FINANCE FOR THE NET ZERO ECONOMY

JRC / EC SUMMER SCHOOL ON SUSTAINABLE FINANCE, JULY 2023

Adair Morse
University of California, Berkeley

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[my] Climate Agenda in 2023
coming out of 2 years of service at U.S. Department of the Treasury

Policy Work

- In Treasury: Standing up financing programs, coordinating domestic climate finance,
- Industrial strategy leadership groups @ White House
- Opportunity language:
  - Transition Economy & Democratization of Opportunity
  - A lot of focus rests on risk and regulation. I try to fill a void, telling stories of investment and carrots.
- Mobilizing implementation structures for investment in the Transition Economy & Net Zero Commitment realization
  - Policy drafting
  - Building of capital stacks and other solutions for Washington-private sector mobilization

Academy

- New research (today) on Net Zero & Banks
- Trying to shape new agendas in climate research in finance.. Governance, EVs, cryptomining, PE, etc.

SAIF center @ Berkeley

Goals:

- Curriculum matters.
- Research matters.
  - Policy makers: Supporting more inducements for academic work not just on financial returns matters.
- Academic platform as trusted partner to supporting government matters

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Outline of my talk

A. Research Progress
   - Focus on climate investment additionality as a north star
   - ….and along the way digression on need for a new language

B. New Research on Banks & Net Zero:
   - Motivation: Transition Economy, Economic Revolution & what these means for finance research in Climate Solutions
   - Off the press: `clipart' version of new research

C. Business School Climate Education (1 slide)
   - Working with other academic leaders and UN-PRME on integration of climate transition leadership into business school education

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Section A:
Research Progress

1) ESG Climate <> Financial Returns
2) Regulatory Policy Assessment
3) Toward Direct Financing of Climate Solutions
4) Capital Stacks as an Asset Class
5) Fiduciary Duty and Lack of Portfolio Exposure to Green

Disclaimer to researchers: Incomplete, apologies for omissions. I would welcome emails to learn of findings.

Progress in Research in Climate Finance: 1) ESG Climate Finance

Financial returns <-> `ESG' Climate topics

- `ESG' returns is the topic of much of the research progress in sustainable finance
- `ESG' is loosely equated as *mainstream climate finance research*. Some issues here.
- Yet, many areas of recent progress
  - Emissions alignment & financial returns
    - eg, Kacperczyk/ Bolton 2021 & others
  - [Taxonomy]/Green investment alignment and financial returns
    - Bassen et al 2022; Hoepner et al 2022; Marinelli 2023, many others
- More on these topics need +….

More progress still needed within this financial return framing on:

- Financial impact of flows / client specific risk positioning,
- Sustainability sector strategies of firms & finance/risk,
- Corporate governance (& finance) around sustainability,
- Role of agency intermediaries vs disclosure,
- Governance within agency relationships,
- Credit risk,
- Insurance,
- Labor force,
- Climate finance across asset classes,
- Etc.

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Digression 1: Some Language Comments

Where is the `word' ESG headed?

- Politics
- Topic of overlay with climate
- ESG & additionality:
  - Does ESG, as used in financial markets, imply any climate mitigation or adoption additionality?
  - If not, is that bad? For sure not.
  - But we <u>also</u> need additionality investment for climate solutions

- Double materiality language
  - Materiality has a very specific implication in US law because of a Supreme Court ruling that is the whole foundation for corporate disclosure
  - Please put asterisks / disclaimers on the use of any use of the word "materiality" that is not defined to be `price relevance', or better yet, pivot to some other word that means the same thing
- Double relevance/ double impact:
  - Are the points of measurement the solution to the disconnection in intention and practice between ESG and climate additionality in investment mobilization? Maybe. We don't know.

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Progress in Research: 2) Regulatory Policy Assessment

Disclaimer:

- I am surely not up to speed on all of the regulatory reaction research

Take this slide as

- it is important, and
- to the observer who is not paying enough attention, here is where some gaps are.

