

INFLATION RISK, WEALTH EXPROPRIATION AND GOVERNANCE IMPLICATIONS

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Abstract

With its often unperceived impact, interest rates and inflation volatility strongly affect long term stability within the firm, surreptitiously reshaping equilibria among different stakeholders and so raising key corporate governance concerns.

Whereas the impact of interest rates and inflation on capital budgeting issues had been extensively analyzed, little attention has been paid to corporate governance implications, concerning key issues such as “optimal” (indexed) contracting, effective corporate ownership (messed up by wealth expropriation and redistribution), asset substitution or information asymmetries (embedded in hidden impacts on interest/inflation sensitive assets and liabilities).

The topic is so theoretically and practically captivating, filling a gap in the existing literature and addressing real value protection targets, unassumingly crucial even for corporate ownership and control issues.

Keywords: Asset & Liability Management, Duration, Cost of Capital, Fixed/floating Debt, Indexation, Transaction Costs

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1 Introduction

With its often unperceived impact, interest rates and inflation volatility strongly affect long term stability within the firm, surreptitiously reshaping equilibria among different stakeholders and so raising key corporate governance concerns.

The impact of interest rates and inflation on sensitive corporate finance issues, such as discounted cash flows, within capital budgeting investments, had been extensively analyzed mainly from the 1970s, when nominal interest rates and inflation were peaking (Van Horne, 1971; Nelson, 1976; Chen and Boness, 1976; Rappaport and Taggart, 1982; Mehta et al., 1984; Mills, 1996). The sensitivity of cash flows to interest rates - incorporating inflation, if expressed in nominal terms - is a cornerstone of financial statement analysis and corporate finance theory and is well described even in textbooks (Groppelli and Nikbakht, 2006, p. 182).

The impact of inflation on real returns for investors has also been extensively analyzed within the public debt / Government bond issue debate (Aizenmann, Marion, 2011); inflation is considered as a sort of hidden tax, levied on hardly conscious debtholders and being used as the last available weapon to fight booming public deficits and cumulated debt.

Little attention has however been paid to corporate governance implications of interest rates and inflation volatility, concerning key issues such as “optimal” (indexed) contracting and inherent transaction costs, effective corporate ownership (messed up by wealth expropriation and redistribution), asset substitution or information asymmetries (embedded in hidden impacts on interest/inflation sensitive assets and liabilities).

The main findings of these sensitivity issues are so applicable to corporate governance issues, since they may deeply concern the relationships among different stakeholders, who may benefit or be penalized by inflation or interest rate changes, especially if unexpected. The main – still obscure – question is how interest rate and inflation risk affect investments, influencing their overall affordability and bankability, together with a (possibly fair) redistribution of the proceeds. And inflation risk, deriving from unforeseen or imperfect benchmark indexation to price increases, may not necessarily represent a zero sum game, if extreme scenarios have a disruptive “game over” impact.

While attention on interest rates and inflation may be currently underestimated, due to contingent recessionary times where interest rates cool down, trying to stimulate economic growth, and inflation is overwhelmed by other macroeconomic concerns, projection over a longer time horizon, where both

inflation and rates may surge, may consequently be biased. And other different outlooks, unlikely but not inexistent, such as hyper-inflation, counterintuitive deflation or muddy stagflation, may represent a further – much more challenging – threat to already troubled corporate governance equilibria among composite stakeholders.

Contractual provisions of inflation scenarios or of fixed vs. floating debt structures may greatly affect stakeholders and their real returns, with strong implications for corporate governance practice and models. While macroeconomic variables such as interest rates – which represent the “price” for lent money – or inflation cannot be influenced by single companies, their impact at the firm’s level may be, at least partially, managed, but it has to be previously well detected and monitored, this being in most cases a far from obvious consideration.

Conventional inflation-protected strategies are constantly jeopardized by inflation’s intrinsic volatility (Fulli-Lemaire, 2013). In such a context, a key governance aim is to achieve real value protection and deflated return targets, with embedded purchasing power guarantees, synonymous of inflation protection. On the lending side, so crucial for debtholders, all not inflation linked bonds offer limited if any protection.

The addressed topic is so captivating, both on theoretical and practical terms, filling a gap in the existing literature and considering also the impact of interest rates / inflation volatility on key financial ratios, such as Net Present Values (NPV) or (nominal)

Internal Rate of Returns (IRR) belonging to the project’s funders (debt and risky capital underwriters) or, residually, only to equityholders.

