Potential dividends versus actual cash flows in firm valuation

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ABSTRACT

Practitioners and some academics use *potential* dividends rather than actual payments to shareholders for valuing a firm's equity. We underline the differences between the two methods and present some arguments supporting the thesis that firm valuation with potential dividends overstate the actual value of the firm's equity. In particular, consistently with DeAngelo and DeAngelo (2006, 2007), we underline that cash flows create value for shareholders only if they are withdrawn from the firm, and that the use of potential dividends may lead to contradictions.

KEY WORDS.

Cash flows, cash flow to equity, liquid assets, potential dividends, firm valuation, equity value, Modigliani and Miller

JEL CLASSIFICATION

G12, G30, G31, M21, M40, M41

Introduction

This paper gives support to the idea that potential dividends that are not distributed (and are invested in liquid assets) should be neglected in firm valuation, because only distributed cash flows add value to shareholders. Hence, the definition of Cash Flow to Equity should include only the cash flow that is actually paid to shareholders (dividends paid plus share repurchases minus new equity investment). Although some authors warn against the use of potential dividends for valuing firms (Vélez-Pareja, 1999, 2004, 2005; Fernández, 2002, 2007; Tham and Vélez-Pareja, 2004; DeAngelo and DeAngelo, 2006, 2007), some respected authors (e.g. Copeland, Koller and Murrin, 1994, 2000; Benninga and Sarig, 1997; Brealey and Myers, 2003; Damodaran, 1999, 2006, 2007)[1] and many practitioners seem to support the idea that the Cash Flow to Equity has to include *undistributed* potential dividends, i.e. excess cash.

To include undistributed potential dividends in valuation is admissible if two hypotheses hold: (i) excess cash is expected to be invested in zero-NPV activities *and* (ii) all the cash from those investments is distributed, sooner or later, to shareholders.[2] If these two assumptions held, potential dividends could be safely used for valuing firms, because they would be value-neutral (see DeAngelo and DeAngelo, 2006; Magni, 2007). But it should be noted that a *definition* of Cash Flow to Equity is meant to be valid for all possible cases, and thus should not depend on a particular assumption about investment in liquid assets, otherwise the consequent definition of firm value would depend on a particular assumption about investment in liquid assets. Furthermore, these assumptions disregard Jensen's (1986) agency theory: if agency problems are present, managers tend to retain funds and invest them in negative-NPV projects, which implies that dividend irrelevance does not apply any more. DeAngelo and DeAngelo (2006) claim that "When MM's assumptions are relaxed to allow retention, payout policy matters in exactly the same sense that investment policy does" (p. 293) and "irrelevance fails because some feasible payout policies do not distribute the full present value of FCF to currently outstanding shares" (p. 294).

This paper aims at reinforcing the arguments on the inappropriateness of adding the excess cash as part of the cash flows used for valuing a firm.

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[1] Professor Tom Copeland in a private correspondence says: "If funds are kept within the firm you still own them -- hence 'potential dividends' are cash flow available to shareholders, whether or not they are paid out now or in the future."

[2] This second assumption is not necessary if one assumes that the firm shuts down after $T<\infty$ periods. At time T, managers will necessarily have to distribute the firm's liquidation value (inclusive of the cash from investments in liquid assets) to shareholders.

The paper is organized as follows: section 1 shows that our definition of Cash Flow to Equity as dividends minus net capital contributions is consistent with basic finance, and, in particular, with Modigliani and Miller's approach to valuation, whereas the definition widely used in many applied corporate finance textbooks and in real-life applications is not; section 2 reviews the different views of several corporate finance authors. Section 3 furnishes several reasons for supporting our thesis, among which confusion between investment value and distribution value and inconsistency between cash flows and financial statements. Section 4 finally illustrates three simple formal arguments. Some concluding remarks end the paper (main notational conventions are collected after this section).

1. Definition(s) of Cash Flow to Equity

This section proposes a definition of Cash Flow to Equity which is consistent with Modigliani and Miller's (1958, 1963) and Miller and Modigliani's (1961) approach to valuation. Let EBV be the equity book value and CS_{t+1} be the capital stock contributed by shareholders up to time t+1. As known, change in equity book value is equal to change in capital stock plus net income (NI) minus dividends paid to shareholders (Div):

$$EBV_{t+1} - EBV_t \equiv CS_{t+1} - CS_t + NI_{t+1} - Div_{t+1}.$$

Using the variation symbol "d",[3] $dEBV_{t+1} = EBV_{t+1} - EBV_t$ is the change in equity book value and $dCS_{t+1} = CS_{t+1} - CS_t$ represents the net capital contributions made by shareholders in the year (i.e. dCS_{t+1} = new equity investment – shares repurchases). Therefore, we may rewrite the above equation as