Policy Research on Financial Regulation for Climate Impact:

Is it keeping up to inform policymakers? Topics:

1) What is working in regulation?
2) Financing-regulatory paths (micro, not macro scenarios)
   - What is most efficient politics-constrained financing-regulatory path?
3) Regulation and Investment in real economy
4) Costs
   - How costly (if so) are regulatory approaches?
   - How do we distribute the costs?
5) Risks
   - What are risk trajectories, reaction functions by micro-deciders, and standard deviations? (Stdev matter: how much precision is worth limited recourses?)
   - How do we distribute risk in the economy?

Green: Research is moving ahead.

Red: Not really moving enough yet, with disclaimer on the left

Progress in Research: 3) Toward Direct Financing of Climate Solutions

Where we have seen great progress in last year or so, but need a lot more, …. Research on that starts with the premise of financing the green projects

- **Allocation of bank credit**
  - Kacperczyk Peydro/Bolton, 2022a,b,; Giannetti, Jasova, et al, 2021; Accetturo, Barboni, et al 2022; Ongena
- **Emission reductions as related to investment activity, ratings, voluntary commitments, etc.**
  - Levine et al., 2018; Goetz, 2019; Kim-Xu, 2021, ElBannen-Loffler 2023; Bolton, Kacperczyk et al, 2023; others.
- **Innovation investment**
  - Green firm- green innovation disconnect: Cohen et al. 2022; Unsal-Yildrim, 2021, Li, Neupane-Joshi, and Tan, 2022
  - Green specialization: Bolton, Kacperczyk et al, 2023; Park 2022; Hege, Pouget, et al, 2023
  - See slides by Giannetti at Stockholm-Berkeley conference on Harnessing Finance for Climate

  https://www.hhs.se/en/houseoffinance/outreach/conferences/container/harnessing-finance-for-climate/presentations/

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Progress in Research: 4) Capital Stacks as an Asset Class
Still missing

- Finance is an input into real economy production
- We study equity or debt contracts/features, and how they lead to real economy outcomes.
- Financial structuring and capital stacking are practitioner's terms, not ones of the academy.
  - That is a mistake on the academy's part.
- Need research that uncovers and mainstreams features in SPVs and capital stacks
  - **Missing finance input to mobilize climate solutions.**
  - **U.S. climate policy**

- Packaging: some examples of feature-based solutions
  - Advance manufacturing coordination
  - Large plant production: timing mismatch
  - Demand Insurance product needs
  - Why windmills but not replacement parts?
    - Answer : Often SME and mundane sectors (and mundane economics) in attracting capital

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Progress in Research: 5) Fiduciary duty and lack of exposure to green

- Laura Starks and coauthors have a good start here,
- But it is urgent that we do not wait for the credit-side financial regulators to decide what is climate risk (as if the credit providers do not know) in order for us to model the risk to asset holding portfolios from not investing in the new economy

- Especially relevant for long horizon capital intermediaries: Insurance Asset Side, Pensions, etc
- Need to step up understanding of holdings
  - Starting point: prior economic revolutions
  - Adair's theory: Fiduciary compatible is not on infrastructure low-risk side, but `high beta' /equity side.

Section B:
New research project and pitching Thought Leadership language.

"NET ZERO COMMITMENTS AND BANK FINANCE FOR THE DECARBONIZING ECONOMY"

Slides : current research © Adair Morse, UC Berkeley

Presenting : `clipart version' with background motivation from the research summary

Please contact me if you have creative ways to test this theory

Framing: Revisit 3) Toward Direct Financing of Climate Solutions

Direct financing of climate change mitigating or adaptation projects. Finance researchers …

- Study banks' reacting to own greening or clients greening in terms of client lending (Marcin, others, prior slides)
- Study banks' reacting in lending to property risk (eg de Marco & Limodio 2022; my colleague Nancy Wallace)
- Study green bond markets: Priced about the same, but maybe green bonds facilitate new capital (ElBannen & references) and/or signal of manager quality as evidence in equities return (Tang)
- Study VC investors interest in green projects (Univ Oklahoma)

Others here, but my point is this:

- The framing starts with the story of a financier and a firm with a greening possibility or a realization of brown exposure
- Is this the framing of how finance contributes to the Transition?
  - We are working within a status quo realm

To explain what is status quo and why it is constraining…
Digression 2: The Transition Economy (U.S. terminology)

What is the Transition Economy?