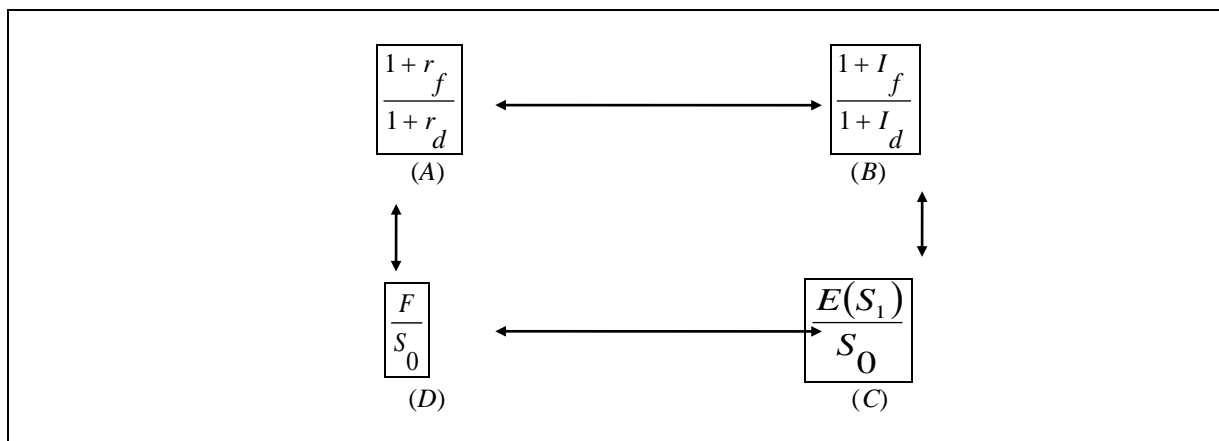
2 Exogenous Macroeconomic Risk: Linking Inflation With Exchange And Interest Rates

Exogenous macroeconomic risk is mainly represented by key parameters such as interest rates (nominal or real/deflated), inflation and exchange currency rates. A short representation of the interaction among these parameters, even if well known, is so necessary for a proper introduction.

A general framework where inflation is linked to interest and exchange rate changes, following well known theoretical parities, allows considering inflation changes in a broader international scenario, in order to detect their impact on the company’s balance sheet. Connecting macroeconomic changes (of inflation) with accounting and financial variables allows practical applications that range from sustainability issues – concerned with the smoothing of inflationary shock – to other useful risk management applications.

Inflation, interest rates and foreign exchange rates are linked by well known formulas, such as Purchasing Power Parity, spot/forward parity or Interest Rate Parity. These models show how variables interact, producing a forecast of exchange rates, as depicted in Figure 1.

Figure 1. Interaction of Inflation, Interest Rates and Spot/Forward Exchange Rates



- where: *A* – interest rate differences;
B – inflation rate differences (Purchasing Power Parity);
C – expected changes on spot Exchange rates;
D – differences between spot and forward rates;
 r_f – foreign interest rate;
 r_d – domestic interest rate;
 I_f – foreign inflation;
 I_d – domestic inflation;
 F – forward exchange rate;
 S_0 – spot exchange rate;
 $E(S_1)$ – expected spot exchange rate;

To the extent that these parities hold, theoretically minimizing real world frictions, linking expected inflation and interest rate differentials to spot and forward exchange rate adjustments, no arbitrage is possible. Through its link with foreign exchange rates, inflation may be imported and exported (Krugman et al. 2012).

In the next paragraphs, a macroeconomic framework will identify how inflation is linked with interest and currency rates; their interaction on the balance sheet is then investigated, questioning about the impact of inflation on economic marginality and financial sustainability. The impact of inflation on the cost of collected capital is then tentatively questioned, with some empirical sensitivity analyses.

Macroeconomic risk, mainly referring to inflation and interest rates (or even to exchange rates, if considering international corporate governance issues) is a typical external factor that cannot be influenced by the company and whose effects may be significant, especially if protracted across time.

Indexation with contractual agreements and the level of coverage of inflation changes (up to 100 %) can have an impact on the revenues and costs of the company in nominal and real terms, increasing or diminishing economic and financial margins. The same concept applies to the indexation of revenues and costs.

When the macroeconomic scenario is perturbed, risk premiums on collected debt and equity increase, due to the credit tightening following the economic slowdown, and leverage decreases both in its absolute value and in its time extension - shorter projects become increasingly fashionable. In a tax-less world, inflation would presumably only augment both future cash flows and discount rates by comparable amounts (Nelson, 1976; Rappaport and Taggart 1982). Proper factoring of inflation on economic margins and cash outflows and inflows is so a key challenge.

One of the main problems dealing with inflation is due to the very fact that inflation itself is neither a unique nor a stable or easily measurable concept. "General" inflation is typically measured with a Harmonized Index of Consumer Prices (combined rate of various baskets of products).

3 An Asset – Liability Management Framework

Interest rates, inflation and currency rates, following the aforementioned interactive patterns, are typically reflected and "stored" in assets and liabilities, so strongly influencing the relationships among different stakeholders. The sensitivity of each accounting asset or liability to these macroeconomic parameters greatly changes and is typically affected by "time depth", meaning that long termed assets or liabilities are much more exposed to macroeconomic changes and repricing.

The economic and financial model of a typical company is composed by three main interactive spreadsheets, respectively representing the assets and liability statement (balance sheet), the profit & loss account and the cash flow statement.

Asset-liability mismatches occur when their financial terms do not correspond. Consequent financial risk can erode their differential, represented by net equity, through a profit & loss imbalance producing a net loss. When volatility is high and liquidity shrinks, the issue becomes even more important, as it happens during crises and recessions. Imbalances are also due to the different nature and interest rate sensitivity of "financial" versus "industrial / operative" assets, liabilities, revenues, costs and cash flows.

