

The Tortoise and the Snail: Reconciling the Evidence on Capital Structure Stability

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Outline

- 1 Summary
- 2 Execution
- 3 History
- 4 This paper
- 5 Targets
- 6 Conclusion

Why is leverage unstable, while adjusting slowly?

- ▶ Write down and estimate a model.
- ▶ Formalize a notion of a “leverage target” in the model.
- ▶ Construct an analogous target in the data.
- ▶ Understand the coexistence of
 - ▶ Leverage instability (DeAngelo and Roll 2015)
 - ▶ Slow leverage adjustment (hundreds of papers)

There are three main results.

- ▶ Targets are more volatile than leverage.
- ▶ Leverage is unstable because targets are unstable.
- ▶ Standard speed-of-adjustment regressions are using the wrong target and give erroneous results.

I want to talk about four things.

- ▶ Execution
- ▶ Historical perspective
- ▶ How does the model work?
- ▶ Alternative definitions of “targets.”

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The execution is impeccable. Thanks!

Easy to replicate!

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Good old static tradeoff theory has no target convergence

- ▶ Optimal leverage trades off tax benefits and distress costs.
- ▶ But static tradeoff theory is **STATIC**.
- ▶ There is no notion of convergence because there is no way for firms to be away from a target.

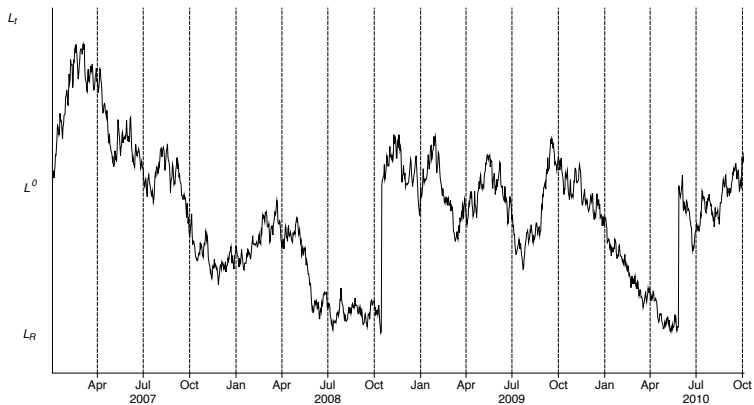
Good old pecking order “theory” has no target

- ▶ By definition.

Contingent claims models have targets

- ▶ Fischer, Heinkel, and Zechner (1989); Leland (1994); Goldstein, Ju, and Leland (2001).
- ▶ Firms take in exogenous, taxable cash flows over time.
- ▶ They shield the cash flows from taxes with debt.
- ▶ They can incur deadweight default costs.
- ▶ Debt issuance costs induce
 - 1 Lots of inaction
 - 2 Actual well-defined targets

Market leverage time path in a contingent claims model



This paper uses a model with dynamic investment decisions and **leverage**.

- ▶ Whited (1992); Hennessy and Whited (2005); DeAngelo, DeAngelo, and Whited (2011)
- ▶ From the Hennessy-Whited abstract:
We develop a dynamic trade-off model with endogenous choice of leverage, distributions, and real investment [...] **We show there is no target leverage ratio ...**
- ▶ There is just a state contingent optimum that can change period by period.
- ▶ So to use this type of model to study targets, you have to add an arbitrary definition of a target.

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This class of models is simple

- ▶ Firms maximize value over time to shareholders.
- ▶ Use capital to make stuff with a stochastic technology.
- ▶ Use debt and equity and internal funds to finance capital.
- ▶ Debt is tax advantaged.
- ▶ There is a collateral constraint.
- ▶ Equity issuance is costly.
- ▶ **NO** debt issuance costs

The model solution is a decision rule.

- ▶ If I have a certain
 - ▶ shock
 - ▶ level of capital
 - ▶ amount of debt

- ▶ What are my optimal choices for debt and capital next period?