$$dEBV_{t+1} = NI_{t+1} - (Div_{t+1} - dCS_{t+1}) \quad (1)$$

which is known in accounting finance as *clean surplus relation*. Note that increase in book value is split into two terms: NI_t is an accounting item, whereas $(Div_{t+1} - dCS_{t+1})$ is a cash flow; in particular, the latter represents the cash flow that equity holders actually receive (net of capital contributions made during the year). It is just this cash flow that adds value to the firm. We therefore define Cash Flow to Equity as

$$CFE_{t+1} \equiv Div_{t+1} - dCS_{t+1}. \quad (2)$$

[3] Henceforth, change in a variable y is defined as: $dy_{t+1} := y_{t+1} - y_t$.

It is worth noting that our eq. (1) is equivalent to Miller and Modigliani's (1961) eq. (4) at p. 414, according to which

$$\text{Issuance of New Equity} = \text{Increase in book value} - (\text{Net Income} - \text{Dividends})$$

$$dCS_{t+1} = dEBVt_{+1} - (NI_{t+1} - Div_{t+1}).$$

(we remind that Miller and Modigliani assume no share repurchases so that $dCS_{t+1}=0$). Our notion of CFE in eq. (2) is exactly what Miller and Modigliani (1961) use to compute the firm value: their eq. (17) at p. 419 highlights the difference between dividends paid and net capital contributions: using our symbols, their formula is

$$E_t = \frac{1}{(1+\rho)}[(Div_{t+1} - dCS_{t+1}) + E_{t+1}]$$

where E_t is the equity market value at time t (and ρ is Miller and Modigliani's symbol for the cost of equity capital). It is worth noting that Miller and Modigliani (henceforth MM) also propose the (equivalent) *stream of earnings approach* to valuation. Their eq. (9) is as follows:

$$E_0 = \sum_{t=0}^{\infty} \frac{NI_{t+1} - dEBV_{t+1}}{(1+\rho)^{t+1}}.$$

Inspecting the numerator, the reader may note that our eqs. (1) and (2) just imply

$$CFE_{t+1} = NI_{t+1} - dEBV_{t+1,} \tag{3}$$

so that $E_0 = \sum_{t=0}^{\infty} \frac{CFE_{t+1}}{(1+\rho)^{t+1}}$. As a result, our approach is consistent with MM's approach. While it is true that Miller and Modigliani (1961) aim at giving a dividend irrelevance theorem in their paper, it is also true that they are perfectly aware of the stringent assumption they explicitly make: irrelevance of dividend policy is based on the coincidence of the cost of capital with the expected rate of return of the extra funds, which means that the activities undertaken (whether investment or financing) are zero-NPV activities. Without that assumption, the theorem breaks down.

By contrast, a large part of practitioners and some corporate finance scholars overlook that assumption and are willing to propose a different definition of cash flow to equity including excess cash. For example, Damodaran (1998, 2006a, 2006b) proposes the use of cash flow available for distribution for valuing a firm's equity, even if it will be not paid to the equity holder. The cash available for distribution is usually called *potential dividends*; the part of it which is not actually distributed (excess cash, retained funds) is invested in liquid assets, i.e. cash and short-term investments such as securities, bonds etc. Formally, $LA_t=C_t+STI_t$ (LA=liquid assets, C=cash, STI=short-term investments). Damodaran's definition of cash flow to equity (he calls it *Free Cash Flow to Equity*) is widely adopted in applied corporate finance, and may be formalized, in relation to our definition, as follows:

$$FCFE_{t+1} = CFE_{t+1}+\text{excess cash}_{t+1} \tag{3}$$

Therefore, $FCFE_{t+1}$ represents *potential* dividends, divided into actual net payments CFE and excess cash. The latter is given by the difference between change in liquid assets and after-tax interest income (see also Copeland, Koller and Murrin, 2000). Formally,

$$\text{Excess cash}_{t+1} = dLA_{t+1}-iLA_t(1-T) \tag{4}$$

where i is the return rate for investment in liquid assets. We may see the same thing starting from the balance sheet. Let us divide the assets of the firm into two categories: Fixed Assets net of cumulated depreciation (NFA), and Working Capital (WC), the latter being the difference between current assets (cash+short-term investments+accounts receivable+inventories) and current liabilities (accounts payable). Then,

$$EBV_t = NFA_t+WC_t - D_t \tag{5}$$

where $WC_{t+1} = C_{t+1} + STI_{t+1} + AR_{t+1} + Inv_{t+1} - AP_{t+1}$ (with Inv=Inventories) and D is the book value of the debt. Therefore,

$$dEBV_{t+1} = dNFA_{t+1}+dWC_{t+1} - dD_{t+1}.$$

Hence, making use of eq. (3), CFE may also be computed with the so-called indirect method:

$$CFE_{t+1} = NI_{t+1} - (dNFA_{t+1} + dWC_{t+1} - dD_{t+1}). \quad (6)$$

where $dNFA_{t+1}$ (=Investment in Fixed $Assets_{t+1}$ − $Depreciation_{t+1}$) represents the so-called *net capital expenditure.*