Figure 2 depicts the forex risk, duration and inflation sensitivity, connecting liabilities with economic and financial flows; £ represents the domestic currency and € the foreign one.

To the extent that assets and liabilities show a different exposure to interest rate changes, adverse imbalances may affect economic marginality, eroding the equity and absorbing cash, up to the point of bringing, in extreme cases, to an equity and / or cash burn out. Corporate governance consequences may be substantial, especially if unforeseen.

What most matters is not exposure of single assets or liabilities to interest rate or inflation changes, but its (un)balance; should assets and liabilities be highly exposed to rates volatility but with a consistent elasticity that moves their value in the same direction, the impact would be limited.

If the debt is fixed rated and long termed, its duration – a measure for interest rate sensitivity – peaks. Floating rate (indexed) debt has a consistently lower duration, limited to its time to repricing span (and considering its fixed component represented by the spread) – short termed and/or variable rate debts have limited duration. Balloon payments, where principal debt is all reimbursed at the end, have a consistently higher duration than (fully amortized) constant periodic payments, where the principal is periodically paid back together with interests, keeping instalments constant.

The asset & liability management issue may so be properly addressed not (only) trying to uniform the sensitivity to interest rate changes – and shocks – of assets and liabilities, this being a ... mission impossible, due to the intrinsic nature and structure of the project, but rather softening the duration of liabilities. Again, whereas time extension of the debt is hardly manageable (depending on the financial necessities of the investment), its duration is not, should flexible rates – possibly with low fixed spreads – be preferred to fixed ones.

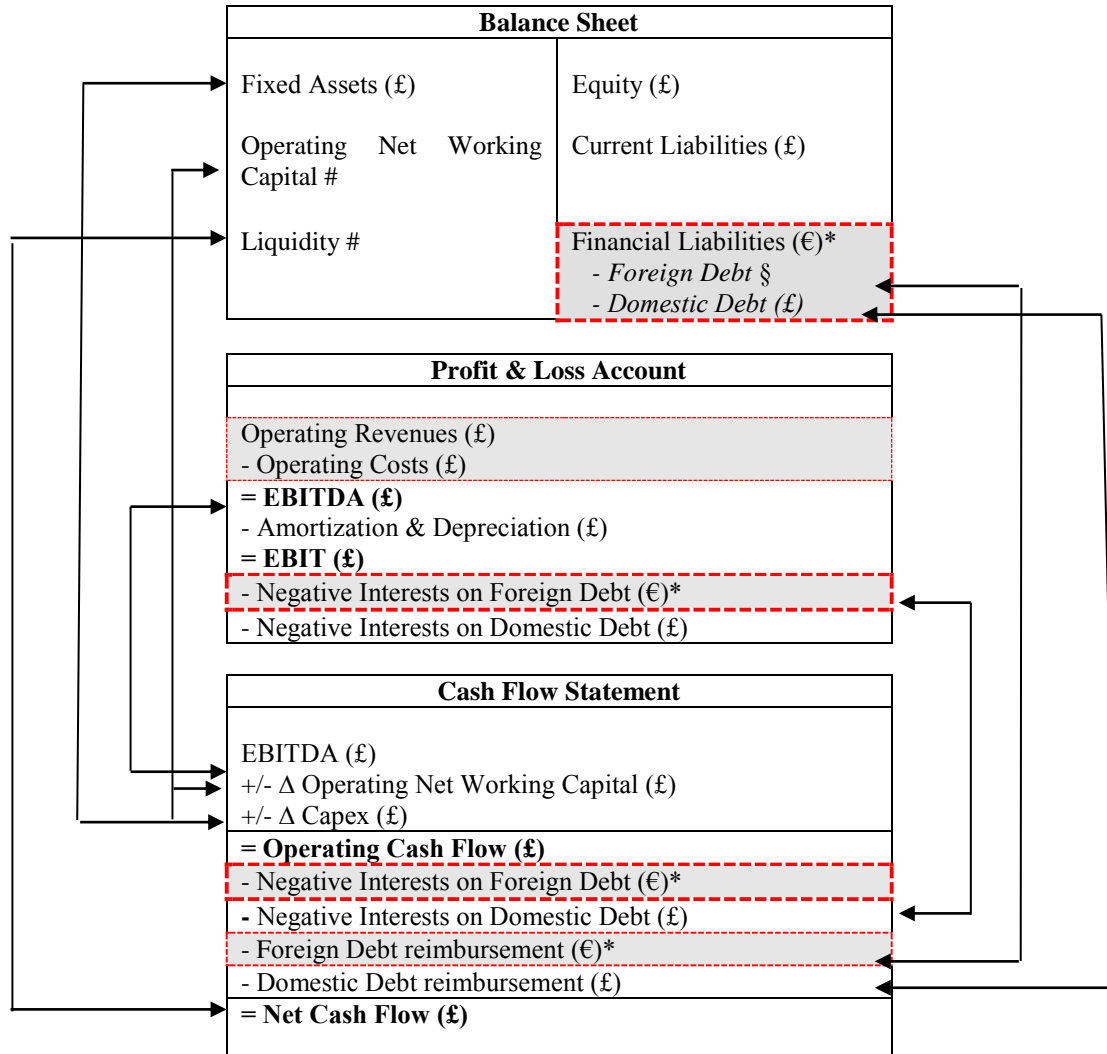
Average duration and inflation sensitivity of some long termed stakeholders (e.g. pension funds) may exceed that of liabilities and their counterbalancing assets, so demanding further real

protection, beyond standard pass-through and repricing cycles, which rarely exceed five years.