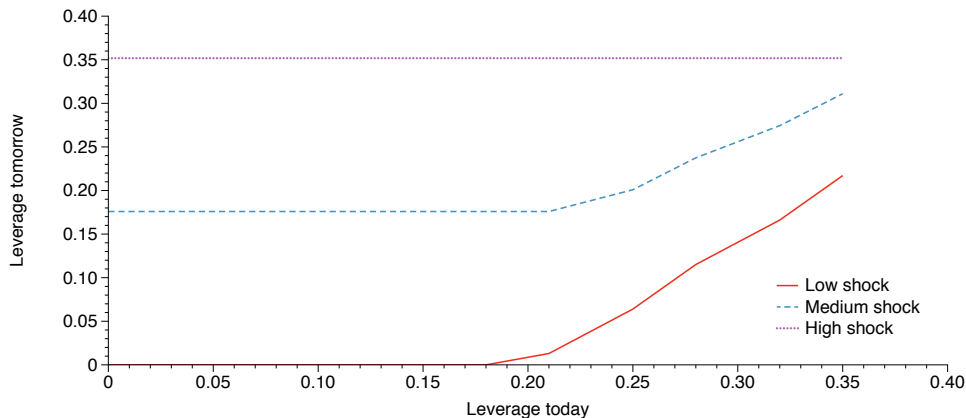
- ▶ This decision rule is the policy function.

The target is based on the decision rule.

- ▶ If I have
 - ▶ A certain shock
 - ▶ A certain level of capital

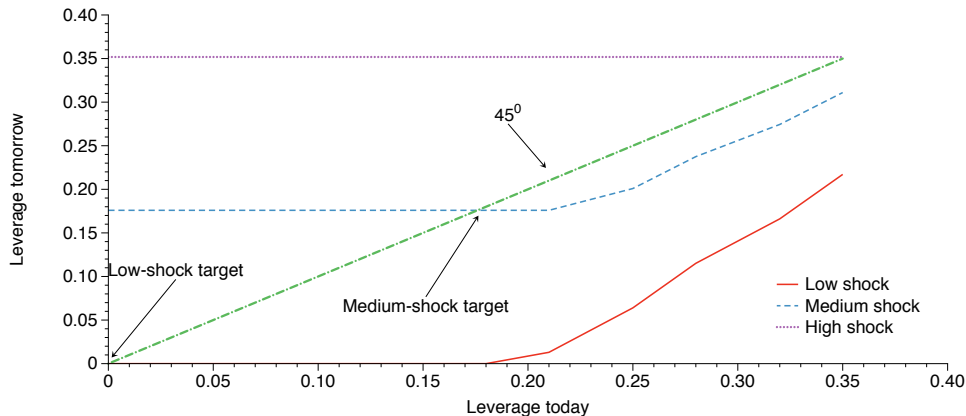
- ▶ What level of debt makes me want the same debt next period?

Policy function for fixed capital



Leverage depends on the state — not the target.

Policy function for fixed capital



Target and optimum are the same if the policy function is flat.

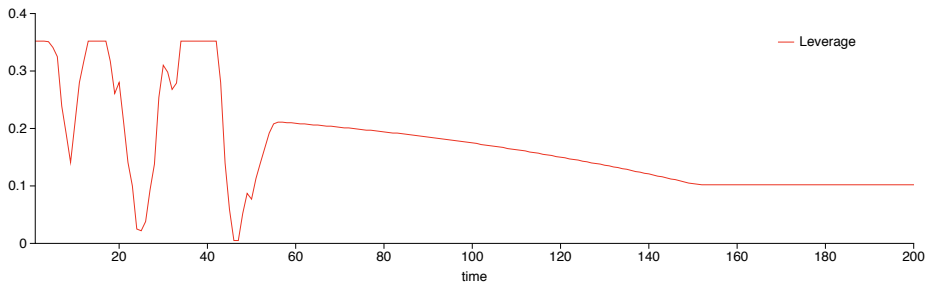
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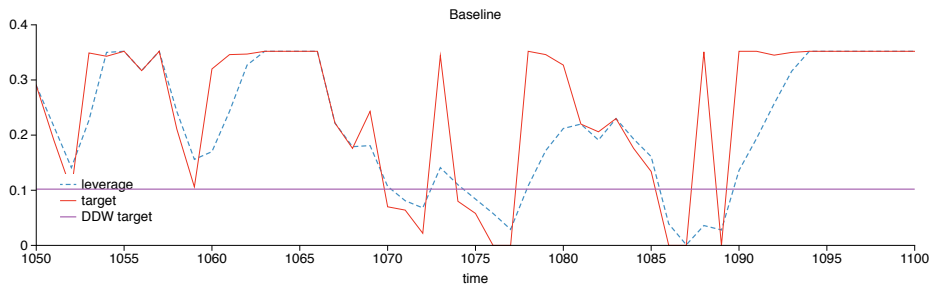
Alternative definition of a target

- ▶ DeAngelo et al. (2011)
 - ▶ If the firm makes its optimal decision rule in the face of uncertainty
 - ▶ And counterfactually receives a long series of neutral shocks
 - ▶ At what level of leverage would it settle?
 - ▶ Roughly, the model steady-state