Economic opportunities created by transitions in energy sectors auto sector, supply chain, etc.

i.e., Paths to the Net Zero Economy + a bunch of other concurrent transitions because of national security, lessons from the pandemic, etc.

Why do I like to talk in this language?

The Transition Economy language is:

- Political party neutral
- … & consistent with many governments' toolkits
- Language of opportunity
- Empowers the idea of democratization of opportunity.

Why does the Transition Economy matter?

- Moves fiduciary duty perception to mainstreaming
- Compels the need for a Transition Asset Class (IMF)
- Draws attention to `mundane' needs geographically everywhere across the economy and their needs for financial solutions
- Matters because we are in an Economic Revolution, but we are speaking at each other in silos

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Motivation: Economic Revolution

Economic Revolution: Why grandiose term?

- Whole systems of production (and accompanying infrastructure) shift in supply chains, logistics, and localization
- Yet we are (mostly) thinking in status quo.
- In particular, we model and measure firms primarily in their status quo roles,
  - with no firm-level reaction functions when we model policy for macro effects
  - with no little sense of firm sector transitions for financial input role.
- We also tend to deploy capital and regulate in status quo

My views: Today's Economic Revolution is different.

- Recent History of economic revolutions
  - Technology/computing, robber barrons (railroad and transport mechanization), industrial revolution
    - Result: concentrated the wealth
  - Plague in 14th century:
    - Made labor and supply chains in short supplies
    - Needed upskilling locally
    - Result: decreased wealth inequality
- Transition Economy revolution is similar to post-plague.
  - Democratization of wealth-building opportunities: geographically and across demographics of owners of scarce resources, local supply chains, and human capital.
- Incredibly important: Populist to different politics

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Come back to the question of financiers and the Transition Economy

Green or brown firm investing/innovation in the new economy. Evidence:

- Bolton, Kacperczyk and Wiedemann (from their slides on the Stockholm/SHOF-Berkeley conference):
  - Companies that do green (brown) innovation tend to be green (brown) companies. Why?
  - Path-dependency (Aghion et al., 2016) and Arrow replacement effect (monopolist has less incentive to innovate than a competitive firm, due to monopolist's financial interest in status quo). `Killer Acquisitions' biotech paper.
  - Point: Companies do not switch their innovation profile even if they change their carbon profile

- But Cohen, Gurun, Nguyen, 2022; Hartzmark and Shue, 2023 : (See Mariassunta's discussion slides at conference)
  - More funding to brown firms is desirable because it favors the adoption of capital-intensive greener technologies

- Conflicting, but likely both at work, supporting a Bolton et al punchline:
  - "Implications: We need a green industrial policy to overcome ecosystem replacement effects"

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Come back to the question of financiers and the Transition Economy

- ….. Continued

Bolton, et al Implications: "We need a green industrial policy to overcome ecosystem replacement effects"

- Sitting in Washington: Brown companies may be necessary in interim.
  - Why, given that Bolton et al's result: brown stay brown
  1. Cohen et al: but brown have capacity to do more green implementation
  2. (huge) Brown have the engineers, supply chain, and infrastructure
  3. Brown have the ability to interact with IRA/BIL/CHIPs career staff, who are another scarce input
  4. This might be easiest way to induce **phaseout**. Scaling back of brown production being contingent on substitution of revenues from green division? Taxpayer efficient placement of funding

Yet…

- Brown companies need Bolton et al's "Green Industrial Strategy"
  - Government to align governance
  - (comes with access to funding programs)
- And brown companies need motivation
  - My research

