its oligopoly characteristics. As a result, all the goodwill acquired in the nine acquisitions of companies that took place in 2010 and 2011, totaling almost R\$ 3.0 billion in absolute numbers, and R\$ 4,51 billion capitalized¹⁰, was quickly converted into physical equity. In 2011, there was sufficient residual profit to recover all the goodwill purchased in 2010 and part of what was acquired in 2011. Just three years later, at the end of 2014, all the remaining goodwill stock was converted into physical equity.

Interestingly, throughout the period under analysis, there was no write-off of goodwill due to impairment, as well as no qualifications about its need in the audit opinions. This is

¹⁰ $895,865 + 2,093,886 + 1,155,566 + 366,270 = R\$ 4,511,587$. By the way, capitalizing goodwill by the market risk-adjusted cost of capital is a conservative computation. Since current accounting rules do not allow the measurement of the cost of shareholder's equity capital, in practice it would be even more quickly the time for goodwill to transform into physical equity.

probably due to the current misunderstanding of seeing goodwill as an intangible asset with and indefinite useful life, and not, as demonstrated in this case study, as an intangible wealth that may become real physical wealth. One of the serious consequences of this current flawed understanding is to allow, in practice, the recognition of internal goodwill for companies that have already converted it into physical assets, as it is the case of the Hypermarchas group.

5 CONCLUDING REMARKS

The current accounting rule for acquired goodwill assumes that the acquirer buys, with the premium paid, a handful of intangible assets with no defined useful life that cannot be identified and measured individually. We have shown in this paper that these intangible elements are forces or value drivers that do not exist apart from the physical assets, neither physically nor economically¹¹. Just as a person's virtues are expressed in his or her physical action, the virtues of the company, its intangible forces, are embodied in the identified assets and liabilities, which are the result of past management decisions, named physical equity in this paper. When this equity is measured by economic concepts (opportunity cost), it captures the excess over the cost of capital that characterizes the residual profit, which in order to exist necessitates the intangible forces.

However, the total economic value of a business concern is also comprised of an intangible equity, or the present value of expected future residual profits of decisions not yet implemented. This latent intangible wealth gradually becomes real physical wealth as new management decisions are made. At the same time, it renews itself continuously as new ideas, intentions and strategies come to the minds of the business owners and top executives. The intangible forces that have been incorporated in the current physical equity will also be incorporated into the future physical net assets, which in the current moment is latent as an intangible equity. This understanding was possible through elaboration on the decision and measurement models used in the Gecon - Information System of Economic Management, a thought experiment¹² that submitted the theory of the accounting information system to the theory of the firm as idealized in the late 1930s by the British economist Ronald Coase, Nobel Prize for Economics in 1991.

The central idea of this paper has been preliminarily tested through a simple case study. The Brazilian pharmaceutical group Hypermarchas S.A.¹³ acquired 9 businesses in 2010 and 2011 paying almost R\$ 3.0 billion for goodwill purchased. We show that in just 4 years, from 2011 to 2014, all this goodwill, in this paper assumed as a proxy for the acquirer's intangible wealth, was transformed into physical assets.

Many avenues open to further empirical tests of the ideas here addressed. For example:

- The acquired goodwill, X , (a proxy for intangible equity), is recovered when the physical equity, Y , of the acquired company grows to $(I+c) * (Y+X)$, excluding capital transactions subsequent to the date of acquisition, where c is the cost of capital.
- Keeping goodwill in the balance sheet after it has been recovered is the same as recognizing internal goodwill. Does the market differentiate the recognition of the internal goodwill from the acquired goodwill?
- The higher the acquired goodwill, in monetary volume, the longer its recovery time.
- The greater the market power of a company, the shorter the time it recovers the acquired goodwill;

¹¹ There is a consensus in the literature that the intangibles that make up goodwill do not exist separately from physical assets. In this article, we show that they are also economically linked to physical assets.

¹² For Barad (2007, p. 100), thought experiments are “pedagogical devices, tools for isolating and bringing into focus key conceptual issues.

¹³ Hypermarchas S.A. changed its name to Hypera S.A.

- More innovative companies recover goodwill acquired in less time than less innovative companies.
- The renewal rate of intangible equity is higher in companies in more innovative industries;
- Given a set of controls, the rate of transformation of intangible equity into physical equity monotonically grows from the most innovative to the less innovative;
- When the growth rate of intangible equity is higher (lower) than the growth rate of physical equity, excluding capital transactions between the company and its shareholders, the company will be more oriented to the future (past).
- How does the transformation rate of intangible into physical equity behave by industry and by country?

If further empirically confirmed, the ideas in this paper will represent a new paradigm on the nature of goodwill¹⁴. As such, the theoretical and empirical literature on the subject, as well as accounting regulation, will be affected. As for accounting regulation, an immediate possibility is the return of linear amortization¹⁵ within an average term to be defined by the empirical literature, in parallel with occasional recognition of impairment losses, similar to what happens in accounting for PPE.

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¹⁴ The same arguments we used in this paper for acquired goodwill are also applied to "other intangible assets with undefined useful lives".

¹⁵ By the way, amortization of acquired goodwill in 10 years or along the asset estimated life, whichever is lower, is already permitted for US private companies (see FASB ASU 2014-02, issued in January 2014).

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