By contrast, a frequent definition in textbooks considers an "operating" or "noncash" notion of cash flow to equity, by excluding interest income from the net income and excluding change in liquid assets from the working capital. As noted, it is often named *Free* Cash Flow to Equity (Damodaran, 1999, 2006b). Formally, it is given by

$$FCFE_{t+1} \equiv NI_{t+1} - iLA_t(1-T) - (dNFA_{t+1} + dWC^{nc}_{t+1} - dD_{t+1}) \quad (7)$$

with WC^{nc} being noncash (operating) working capital: $WC^{nc}_{t+1} = WC_{t+1} - LA_{t+1,}$ so that $dAR_{t+1} + dInv_{t+1} - dAP_{t+1} = dWC^{nc}_{t+1}$ (see, for example, Damodaran, 1999, p. 128; Damodaran, 2006a, p. 79). Hence,

$$FCFE_{t+1} = CFE_{t+1} + dLA_{t+1} - iLA_t(1-T),$$

which is just eq. (3).[4]

2. The use of potential dividend in firm valuation

Damodaran (2006b) acknowledges the valuation divergences derived from using potential dividends rather than actual cash flows. After presenting a notion of cash flow to equity equal to dividends paid to shareholders, he extends the definition to include share repurchases: "we extend our definition of cash returned to stockholders to include stock buybacks, thus implicitly assuming that firms that accumulate cash by not paying dividends return use them to buy back stock." (Damodaran, 2006b, p. 19). This definition (which is strikingly similar to ours) is soon dismissed in favour of a notion of cash flow to equity that includes excess cash (the FCFE above): he writes that "the free cash flow to equity model does

[4] It is worth noting that it is rather hard to grasp a univocal definition of cash flow to equity in many applied finance textbooks. Given their non-scientific purpose, there isn't any use of formalism, and ordinary language is used in a rather loose way: the same terms may denote different things in different places of the book, and several different terms are used for equal concepts. Also, there is no standard terminology so different authors may use the same set of terms in rather different ways, increasing the difficulties in understanding. For example, the removal of after-tax interest income in Damodaran (2006a) must be inferred from careful reading: "If using net income to estimate cash flows to equity, you need to remove after-tax interest income" (Table 10.1, p. 345). Also, at p. 337: "we would first back out the portion of the net income that represents the income from financial investments … and use the noncash net income to estimate free cash flows to equity" (Copeland, Koller and Murrin, 2000, essentially use numerical examples and Tables, so that the task of abstraction is even more demanding). Only a thorough investigation of the authors' perspectives and careful inspections of the examples provided enable one to formulate simple definitions such as the one in eq. (7).

not represent a radical departure from the traditional dividend discount model" (p. 20) even though he is aware that this model implies a well-determined assumption: "When we replace the dividends with FCFE to value equity, we are doing more than substituting one cash flow for another. We are implicitly assuming that the FCFE will be paid out to stockholders" (p. 21). He is perfectly aware that this assumption is harmless *only* if the excess cash "is invested in fairly priced assets (i.e. assets that earn a fair rate of return and thus have zero net present value)" (p. 24). He correctly observes that "when the FCFE is greater than the dividend and the excess cash either earns below-market interest rates or is invested in negative net present value assets, the value from the FCFE model will be greater than the value from the dividend discount model" (p. 24). And he himself admits that "there is reason to believe that this is not as unusual as it would seem at the outset" (p. 24). Nevertheless, in his textbooks and papers he seems to contravene his very arguments, given that he favours the potential-dividends model over the other ones:

> Actual dividends … may be much lower than the potential dividends (that could have been paid out) … When actual dividends are less than potential dividends, using a model that focuses only on dividends will *under state the true value* of the equity in a firm. (Damodaran, 2008, slide 106)

It is worth noting that the author, instead of inferring that potential dividends *overstate* the value of a firm, infers that actual cash flows *understate* the value of a firm, so reversing a basic tenet in finance, according to which an economic asset is valued for the cash flow it pays off, not for the cash flow it could pay.