Long versus short termed stakeholders have different tastes and targets, both demanding tailor

made professional intermediation and monitoring, shifting from tactical to strategic investment allocations.

Figure 2. Forex risk, duration and inflation sensitivity



* currency mismatch § High duration [£ domestic / € foreign rate]
 Inflation sensitivity # Low duration

4 The Impact Of Inflation On Economic And Financial Marginality

Interest rates and inflation have an impact on economic and financial flows and, especially, on cumulated long term assets and liabilities (Faraglia et al. 2013). Corporate governance implications, considering in particular an often surreptitious wealth transfer effect among different stakeholders, may be significant.

The company's revenues and costs may be (fully or partially) indexed to prevailing inflation rates. To the extent that revenues command a positive margin over costs, indexation widens economic marginality. Inflation may so be beneficial for the company,

especially if it surges beyond expected values and if the debt is not fully indexed, so reducing its real face value.

Inflation has a potential non negligible impact on the financial and economic margins, particularly if it concerns long termed investments. Revenues either bear contractual inflation regulated with revision mechanisms, or are fully market driven and subject to timely repricing.

Even costs may be fully or partially indexed to contractual or market inflation; but costs concern even depreciation (fully irrespective of inflation, if they are calculated on fixed assets with a not reevaluated historical cost), negative interest rates (sometimes floating with basic rates and inflation) and taxes

(calculated on a taxable base that is reduced by higher – inflated – interest rates but also increased by devalued – non indexed – depreciation and higher economic margins...). Hyper-inflated economies may apply the accounting principle IAS 29, according to which the financial statements of an entity that reports in the currency of a hyper-inflationary economy should be stated in terms of the measuring unit current at the balance sheet date.

Interest rates are also linked to inflation and their difference is represented by real rates; to the extent

that interest rates are not fully flexible (e.g., fixed rates or even floating rates with a fixed spread), the indebted company makes a gain in real terms, its debt being devalued.

In the allocation of capital to investment projects, it is unlikely that optimal decisions will be reached unless anticipated inflation is embodied in the cash-flow estimates (Van Horne, 1971). Sensitivity to inflation – and, conversely, to real interest rates - of the main accounting items is summarized in Table 1.

Table 1. Sensitivity to inflation of the main accounting items

Accounting item / ratio	Sensitivity to inflation	Stakeholders bearing risk
Operating revenues	High sensitivity to “market” or to “contractual” inflation, sometimes (slightly) smaller than effective one. Price increases – to recover from inflated costs – may be impeded by competition.	If price upgrading to inflation is impeded, economic and financial margins shrink, possibly up to the point of endangering the debt service and overall bankability. Potentially any stakeholder is involved, being revenues the economic driver of gross profitability and operating cash flows.
Operating costs	Even operating costs follow different inflationary patterns, being sensitive to contractual inflation (for wages ...) or market inflation (purchase costs ...).	(see operating revenues).
(Operating) Net Working Capital	Being short termed, sensitivity to inflation is intrinsically limited. If revenues grow more than costs, due to inflation upgrading, margins rise and so does NWC, since credits linked to (higher) revenues outweigh higher debts linked to purchases.	This (limited) risk is internally borne by the firm, together with its commercial counterparts, so affecting stakeholders such as customers and suppliers.
Capital expenditure (Capex) and its depreciation	If CAPEX (mildly) grows, it decreases economic and financial marginality, with a (modest) negative impact on operating and then net cash flows. To the extent that fixed assets are not revalued, depreciation is based on historical costs, irrespectively of subsequent inflation. Being a non monetary cost, it doesn't affect the cash flows.	The owner of the investment depreciates it normally at the historical cost, and depreciation rates are eroded in real terms by cumulated inflation, reducing deductible costs and raising taxable income.
Operating Cash Flow CFO	The impact of inflation on CFO – a key parameter, not only for bankability – depends on the sometimes “capricious” interaction of the aforementioned variables	The firm and its financiers, if overall bankability is endangered, up to cash burn out.
Interest rates (in domestic currency)	Interest rates (on subordinated debt ...) denominated in the domestic currency are typically fixed rated; domestic inflation decreases their real value.	Debtholders bear the risk that the real (deflated) value of their debt remuneration decreases; adequate spreads should incorporate this risk, together with fixed to floating swaps and reduction of the debt duration
Interest rates (in foreign currency)	Interest rates (on senior debt ...) in (hard) foreign currency are primarily sensitive to foreign inflation; but also domestic inflation indirectly matters, since it affects exchange rates – following the Purchasing Power Parity model – and so the effective burden of foreign interests translated into domestic costs.	Same as above; domestic inflation increases domestic interest rates but not foreign interest rates; but since the exchange rate depreciates, so as to re-establish a purchasing power parity for the inflation differentials, the real burden of foreign interest rates is also affected by domestic inflation.