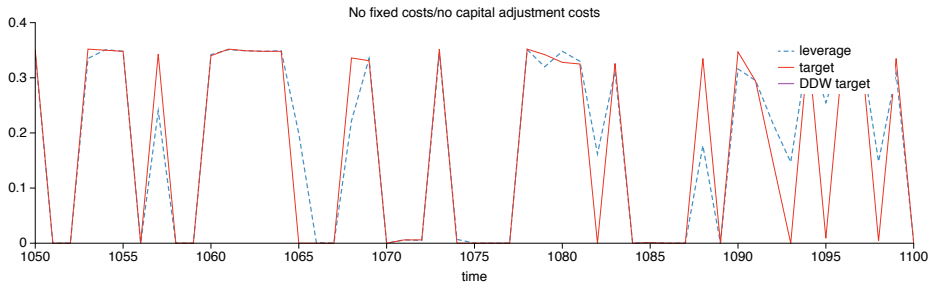
The DDW target looks like this.



Compare the ISS and DDW targets

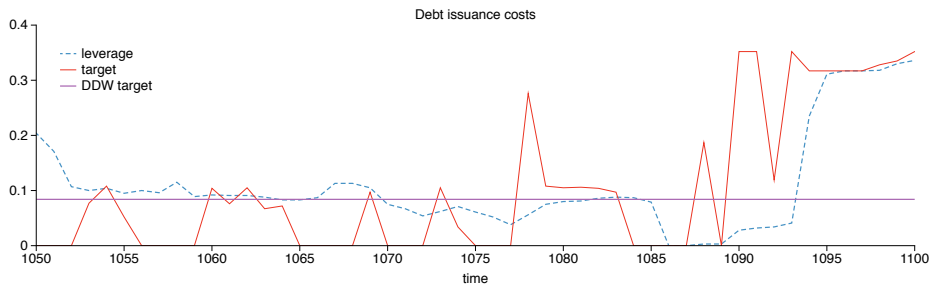


Why are there gaps? FRICTIONS!



But not financial frictions. Fixed operating costs and capital adjustment costs.

If you add debt issuance costs, the gaps are very large



The target almost becomes irrelevant.

Questions about the target.

- ▶ Does it make common sense?
- ▶ Is a **target** something that lasts for at most a few periods?
- ▶ Remember that for this class of models, all definitions are arbitrary.
- ▶ I will offer up an alternative in a bit.

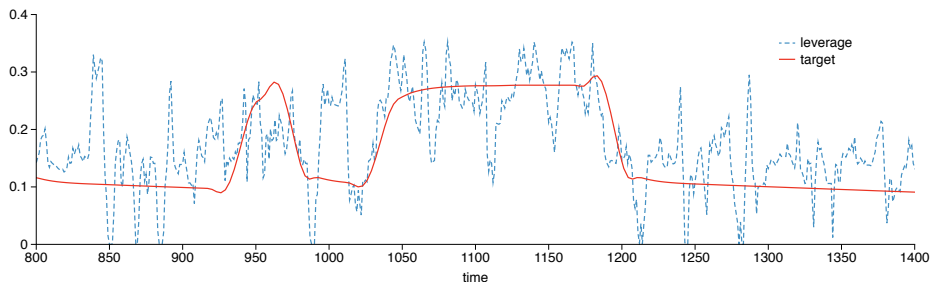
The authors are going to cite the macro literature.

- ▶ Do employment gaps predict employment adjustment (Caballero and Engel 1993, 2004)?
- ▶ But the gap is measured incorrectly (Cooper and Willis 2004).
- ▶ The Caballero-Engel gap is directly analogous to the gap in between leverage and target in a Leland model.
- ▶ The Cooper-Willis gap is what the current authors use.
- ▶ The first is defined within the model. The second is an add-on.

It is not clear that a constant target is ideal either

- ▶ The broad idea of a state-contingent target has merit.
- ▶ The idea of implementing a target with empirical policy functions has a lot of merit.
- ▶ What about a slow-moving business-cycle contingent target.
- ▶ I coded up a simple two-state boom-bust cycle.

Deviations from target are not large relative to the slow-moving target



Implementable with empirical policy functions.

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Revisits the conundrum between instability and slow adjustment

- ▶ What the authors do:
 - ▶ Use the notion of a one-period state-contingent target.
 - ▶ The target is more volatile than leverage — sometimes much more.
- ▶ My thoughts
 - ▶ **Any** notion of a target is an arbitrary add-on in this class of models.
 - ▶ Leverage moves because of the policy rule, not the target.
 - ▶ Perhaps a slow-moving, state-contingent target would be a good alternative.

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