Deflation, Sticky Leverage and Asset Prices
by
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Discussion

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Summary

▶ Study impact of deflation risk on equity and debt values in the dynamic capital structure model of Bhamra, Kuehn, Strebulaev (2010) extended to allow for stochastic inflation.

▶ Pricing kernel obtained from representative EZ agent economy with exogenous aggregate consumption specified as GBM with drift and volatility following a 2 state Markov Chain:

→ (Exogenous) pricing kernel with state-dependent risk-premium and priced jump risk

▶ Closed-form equity and debt of firms with EBIT dynamics driven only by idiosyncratic diffusion risk, with drift and diffusion changing across macro-economic states.

▶ Debt is perpetual with constant nominal coupon chosen at time 0.

▶ Price level is locally deterministic with a growth rate following a 2 state MC independent from aggregate consumption.

▶ Firms choose (4) optimal state-dependent EBIT default thresholds and (1) optimal time-0 coupon level by trading off tax benefits of debt with bankruptcy costs.

Results

- ▶ Deflation raises the real value of the promised nominal debt coupons, which increases real leverage and the firm's optimal default threshold, both of which reduce share-holder wealth and increase equity volatility.

- ▶ The effect is asymmetric: Deflation reduces share-holder wealth more than inflation increases it, because default probability is convex in distance to default.

- ⇒ The levered equity premium is higher in deflation periods than in inflation periods.

- ⇒ Estimate that for all NYSE listed companies ($19 trillion) sticky leverage has a negative impact on equity values of $145 billion!

- ▶ Impact of Deflation risk on equity premium and volatility is higher for more leveraged firms.

- ▶ Deflation raises corporate debt values as the effect of lower nominal risk-free rates seems to dominate (in their calibration) the higher default probability.

- ▶ Find empirical evidence consistent with their model predictions:
  - ▶ Moody's empirical PD are higher during deflation periods than inflation periods.
  - ▶ The spread in average returns between high and low beta stocks is (marginally) higher in deflation periods than in inflation periods.

Comments about the Theory

▶ The theory assumes zero correlation between shocks to real activity and shocks to inflation (and an exogenous pricing kernel).

⇒ Is deflation a symptom or a cause (or an amplifier) of increased default risk?

⇒ One would expect real activity, leverage, defaults, and deflation to be highly intertwined (Fisher (1933)).

▶ All individual firms diffusion shocks are idiosyncratic:
   ⇒ Entire individual firm's risk-premium is due to regime-switching jump risk-premium.
   ⇒ Difficult to think of (general equilibrium) link to aggregate consumption.

▶ Optimal coupon choice fixed as of date 0 prevents firms from adjusting their capital structure depending on the state.

⇒ Is the money left on the table really $145 billion?

▶ More generally, many ways for firms to mitigate their exposure to inflation risk: short vs. long-term debt, floating rate debt, inflation-indexed debt, inflation swaps...

Comments about the Theory

- ▶ Conundrum: Markets are rationally pricing the firms with large nominal rigidities (so that the model correctly gives the amount that is 'left on the table'), yet at the same time managers are irrationnally not choosing the optimal debt/hedge mix to mitigate the sticky leverage cost (and markets are not exploiting the 'arbitrage opportunity').

- ▶ If truly firms are highly exposed to deflation risk, because they primarily issue long-term fixed rate debt, and market is not arbitraging this away, then perhaps

  - ▶ Markets suffer from 'money illusion' (Modigliani-Cohn (1979)).

  - ▶ Nominal fixed-rate debt may solve some other function (agency, moral hazard. . .).

⇒ Need to understand the firms' choice of inflation exposure and of debt structure (long vs. short maturity, fixed vs. floating, dynamic leverage adjustments. . .) to better estimate the cost of deflation.

Comments about the Empirics

▶ Difficulty in testing the causal effects deflation has on (increasing) Probability of Defaults is adequately controlling for fundamentals.

▶ When regressing monthly default rates on inflation and controls, inflation drives out YoY Industrial Production.

⇒ Is inflation a better measure of real-activity than YoY Industrial Production?

▶ How dependent are results on either great depression or great recession episodes (can you obtain same results without these two episodes)?

Comments about the Empirics

- ▶ Evidence that spread in expected returns on stocks sorted on market beta is higher in inflation versus deflation states is interesting evidence, but can you conclude:
    - ▶ that you 'identify a new source of risk that is priced in the cross-section of individual stock returns'?
    - ▶ this is an 'inflation risk-premium' or that 'deflation risk induces and additional risk premium'?

- ▶ Extensive evidence that market beta alone fails to capture risk appropriately (e.g., Fama-French-Carhart) and that conditional CAPM is typically rejected (Nagel, Lewellen, Shanken (2006)).

- ▶ Instead the evidence seems possibly consistent with
    - ▶ the market risk-premium is higher in deflation than in inflation states, and/or
    - ▶ the cross-sectional variation in betas is higher in deflation than in inflation states

- ▶ In particular, the evidence is equally supportive of model where real-activity risk-premia are time-varying and higher in recession states.

- ⇒ Need to develop more specific tests of the model.

Concluding comments

▶ Even though Fisher (1933) is widely cited, there seem to be few equilibrium models formalizing the relation between (sticky) leverage, deflation, default risk, and economic activity.

▶ This seems like a good research question and this paper makes a nice contribution by offering a simple framework where all relevant quantities are solved in closed-form.

▶ Would be nice to extend the model to allow for true (equilibrium) interplay between real activity, leverage and deflation.

▶ Probably requires endogenizing aggregate consumption and the pricing kernel, e.g., through explicit production and investment decisions, and feedback of leverage and default on such quantities. (Gomes, Jerman, Schmid (2016)).

▶ Also would be nice to address the *conundrum*: Why do firms retain so much nominal fixed-rate debt exposure in the first-place (if such is, in fact, the evidence), if it is really so costly?