Table 1. Sensitivity to inflation of the main accounting items (continued)

Accounting item / ratio	Sensitivity to inflation	Stakeholders bearing risk
Debt repayments	Repayment of the principal follows the same logic of its accessories (interest rates), either in local or in foreign currency. Balloon payments concentrated at the end have a (consistently) higher duration than debt schedules with partial amortization of the principal's payback, being intrinsically riskier for the debtholder, even in terms of inflation rates.	Debtholders bear inflation risk if the face value of the debt depreciates in real terms.
Taxes	The taxable base is increased by higher (inflated) margins and by eroding depreciation (in real terms).	The private taxpayer bears the risk of a tax increase, or conversely the opportunity of a reduction.
Net Equity / Free Cash Flow to Equity	It is the bottom line parameter of the cash flow statement, residually depending on what comes before.	Inflation may be a net opportunity (or cost) for residual claimants such as the shareholders.
Debt Service Cover Ratio	Operating Cash Flows are sensitive to inflationary impact on revenues and costs; nominal outstanding debt is also affected in real terms.	Debtholders, whose capacity to get paid may decrease if cover ratios shrink.
Leverage	High inflation may be associated with lower leverage, especially if the debt is not indexed.	Any leverage increase shifts risk from equityholders to debtholders, and vice versa.

Even if inflation may mildly affect the real value of debt and interests, in practice it may strongly affect the cash flows deriving from operating activities, so altering (endangering) cash creation and its prior allocation to debt servicing, measured by deterioration of the debt service cover ratio (the ratio of cash available for debt servicing to interest, principal and lease payments).

The main concerns are the following:

- to the extent that inflation may reduce the differential between operating revenues and costs, measured by the Earnings Before Interests and Taxes (EBIT) or, in monetary terms, by the Earnings Before Interests, Taxes, Depreciation and Amortization (EBITDA), it affects the operating cash flow and, with it, the ability to generate enough cash to service the debt;
- the bankability of the whole project may be endangered not only by cash shrinking, but also by the difference between expected and real inflation. Loans are granted and bankability is assessed at the very beginning of a long term investment adventure, but then life changes, year after year, and shocks may reduce it.

The EBIT (or EBITDA) differential is negatively affected by inflation risk when it shrinks, especially if compared with ex ante modeling (according to which bankability is granted). So inflation risk may paradoxically be represented by an inflation reduction, more than a surge: if revenues and costs are both timely repriced, year after year, at a lower than expected inflation rate, then the EBIT(DA) differential between operating revenues and costs shrinks, and so

consequently does operating cash flow, possibly up to the point of endangering bankability.

What mostly matters is unexpected inflation, i.e. inflation that is not properly forecast in the model and contractually agreed upon.

5 Impact On The Cost Of Collected Capital

The weighted average cost of capital (WACC) is the rate that a company is expected to pay to finance its assets. WACC is the minimum return that a company must earn on existing assets to satisfy its creditors, owners, and other providers of sources of capital, consisting of a calculation of a firm's cost of collected capital in which each category of capital is proportionately weighted.

The WACC is a key parameter in corporate finance, strongly connected with other key financial ratios.

When inflation grows, the real – deflated – value of expected cash flows decreases and risk, incorporated in cash flows and (especially) in their discount factor, has to be carefully adjusted for inflation, otherwise both the NPV and the IRR may look artificially “pumped” and distorted by inflated values. Considering the NPV or IRR of equity, it should be noted that inflation has a residual impact: after having affected the assets and the liabilities, it has an ultimate impact on their differential. The statement, only apparently trivial, has important consequences, since shareholders are hardly covered against inflation and the market value of their equity,

confronted to its typically not indexed book value, shows if there are gains or losses in real terms.

If the debt rate is fixed, it devalues in real terms and so there is a risk transfer from equityholders to debtholders; WACC may not necessarily change – due to a possible “zero sum game” effect – but its internal

composition may be affected, with an asymmetric impact on different stakeholders.

An extended formulation of WACC, including foreign debt financing, is the following:

$$WACC = k_e \frac{E}{D_f + E} + k_{d-dom}(1-t) \frac{D_{f-dom}}{D_f + E} + k_{d-forex}(1-t) \frac{D_{f-forex}}{D_f + E}, \quad (1)$$

where: D_f dom – Financial debts (in domestic currency);

D_f forex – Financial debts (in foreign currency);

E – Equity;

K_e – Cost of equity;

K_d – Cost of debt (directly affected by inflation, through a change in nominal interest rates);

t – Corporate tax rate;

If financial debts are not inflation linked, their nominal (face) value decreases when inflation grows. To the extent that Equity is a residual, potentially unlimited, claim, the Debt / Equity ratio (leverage) decreases in real terms with inflation, depending also on the value of assets. Deflation (or less than expected inflation) has an opposite effect. The weighted average component of WACC is so affected by inflation changes.