Also,

> firms do not always pay out what they can afford to in dividends. A more realistic estimate of equity value may require us to estimate the potential dividend—the cash flow that could have been paid out as a dividend (Damodaran, 2006a, p. 111)

Obviously, the fact that firms do not pay out what they can afford is not a good reason for favouring potential dividends as opposed to actual cash flow. Quite the contrary, if firms do not pay out cash flows that is available, then value is affected; in principle, whatever the magnitude of potential dividends, if a firm pays out no dividend over the life of the enterprise, the equity's value is zero, as MM correctly recognize (MM, p. 419, footnote 12). And this is true even if the firm has invested in positive NPV projects (see also DeAngelo and DeAngelo, 2006): what's the use of investing in positive NPV projects if shareholders will never receive any cash flow? As a

simple example: suppose shareholders contribute 100 dollars and managers invest those 100 dollars at a rate of return above the cost of capital (positive NPV). Suppose also that managers never liquidate the compound amount to shareholders: then, shareholders' wealth is decreased by 100 dollars, because they have suffered an outlay with no subsequent positive payoff.[5]

Benninga and Sarig (1997, p. 36) share Damodaran's view:

> Free Cash Flow (FCF) [is] a concept that defines the amount of cash that the firm *can* distribute to security holders … Cash and marketable securities are the best example of working capital items that we exclude from our definition of [change in net working capital], as they are the firm's stock of excess liquidity".

When calculating cash flow to equity these authors do not subtract dLA_{t+1}, which entails that they abide by eq. (7) above (they make use of the term "net working capital" while meaning "operating net working capital", inclusive of change in liquid assets).

Copeland, Koller and Murrin's (1990, 1994, 2000) (henceforth CKM) definition of free cash flow is consistent with Damodaran's and Benninga and Sarig's: they define it as "gross cash flow (NOPLAT plus depreciation) minus gross investment (increases in working capital plus capital expenditures)"(CKM, 2000, p. 138). Like Benninga and Sarig, they employ the expression "working capital" but refer to "operating working capital", as they explicitly state at p. 168. As a consequence, their definition of cash flow to equity does not exclude dLA_{t+1}, whereas it includes after-tax interest income (as they may be inferred by their Tables: no clear definition is given in the book. See, for example, CKM, 1994, p. 480, Exhibit 16.3; CKM, 2000, Exhibit 21.2 at p. 430 and Exhibit 21.10 at p. 438). Admittedly, in the first edition of their book (CKM, 1990) they seemed to be inclined to accept a strict definition of cash flow to equity as cash flow paid to shareholders: in their Exhibit 13.2 at p. 379 one finds, referred to equity,

Free Cash Flow = Dividends to equity

and in the same page they explicitly refer to "free cash flow to shareholders, which is mathematically identical to dividends". Yet, from the second edition of their book a radical shift toward potential dividends is consummated, albeit with no justification.

Brealey and Myers (2003, p. 75) write that "free cash flow is the amount of cash that a firm *can pay out* to investors after paying for all investments necessary for growth." Therefore, while not

[5] But see footnote 2 above.

being explicit, they seem to share the above mentioned authors' stance. Their notion of working capital is consistent with the above mentioned authors, who do not subtract the change in liquid assets: "Working capital summarizes the net investment in short-term assets associated with a firm, business or project ... Working capital = inventory + accounts receivable – accounts payable." (p. 126).

While the practice of using potential dividends for valuing firms is a widespread one, there are some authors who consider it an error and correctly use only actual payments to shareholders for defining cash flow to equity. For example, Fernández (2002, p. 171) clearly states that "the forecast equity cash flow in a period must be equal to forecast dividends plus share repurchases in that period" and "the ECF in a period is the increase in cash (above the minimum cash, whose increase is included in the increase in WCR) during that period, before dividend payments, share repurchases and capital increases" (Fernández, 2002, p. 172); "considering the cash in the company as an equity cash flow when the company has no plans to distribute it" (Fernández, 2007, p. 26) is a frequent error in real-life applications:

> In several valuation reports, the valuer computes the present value of positive equity cash flows in years when the company will not distribute anything to shareholders. Also, Stowe, Robinson, Pinto, and McLeavey (2002) say that "Generally, Equity Cash Flow and dividends will differ. Equity Cash Flow recognizes value as the cash flow available to stockholders even if it is not paid out." Obviously, that is not correct, unless we assume that the amounts not paid out are reinvested and obtain a return equal to Ke (the required return to equity). (Fernández, 2003, p. 10)

His notion of working capital explicitly includes liquid assets:

$$\text{WCR} = \text{Cash} + \text{Accounts receivable} + \text{Inventories} - \text{Accounts payable}$$

(e.g. Fernández, 2002, p. 39), where "Cash" is Fernández's term for "liquid assets". Accordingly, his definition of equity cash flow is equivalent to our eq. (6) (Fernàndez, 2002, p. 178 and Tables 9.6-9.8 at pp. 179-181). Cash flows to equity must necessarily include excess cash, "otherwise, we will be making hypotheses about what use is given to the part of the equity cash flow that is not used for dividends (cash, investments, repaying debt, etc.) and it will be necessary to subtract it beforehand from the equity cash flow" (Fernández, 2002, p. 179):

Shrieves and Wachowicz (2001, p. 35) commendably stress that working capital is inclusive of cash and marketable securities. Their eq. (2) defining cash flow paid to shareholders is equivalent to our eq. (6) above (they use the symbol *Div* to mean net payments to shareholders).