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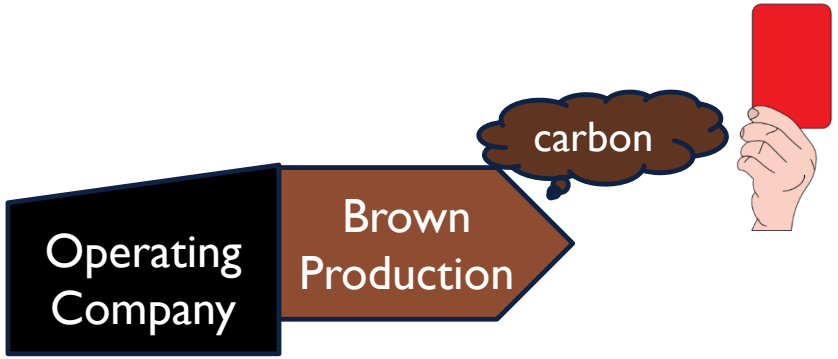
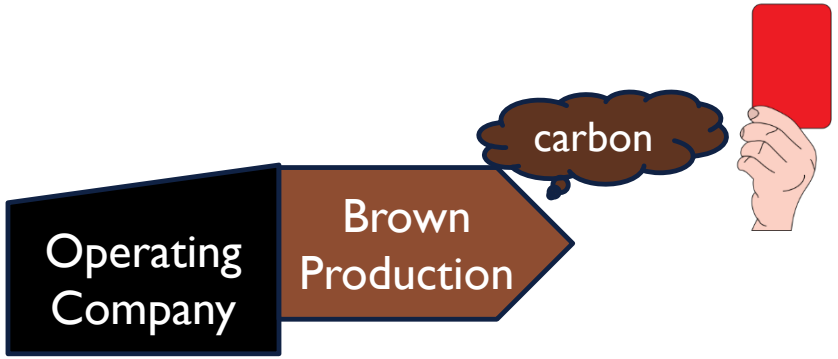
A Story Often Told:



- Imagine an operating company that produces a product with a carbon-emitting technique.
- The operating company faces a penalty function (could be market pressure or otherwise) on the production of carbon.

A Story Often Told:

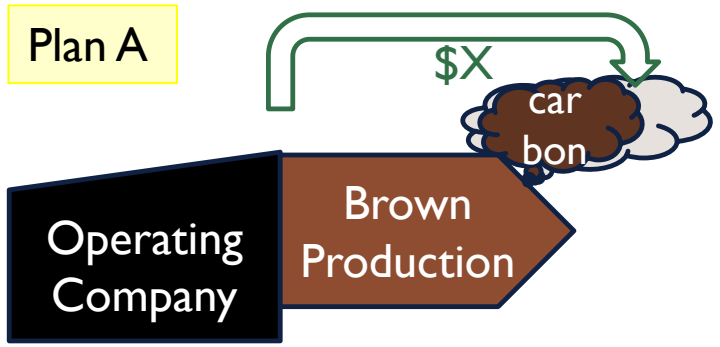


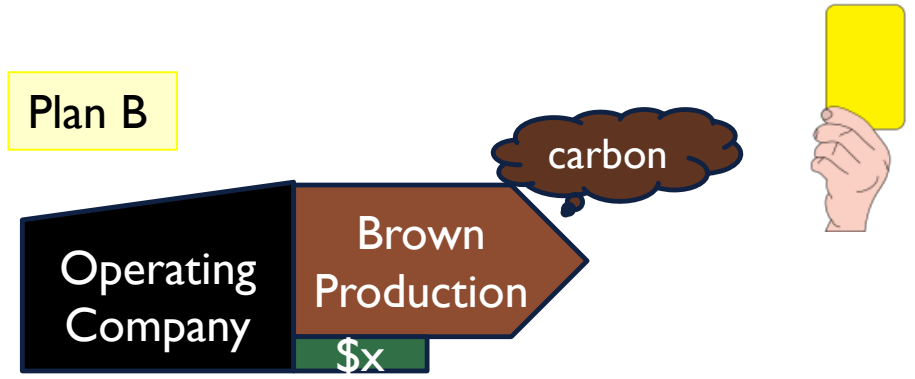
The company can

A. spend $X to reduce carbon through process improvement, or
B. invest $X in a green new division that is along a net zero sector pathway; yet showing no quick improvement in existing production.

Because the company has little in the way of immediate decarbonization results for plan B, the company prefers plan A.