For what concerns the cost of equity or, respectively, the cost of debt, in the numerator a similar reasoning may be carried forward: most depends on the impact of inflation on debt service; in particular, what primarily matters is the impact of inflation on interest rates: are they floating, so being indexed to inflation ups and downs?

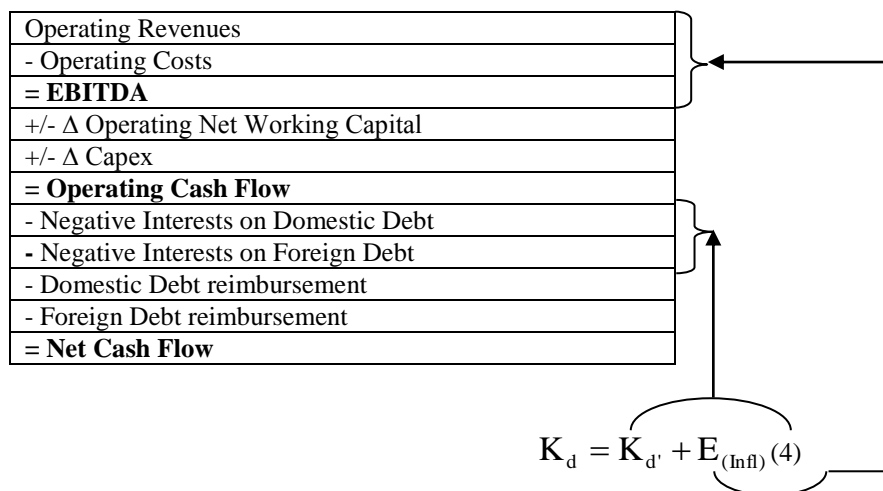
Another component of the cost of debt is represented by the tax shield, connected to the deductibility of interest rates and, more generally, to the impact of inflation on taxable revenues and deductible costs. If interest rates are floating, they

adjust for inflation and increase the deductible tax shield when inflation surges. Even other deductible costs, such as salaries and costs of purchased assets are typically indexed to (their) inflation. On the other side, depreciation of fixed assets is kept fixed and so decreases in real terms, unless the nominal value of assets is reevaluated.

Cost of capital is strongly linked to corporate governance issues, being minimized when the relationships among stakeholders are fair and efficient. Real cost of capital matters.

Considering the profit & loss account and the cash flow statement, it appears evident that the impact of inflation is mainly concentrated on operating revenues and costs, affecting the company’s EBITDA, whereas interest rates directly impact on after EBIT costs (financial charges), so leaving unchanged the (unlevered) operating cash flow. Real interest rates (K_d) and expected inflation $E_{(infl)}$ jointly affect the cost of collected debt. Evidence is shown in Figure 3.

Figure 3. Volatility of accounting items and macro variables



6 Inflation Risk Versus (Optimal) Corporate Governance

The impact of inflation on the asset & liability structure, the profit & loss account and the cost of collected capital, has a subsequent repercussion on delicate corporate governance equilibria and subsequent contracting among the different stakeholders.

A company can be considered as a nexus of contracts both internally, so justifying in a *Coasian* way its very existence, and externally, should agreements with third parties be considered, within a broader framework; both are inflation-sensitive. External nexuses of contracts typically involve synergic stakeholders, linked to the investment company with pass-through contracts or other cooperation agreements; while stakeholders always include shareholders, they typically go beyond this core character, being represented also by debtholders, clients, suppliers, workers, and public authorities, up to the civil society surrounding the company and interested in its well being.

According to Shleifer and Vishny (1997), “corporate governance deals with the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment. How do the suppliers of finance get managers to return some of the profits to them? How do they make sure that managers do not steal the capital they supply or invest it in bad projects? How do suppliers of finance control managers? At first glance, it is not entirely obvious why the suppliers of capital get anything back. After all, they part with their money, and have little to contribute to the enterprise afterward. The professional managers or entrepreneurs who run the firms might as well abscond with the money. Although they sometimes do, usually they do not. (...). In fact, the subject of corporate governance is of enormous practical importance”.

And again “people who sink the capital need to be assured that they get back the return on this capital. The corporate governance mechanisms provide this assurance”. What matters when inflation peaks or is enduring are real – deflated – returns, which accrue to different stakeholders, respecting their purchasing power. If devalued money is paid back, its real value may be substantially reduced, so exacerbating governance problems.

A core issue of corporate governance is concerned with the agency problem (Kostyuk et al., 2007, p. 56), sometimes referred to as separation of ownership from control, within firms that can be interpreted as a *Coasian* nexus of contracts among different resource holders. Agency relationships arise whenever an individual, called principal, delegates other individuals, called agents, to perform some service; the two main relationships are between:

- the principal-stockholders and the agents-managers, which are delegated to invest shareholders’ capital;

- the principal-debtholders and the agents-stockholders, where the former provide funds to the firm, underwriting the debt, and these funds are managed by stockholders and their ultimate agents, represented by managers, following the aforementioned relationship.

