



Optimal inflation with corporate taxation and financial constraints

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ABSTRACT

How does inflation affect the investment decisions of financially constrained firms in the presence of corporate taxation? Inflation interacts with corporate taxation via the deductibility of i) capital expenditures and ii) interest payments on debt. Through the first channel, inflation increases firms' taxable profits and further distorts their investment decisions. Through the second, expected inflation affects the effective real interest rate and stimulates investment. When debt is collateralized, the second effect dominates. Therefore, present a tax-advantage to debt financing, positive long-run inflation enhances welfare by mitigating or even eliminating the investment distortion.

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1. Introduction

A large body of literature supports the idea that long-run inflation reduces welfare.¹ One channel is through inflation exacerbating the distortionary effects of corporate taxation, thereby providing a further argument in favor of low (if not negative) rates of inflation.² Our paper revisits this statement by showing that, in the presence of collateral constraints, expected inflation actually *raises* equilibrium welfare – the opposite of the common presumption.

Corporate taxation distorts firms' investment and tax deductions are usually introduced to mitigate these distortions, absent more granular tax systems. As deductions are formulated in nominal terms, the rate of inflation can affect the effective tax burden, thus creating a source of monetary non-neutrality. This is notably the case for two common corporate tax deductions: investment expenditures and interest payments on debt.

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¹ See, for instance, Cooley and Hansen (1991), Lucas (2000), Lagos and Wright (2005) and Schmitt-Grohe and Uribe (2010).

² Feldstein (1983) collects a number of studies on the interaction of inflation and existing tax rules in the U.S., Feldstein (1999) gathers cross-country analyses.

When *investment expenditures* are computed at their historical value, as is often the case, inflation reduces the real value of the deduction. This raises the firm's net-of-depreciation taxable profits and consequently increases the distortionary effects of corporate taxes – an often-made argument for low inflation (e.g. Feldstein, 1999).

The deductibility of *interest payments* on debt changes the effective real rate of interest faced by firms and the tightness of their financial conditions, i.e. inflation acts as a subsidy to borrowers. If borrowing is collateralized by the firm's capital, inflation ultimately stimulates capital accumulation and brings the return to capital closer to the first best. This last channel, neglected by previous literature, turns out to dominate. The overall effects of inflation on equilibrium welfare are thus reversed compared to the frictionless model.

These points are made by proceeding in two steps. First, the interaction between corporate taxes and borrowing constraints is analyzed in a simple two-period model. We establish the optimality of positive inflation in the presence of interest rate deductions only, and its impact on corporate tax revenues. Second, the quantitative relevance of the central mechanism of this paper is assessed using a calibrated dynamic version of the model featuring corporate taxes and a collateral constraint à la Kiyotaki and Moore (1997). The stylized tax code presented in the model captures the two main tax/inflation distortions mentioned above and highlighted by Feldstein and Summers (1978): i) corporate taxes with deductibility of interest payments on debt and ii) deductibility of investment expenditures at historical values. Last, optimal inflation is computed in an extended version of the model that includes costly price rigidities.

The main quantitative results of the paper can be summarized as follows. In a world with perfectly competitive markets and flexible prices, for a given tax structure, a positive and relatively large long-run inflation rate (5.67%) is optimal. The Friedman rule (i.e., deflation at the real rate of interest) is optimal only in the limit case of full deductibility of investment. Introducing price stickiness and monopolistic competition does not completely offset our results. If price adjustments are costly also in the long run, the optimal inflation rate is reduced but remains positive (2.7%). Furthermore, the optimal long-run inflation is an increasing function of the degree of monopolistic distortion. This contrasts with the standard New-Keynesian literature, which finds that the optimal long-run inflation in the presence of sticky prices is zero, independently of the degree of monopolistic competition (see King and Wolman, 1999; Woodford, 2003).

It is important to note that the tax system is taken as exogenous. An opportunely chosen set of taxes could bring about the first best with zero inflation as in Fischer (1999, p.42). Nevertheless, the ideal configuration differs from the *observed* constellation of taxes – for reasons that are beyond the scope of this analysis.³ Our paper should thus be taken as invalidating, under the current system of corporate taxation, conventional wisdom on the detrimental effects of inflation.

The paper is organized as follows. Section 2 illustrates the interaction between corporate taxes, inflation and firms' investment decisions in a simple two-period model. Section 3 describes the general equilibrium dynamic model. Section 4 assesses the quantitative relevance of our mechanism. Section 5 introduces price rigidity and monopolistic competition. Section 6 discusses our financial frictions assumption. Section 7 examines the robustness of preceding results to different fiscal policy assumptions. Section 8 concludes. Most proofs and model details are gathered in the online appendix.

1.1. Related literature

A consistent finding in the literature is that the optimal rate of long-run inflation should range between the Friedman Rule and numbers close to zero. Schmitt-Grohe and Uribe (2010) survey the literature on the optimal rate of inflation and show that positive inflation could be justified only in the absence of a uniform taxation of income (e.g. when untaxable pure profits are present). However, these authors conclude that for reasonably calibrated parameter values, tax incompleteness could not explain the magnitude of observed inflation targets. In this paper we show that, under plausible conditions, the interplay between borrowing constraints and distortionary taxes justifies a positive long-run target inflation. Importantly, the mechanism at play is not only theoretically plausible, but also quantitative relevant.

Venkateswaran and Wright (2014) also find that inflation is welfare improving in the presence of distortionary taxes and collateral constraints, but their mechanism differs from ours in many respects. In both models, distortionary taxation generates under-accumulation of assets. In Venkateswaran and Wright (2014), positive inflation is beneficial because it induces *households* to shift from real balances to the real asset, i.e. capital (Mundell–Tobin effect). In our model, inflation spurs capital accumulation by easing *firms'* financing conditions via its effect on the interest tax shield.

2. Inflation, financial frictions and corporate taxes: inspecting the mechanism

Consider a firm that maximizes, over two periods, the present value V of current and future dividends discounted at the net real interest rate ρ . The firm produces output Y with capital k and labor l with a constant-returns-to-scale, increasing and concave production function. It may choose to issue b nominal bonds promising to pay a net nominal rate of interest r . The gross inflation rate is π , so that $1 + r = (1 + \rho)\pi$. For simplicity, there is no capital depreciation.

³ For about 100 years, interest payments on debt has been fully deductible in the U.S. In the aftermath of the recent financial turmoil, it has become a hotly debated topic in the fiscal-reform debate together with other policies aiming at discouraging the use of debt to finance business activities. For example, the Wyden–Coats Tax Fairness and Simplification Act proposes to limit interest deductions to their non-inflationary component.

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