They correctly notice that by omitting liquid assets from the notion of working capital cash flows are overstated and observe that such an omission is harmless only if potential liquid assets are zero NPV investments.

DeAngelo and DeAngelo (2007) argue that a firm's equity is not given by potential dividends but by cash flows paid to shareholders. The former (they label them "free cash flow") determines the *investment value*, the latter leads to the *distribution value*: "Investment value is the discounted value of the FCF *to the firm* generated by its investment policy, which determines the firm's *capacity* to make payouts. Distribution value is the discounted value of the cash payouts to currently outstanding shares, i.e., the cash flow paid *to stockholders*, which determines the market value of equity" (p. 16, italics in original). They underline that "value is generated for investors *only to the extent that this capacity is transformed into actual payouts*" (DeAngelo and DeAngelo, 2006, p. 309). Only if "the full PV of FCF is distributed to investors, variation in the timing of the stream of payouts and in their form (e.g. dividends versus stock repurchase) has no effect on stockholder wealth" (DeAngelo and DeAngelo, 2007, p. 25).

Penman (2007, p. 39) underlines that "Owner's equity increases from value added in business activities (income) and decreases if there is a net payout to owners. Net payout is amount paid to shareholders less amount received from share issues. As cash can be paid out in dividends or share repurchases, *net payout is stock repurchases plus dividends minus proceeds from share issues*". He also writes that "it is noncontroversial that the price of a security is expressed as the 'present value' of the expected future payoffs to holding the security" (Penman, 1992, p. 466), where 'payoffs' unambiguously refers to "the payoffs for equity securities" (p. 466). His notions of "net cash flow to shareholders" (p. 239) or "net dividend" (p. 241) are consistent with our notion of cash flow to equity:

$$\text{Net dividend} = \text{Cash dividend} + \text{Share repurchases} - \text{Share Issues}$$

(p. 241, Microsoft Corporation example). However, while he is perfectly aware that "The theory of finance describes equity valuation in terms of expected future dividends" (Penman and Sougiannis, 1998, p. 348), in his textbook he explicitly adopts the convention of assuming that dividend irrelevance holds (Penman, 2007, p. 96), so that using either net dividend or cash flow available for distribution is immaterial to the final result.

3. Some reasons for using actual cash flows rather than potential dividends

This section summarizes some reasons for including in the cash flow only what indeed is a flow of cash.

Cash flows in and out of the firm. If a firm does not pay out cash flow, no value is created to shareholders. Firm is an entity separated from shareholders: if firm generates large amounts of cash flows, this does not automatically make shareholders richer. It depends both on the magnitude of the cash flows and on the fact that those cash flows are actually paid out to shareholders. Inflows for capital providers are outflows for the firm and viceversa, so the value of the firm for shareholders does not lie in the funds retained by the firm, but in the funds that are withdrawn from the firm by shareholders. To retain funds is a good choice only if those funds will provide, sooner or later, sufficient payouts to shareholders above the cost of capital. Shareholders' wealth does not increase if cash is not actually pulled out from the firm and distributed to shareholders. In other words, the *investment* value of a firm is different from the *distribution* value of a firm (DeAngelo and DeAngelo, 2007). Only distribution value counts for shareholders. To assume that potential dividends are actually pulled out of the firm is like trying to pull potential rabbits out of actual hats.

Consistency between cash flows and financial statements. There should be a complete consistency between cash flows and financial statements. If one assumes that every dollar available belongs to the equity holders, then that fact should be reflected in the financial statement. That is, those funds should appear as effectively distributed. If management is expected to invest retained funds in marketable securities, that decision should appear in the financial statements. Likewise, if cash holdings are invested in additional operating assets, that decision should be included in the analysis; if they are devoted to acquisitions or buyouts, again, that decision should be reflected in the cash flows with all the financial implications it has. The objection according to which retained funds may be useful for various reasons to shareholders (flexibility, high costs of external financing etc.) is not acceptable: retained funds are an equity contribution shareholders are forced to, so the issue is: will flexibility due to retained funds lead to higher payments to shareholders with respect to the case of distribution of those retained funds? Will internal financing lead to higher expected cash flows to shareholders? If the answer is "yes", then those very higher cash flows should be reflected in the prospective financial statements, and expected payments to shareholders will directly incorporate the benefits of

flexibility, internal financing and so on. Otherwise, the reasons provided are only a way to disguise interests at variance with shareholders' interests.