Since these relationships are not necessarily harmonious, conflicts of interests may easily arise and so agency theory is primarily concerned with the binding mechanisms and incentives that principals may use with agents to get their money back, possibly with a fair and risk-adjusted gain.

Inflation can distort agency problems, with an asymmetric and somewhat surreptitious transfer of risk among different stakeholders.

According to agency theory, in imperfect labor and capital markets, managers will inevitably seek to maximize their own utility at the expense of shareholders; inflation may well be considered a major source of imperfection. Agents-managers have the ability to operate in their own conflicting self-interest rather than in the best interests of the firm. This happens as a consequence of asymmetric inside information (since they know better than shareholders whether they are capable of meeting the shareholders’ objectives) and physiological uncertainty (since myriad factors contribute to final outcomes, it may so not be evident whether the agent directly caused a given outcome, positive or negative).

Unless properly treated and foreseen, inflation can exacerbate conflicts among stakeholders, surreptitiously acting as a wealth re-distributor, distorting previously agreed rules of the game. Compensating winners and losers may end up to a disrupting disequilibrium, causing a game over scenario. Inflation may so distort and hamper the search for “optimal” corporate governance, where equilibrium and fairness among stakeholders prevails over disorder.

Another typical conflict of interests between managers and investors is concerned with managerial discretionary investment decisions, which may typically reflect the personal interests of the former. According to the free cash flow theory elaborated by Jensen (1986), managers are inclined to reinvest the free cash in the company rather than return it to investors; this over-investment problem, opposed to the under-investment problem where the conflicts of interest are between shareholders and debtholders, is however quite unlikely within the project finance industry, also because investments are notoriously not so discretionary and free cash flow may form only after many years, when high initial leverage reaches a much lower level; also dividends, that cash out free liquidity, are typically foreseen since inception and, to the extent that they can be paid, it is uneasy not to fulfill this commitment towards thirsty shareholders.

Agency problems may undermine the reputation of agents acting on their own self interest and, from the other side, reputation-building, so useful for managers seeking employment, but also for shareholders attempting to collect the debt, is a common explanation for why people respect their commitments even if they cannot (always) be forced to do so (Kreps, 1990).

Outsourcing interest rate and inflation risk, mainly with dynamic hedging strategies based on

derivatives or portfolio insurance techniques, may be expensive or troublesome.

7 Inflation and Corporate Governance Distortions

The impact of inflation on some typical corporate governance “hot” issues is synthesized in table 2.

Table 2. Inflation and corporate governance issues

Corporate governance issue	Description	Impact of inflation	Mitigation strategies
Asset substitution	When leverage increases, managers have a bigger incentive to undertake risky projects, even with negative NPV, transferring risk, but not rewards, to debtholders.	Inflation affects both the cash flows in the numerator and the discount factor in the denominator of the NPV formula; but indexation to inflation is typically asymmetric, especially if increased debt is not floating	Making sensitivity to inflation of the NPV numerator and the denominator similar; building up an asset & liability structure where riskier and typically non cash assets tend to be less inflation sensitive, so requiring a different matching with growing liabilities. Natural inflation-hedging assets, decorrelated with other securities, are represented by commodities or listed real estate, which however may at times experience brutal swings in value.
Under-investment	If the debt is risky, the gain from the project will accrue to debtholders rather than shareholders. So managers have an incentive to reject positive NPV projects, even though they have the potential to increase firm value.	Low risk projects are typically more liquid and so more sensitive to inflation, if compared to riskier and more complex investments	Adoption of incentive and hedging strategies. Detection of inflation sensitivity of both safe and risky investments, forecasting their cash flows.
Free cash flow abuses / managerial discretion	unless free cash flow is given back to investors, management may have an incentive to destroy firm value with discretionary use of cash flows or retaining it for safety purposes even if shareholders are damaged.	If free cash flow is not temporarily invested in assets earning a floating and inflation sensitive interest rate, it devalues in real terms	Park free cash flow in inflation-safe harbors; avoid excessive cash storing, especially if good investment prospects are not at hand or if the debt is excessive
Moral hazard	Irresponsible behavior of an individual / company which makes a biased decision about how much risk to take, knowing that a counterpart bears the costs if things go badly	Inflation may distort the risk / return profile, especially for long term or international investments	Reduce information asymmetries, even with indexed contracts
Adverse selection	it occurs when the lender finds it difficult to discriminate between risky and safer borrowers	Inflation, if not properly detected, may increase information asymmetries and the discrimination between safer and riskier borrowers	Again, reduce info asymmetries, and make proper simulations so as to assess the impact of inflation

Other considerations may concern executive remuneration (with stock option plans and their

sensitivity to inflation), debt covenants and dividend payout policies and proper debt monitoring, or other

classical corporate governance issues, such as relationship governance and the “optimal” contracts between the firm and its strategic suppliers or customers.