Modigliani and Miller's approach. Modigliani and Miller's (1958, 1963) approach to firm valuation only takes account of cash flows paid to investors. There are no "potential dividends" in their articles. The same is true even in MM (1961) where the irrelevance of dividends is proved. As DeAngelo and DeAngelo (2006) underline, in MM's 1961 paper there are no retained funds, and the assumption is "to mandate 100% free cash flow payout in every period" (p. 293). MM do not deal with potential dividends retained in the firms and invested in liquid assets. There are no investments in liquid assets in MM (1961). MM's thesis may be extended to the case of retention of free cash flow only if that investment is made at the opportunity cost of equity *and* "provided that managers distribute the full present value of FCF" (DeAngelo and DeAngelo, 2006, p. 303. See also Magni, 2007). The latter assumption is, as previously noted, no less important than MM's assumption of "fairly-priced assets".

It is never sufficiently stressed that irrelevance holds if and only if a perfect market exists where excess cash is invested in zero-NPV investments (and the full value is distributed to shareholders). In real life, excess cash is invested in liquid assets at some available rate that might be greater, equal or lower than the cost of equity. This means that the NPV of those undistributed funds can be greater, equal or less than zero. Thus, the use of potential dividends makes a valuation insensitive to the managers' choices regarding the excess cash, whereas it is highly dependent on it.

Zero-NPV assumption in real-life applications. One argument often used to justify inclusion the cash holdings as a cash flow is just that: the net present value of those investments is zero. Theoretically speaking, if one *explicitly* makes this assumption (along with the assumption of full distribution), then the firm's equity will be the correct one. But, if this assumption is made, one should support it with some empirical evidence. In constructing pro-forma financial statements (forecasting) one should look at the history of the firm, estimate the historical returns on those funds and forecast them accordingly to some historical average return. If the forecasted return is lower than the cost of capital, then value is destroyed. If it is higher, a creation of value occurs. The idea of automatically assuming, without any serious investigation on the past management's behaviors, that investments in liquid assets will be value-neutral, boils down to disregarding management's policies. Evidently, management's policies are relevant: retained funds may be kept in safe box, in the bank, in an investment fund, etc.

A stockholder would not accept to be virtually rewarded with "potential" dividends that never go to her pocket; likewise, banks or, in general, debt holders would not accept that interest or principal payments should be paid with "potential" interest and principal payments. Therefore, why should we expect that shareholders accept to consider retained funds as actual cash flows?

Agency theory. Although corporate financial theorists and practitioners may conveniently employ the assumption of value-neutral investment in liquid assets, in practice such assumptions are very rarely fulfilled, as Jensen and Meckling (1976) and Jensen (1986) underline. So, there is a need for distinguishing between potential cash flow available for distribution and actual cash flow effectively paid out to capital providers. The existence itself of this kind of problem is a confirmation that the assumption of value-neutral investment in liquid assets by managers is empirically unacceptable in most cases. If managers' interests (and actions) were aligned to the shareholders' interests, then managers would not waste money in negative NPV investments. In this case, managers would invest retained funds either in zero-NPV investment or in positive-NPV investments. In the former case potential dividends could replace actual cash flows in firm valuation, but in the latter case the positive NPV should be reflected in the prospective financial statements, as seen above. The fact that *in theory* managers may undertake zero-NPV investments and should distribute the available cash that is not used for positive NPV investments does not imply that *in practice* the analyst should believe in such assumptions: "the theory is empirically refutable, predicting that firms will distribute the full PV of FCF, an implication that differentiates it from Jensen's (1986) agency theory" (DeAngelo and DeAngelo, 2006, p. 295).

4. Some simple formalizations

We formalize in this section three simple arguments that aim at logically supporting the thesis according to which undistributed dividends do not add value to shareholders (and therefore must not be included in the definition of Cash Flow to Equity). In particular, they show that the use of potential dividends for valuation: (a) does not comply with the CAPM, (b) does not comply with the basic tenet of valuation theory, (c) does not comply with the no-arbitrage principle.

Potential dividends and CAPM. The use of undistributed potential dividends is in clear contradiction with the Capital Asset Pricing Model. When the CAPM is used to estimate the

cost of equity, k_e, one uses dividends paid out to calculate the historical stock returns and historical beta; one never uses potential dividends.

Proposition 1. *Suppose (i) an investor uses the CAPM for computing the cost of equity and (ii) uses potential dividends for valuation. Then, the firm lies on and above the SML.*

Assume, with no loss of generality, $\mathrm{dLA}_{t+1} > i\mathrm{LA}(1-\mathrm{T})$ (funds are retained by the firm). Due to (i), the following relation holds:

$$k_e = r_f + \beta_e (r_m - r_f) \tag{8}$$

with $\beta_e = \mathrm{cov}(\tilde{r}_e, \tilde{r}_m)/\sigma_m^2$, where $\tilde{r}_e = \tilde{\mathrm{F}}_{t+1} / \mathrm{E}_t - 1$ is the random rate of return and $\tilde{\mathrm{F}}_{t+1}$ denotes the cum-dividend equity value at time t+1. This implies

$$\mathrm{E}_t = \frac{\mathrm{F}_{t+1}}{1+k_e} \tag{9a}$$

with F_{t+1} being the expected value of $\tilde{\mathrm{F}}_{t+1}$. However, due to (ii), excess cash is discounted as well, so that

$$\mathrm{E}_t = \frac{\mathrm{F}_{t+1} + \mathrm{dLA}_{t+1} - i\mathrm{LA}_t(1-\mathrm{T})}{1+k_e}. \tag{9b}$$

Eqs. (8) and (9a) tell us that the firm lies *on* the SML, whereas (9b) tells us that the firm lies *above* the SML, given that it implies

$$k_e = \left(\frac{F_{t+1}}{\mathrm{E}_t} - 1\right) + \frac{\mathrm{dLA}_{t+1} - i\mathrm{LA}_t(1-T)}{\mathrm{E}_t} = r_f + \beta_e (r_m - r_f) + \frac{\mathrm{dLA}_{t+1} - i\mathrm{LA}_t(1-T)}{\mathrm{E}_t}.$$

The basic tenet of valuation theory. Section 1 has shown that our definition of CFE is consistent with MM's approach to valuation. MM, in turn, strictly abide by a basic tenet of valuation theory: value depends on cash flow actually received by the investor. This tenet may be formalized as:

$$E_t = \frac{E_{t+1} + \text{Cash Flow paid to shareholders}_{t+1}}{1 + k_e} \tag{10}$$

(see, for example, Miller and Modigliani, 1961, eq. (2)).

Proposition 2. *Suppose (i) an investor uses potential dividends for valuation and (ii) accepts the basic tenet of valuation theory. Then, she incurs contradictions.*

Note that one must have $dLA_{t+1} \neq iLA_t(1-T)$, otherwise the use of potential dividends is meaningless. From (i), we have

$$E_{t+1} = E_t(1+k_e) - FCFE_{t+1}. \tag{11}$$

But

$$\text{Cash Flow paid to shareholders}_{t+1} = FCFE_{t+1} - dLA_{t+1} + iLA_t(1-T) \tag{12}$$

for, by definition, $dLA_{t+1} - iLAt(1-T)$ represents retained funds not distributed to shareholders. From (ii),we have $E_{t+1} = E_t(1+k_e) - \text{Cash flow paid to shareholders}_{t+1}$. Replacing (12) in the latter, we have

$$E_{t+1} = E_t(1+k_e) - (FCFE_{t+1} - dLA_{t+1} + iLAt(1-T))$$

we find, owing to (11), $dLA_{t+1} - iLAt(1-T) = 0$, which contradicts the hypothesis.

The arbitrage argument. As is well-known, the no-arbitrage principle is a cornerstone in financial theory (Varian, 1987) and decision theory (Smith and Nau, 1994), and, more generally, represents a norm of rationality in economics (Nau and McCardle, 1991).

Proposition 3. *Suppose an investor uses potential dividends for valuation. Then, she is open to arbitrage losses.*

By assumption, investors in the market use eq. (3) (or, equivalently, eq. (7)) to value assets. Let us consider a firm traded in the market: let $\tilde{a}$ be the periodic (random) payment to shareholders, and let $\tilde{b}$ represent (random) *undistributed* potential dividends (excess cash). Given that investors positively evaluate $\tilde{b}$, then the market price of $\tilde{b}$ is $\frac{b}{i}$ where b is the expected value of $\tilde{b}$ and i represents some (positive) expected rate of return. However, according to eq. (3), both payments to shareholders and excess cash are discounted to compute the equity market