8 The Utopia of Complete Contracts

The legal protection system of creditors is represented by a complex nexus of loan contracts, together with monitoring powers - ... and duties - from the debtholders' side. Loan contracts are the legal backbone behind financial and economic bankability and their binding nature intrinsically minimizes managerial discretion.

According to Shleifer and Vishny (1997), “the agency problem in this context refers to the difficulties financiers have in assuring that their funds are not expropriated or wasted on unattractive projects. The trouble is, most future contingencies are hard to describe and foresee, and as a result, complete contracts are technologically infeasible”. And again: “When contracts are incomplete and managers possess more expertise than shareholders, managers typically end up with the residual rights of control, giving them enormous latitude for self interested behavior”.

The utopia of complete contracts, ideally able to cover with their legal provisions all the possible states of the world, has to realistically face an imperfect context, where unforeseen and risky events are always possible and likely to occur. In order to minimize problems and fallacies within necessarily incomplete contracts, two different approaches may be used and confronted, each with its advantages and pitfalls:

- detailed contractual provisions, trying to regulate with analytical provisions any possible situation and state of the world, targeting “complete” contracting goals;
- extensive referral to existing laws and codes, following and relying to general principles, as far as possible.

The dichotomy between long / detailed versus short / generalized contracts is also influenced by the general legal system of the country where investments are located; civil law countries, particularly concentrated in Continental Europe, refer to codified laws easier and more systematic, whereas common law countries, following analogical court cases, are more diffused in Anglo-Saxon countries and typically bring to more detailed contractual provisions, within a less codified general framework.

While the analytical approach, albeit being “philosophically” sound, aiming at perfect contracting, may seem theoretically preferable, its pitfalls should not be underestimated, considering that excessive details may lack a general provision of unforeseen events, whereas a more general framework of reference, albeit seeming less binding, may be more elastically applicable to unpredictable states of the world.

Contracting costs may lead to incomplete contracts and agency conflicts, where the cost of uncertainty, concerning also inflation (Aglietta and Rebérioux, 2005, par. 7.4.), matters. Indexation mechanisms represent the most intuitive way to protect stakeholders against inflation, even if they are not always easy to model and may have negative side effects, for instance if they fuel up inflation, with a spiral effect (prices grow to incorporate inflation, so generating new inflation).

Wage increases may be linked to target inflation (Gospel and Pendleton, 2006), set by the government, typically with a conservative approach. Inflation targeting is a typical central bank monetary policy.

Long versus short term stakeholders are differently biased by inflation, since risky prolonged time to repricing mostly affects the former.

Since inflation devalues not indexed debt, it decreases leverage, expropriating wealth in real terms. The impact of inflation on capital structure – a core corporate governance issue, concerning how companies are financed – has been analyzed by Gulati and Zantout (1997) and Noguera (2001).

Adequate contracting may protect debtholders, unless they have confidence in low inflation expectations.

9 Concluding Remarks

Interest rates and inflation has an impact on economic margins and related cash flows, so modifying the economic and financial relationships among stakeholders, with an often unperceived but nevertheless enduring impact, especially if protracted along time.

Asymmetric sensitivity to interest rates and inflation may exacerbate conflicts of interest and so any rise in the general level of prices affects core corporate governance issues. While the problem is of general interest, little attention has been paid to the relationship between inflation risk and “real” corporate governance, after having discounted this factor. A platform for debate may so be established, together with growing awareness of the importance of the problem, which tends to be underestimated when inflation is low.

The theoretical assumption according to which exchange rates adjust to inflation differentials, so assimilating domestic and foreign funding, is severely challenged by empirical imperfections and deviations from “optimal” international parities, which are in practice very likely and may for instance concern:

- capital rationing, if debt capital, denominated in either domestic or foreign currency is not sufficient or fit for full funding of the project;
- deviations from general price index of peculiar assets, liabilities, revenues and costs;
- asynchronous indexation of (not fully indexed) debt;

• discrepancies between contractual and/or market inflation.

Liability driven indexation mechanisms are the first and most used mean of mitigation against inflation vulnerability - and floating interest rates, albeit difficult to model *ex ante*, may be used instead of fixed rates. Even inflation-indexed debt can consistently reduce the risk that real returns, after adjusting for inflation, may become negative.

An innovative reference to an asset – liability framework, integrated with the profit & loss account and the cash flow statement, such as that proposed in this paper, may help detect the relevant impact of inflation on investments, fostering much desired economic and financial sustainability.

Prompt monitoring and resilient contractual design ease inflation risk detection, management and mitigation, together with proper and flexible financial modelling.

Sustainable corporate governance models should properly consider the changing nature of the relationship of the firm towards its stakeholders, including the impact of external macroeconomic factors, such as inflation or interest rates. This should enable board members to develop inflation-proof professional standards and long lasting strategies, where external distortions – with their expropriating and redistributing effects - are properly considered and hopefully minimized.

Practical implications may be interesting for Chief Risk Officers, constantly refining their risk assessment paradigms, and affect “real” corporate ownership and control matters, sensitive to the surreptitious but potentially disrupting impact of cumulated inflation and volatile interest rates.

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