value. The latter is then priced at $\frac{a}{r} + \frac{b}{i}$ where r is the appropriate discount rate (possibly equal to i) for a (expected value of $\tilde{a}$). An arbitrageur fixes two amounts h_1, $h_2 > 0$, so that $h_1 + h_2 < \frac{b}{i}$ and proposes an investor a contract whereby the investor pays the arbitrageur an immediate sum equal to $(\frac{a}{r} + \frac{b}{i} - h_1)$ and the arbitrageur guarantees periodic payments equal to those distributed by the firm to its shareholders. To the investor, this contract is equivalent to directly owning the firm's equity. The market value of the firm's equity is $\frac{a}{r} + \frac{b}{i}$, but she only spends $(\frac{a}{r} + \frac{b}{i} - h_1)$ to receive that value. Therefore, NPV is positive to the investor:

$$\text{NPV} = h_1 > 0$$

so she accepts the contract. Then, the arbitrageur proposes a second contract whereby the investor immediately receives from the arbitrageur an amount equal to $(\frac{a}{r} + h_2)$ and periodically pays off the arbitrageur an amount equal to the cash flow that will be distributed by the firm to its shareholders. The investor accepts again, because she will pay $\tilde{a}$, whose present value is $\frac{a}{r}$, but immediately receives a greater amount, so that

$$\text{NPV} = h_2 > 0.$$

This strategy results in an arbitrage loss for the investor and an arbitrage profit for the arbitrageur (see Table 1). (To avoid arbitrage, one needs to value excess cash at zero).

To sum up:

> From Proposition 1: if one uses the CAPM for computing the cost of equity, then one *may not* use potential dividends for valuation
>
> From Proposition 2: if one uses potential dividends for valuation, then one does not accept the basic tenet of valuation theory
>
> From Proposition 3: if one does not accept the basic tenet of valuation theory, one is open to arbitrage losses.

Table 1. Arbitrage loss for an investor who uses eq. (3) for valuation

	Cash flows to the investor*	
	time 0	time $t = 1, 2, 3, \ldots$
First contract	$-\frac{a}{r} - \frac{b}{i} + h_1$	$\tilde{a}$
Second contract	$\frac{a}{r} + h_2$	$-\tilde{a}$
Total	$h_1 + h_2 - \frac{b}{i} < 0$	0

*The cash flows to the arbitrageur are the same cash flows changed in sign

Conclusions

Economics, and in particular, financial economics provide rigorous theoretical tools for valuing assets. The theory is unambiguous in stating that the value of an asset depends on the cash flow actually received by investors, not on the cash flows that *could* be received. If excess cash is retained within the firm, it may be invested in zero- or nonzero-NPV activities. If it is invested in zero-NPV activities *and* their full present value is distributed to shareholders (DeAngelo and DeAngelo, 2006, Magni, 2007), then the use of potential dividends is equivalent to the use of actual net payments to shareholders. If it is invested in nonzero-NPV investments, one is bound to explicitly forecast the payout policy of the firm, to avoid to overstate the firm's value. Whatever the assumption, the use of actual payments always leads to the correct value.

If, historically, the firm has not distributed all the available cash or if investment in liquid assets has not been a zero-NPV investment, then one should be careful in assuming that the investment policy and the payout policy will change in the future. While some authors correctly recognize that only cash flows paid to shareholders should be used for valuation (Vélez-Pareja, 1999, 2004, 2005; Shrieves and Wachowicz, 2001; Fernández, 2002, 2007; Tham

and Vélez-Pareja, 2004; DeAngelo and DeAngelo, 2006, 2007), several authors in applied corporate finance and a large part of practitioners use potential dividends for computing a firm's equity value (e.g. Benninga and Sarig, 1997; Damodaran, 1998, 2006; Copeland, Koller and Murrin, 1994, 2000) This paper aims at showing that the practice of adding excess cash to the cash flows actually paid is at odds with finance theory. Cash Flow to Equity should be defined as dividends paid minus net capital contributions, i.e. dividends plus shares repurchases minus new equity investment.

Main notational conventions

AP	Accounts Payable
AR	Accounts Receivable
C	Cash
CFE	Cash Flow to Equity
FCFE	Free Cash Flow to Equity (potential dividends)
CS	Capital stock
d	Variation symbol
D	Debt (book value)
Div	Dividends
E	Equity market value
EBV	Equity book value
$\widetilde{F}$, F	Cum-dividend equity market value (random and expected)
FCF	Free Cash Flow
i	Return rate for excess cash
Inv	Inventories
k_e	Cost of equity
LA	Liquid assets
NFA	Net Fixed Assets (fixed assets minus accumulated depreciation)
NI	Net income
STI	Short-term investment
T	Tax rate
WACC	Weighted Average Cost of Capital
WC	Working capital
WC^{nc}	noncash Working Capital
β_e	Beta of equity
$r_{f,}$ r_m	Risk-free rate, expected market rate of return
σ_m^2	Variance of market rate of return

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