I don't want to ignore positive attributes of Plan A, but I want to focus on why Plan B is not ***also*** happening in many cases.





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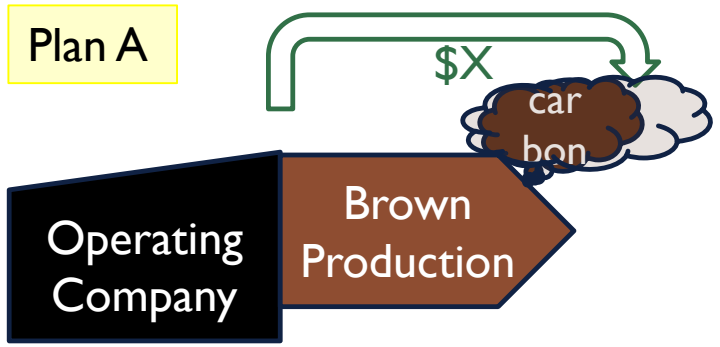
What's wrong with the story?

1) Is the firm really constrained to spend only $X? If so, why?

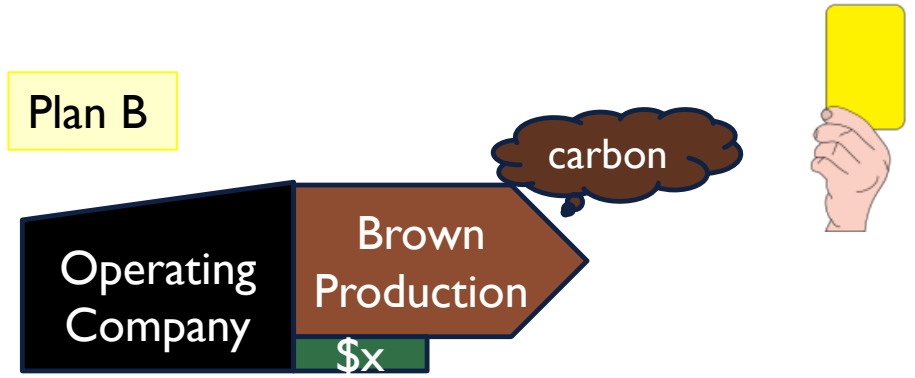
- Answers often heard:
  - Short term shareholder value maximization.
  - Shortermism in management skin-in-the-game over profitability
  - Other answers
    - Leverage ratios, capital structure, importance of dividends as signals, etc.
    - Changing the risk profile and sector exposures erodes a dominant positioning in the incumbent industry

Let's bundle these all and say that the shareholders constrain the operating company to spend only $X.



2) Is there really a yellow flag penalizing the choice of Plan B?
Or is there another problem constraining Plan B?

- Debatable. I personally think both. Let's ignore the penalty and focus on other constraints.
- Let's think about $x



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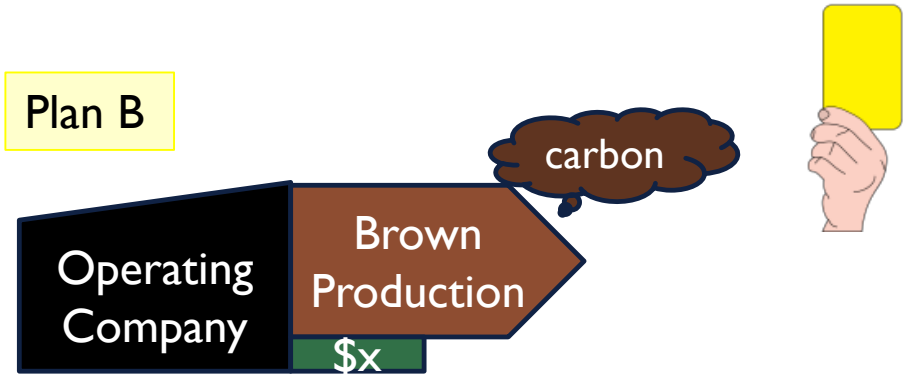
What is $x ? Let's call it GREEN DIVISION INCUBATION INVESTMENT

What are the problems with Green Division Incubating beyond the tension with Plan A?

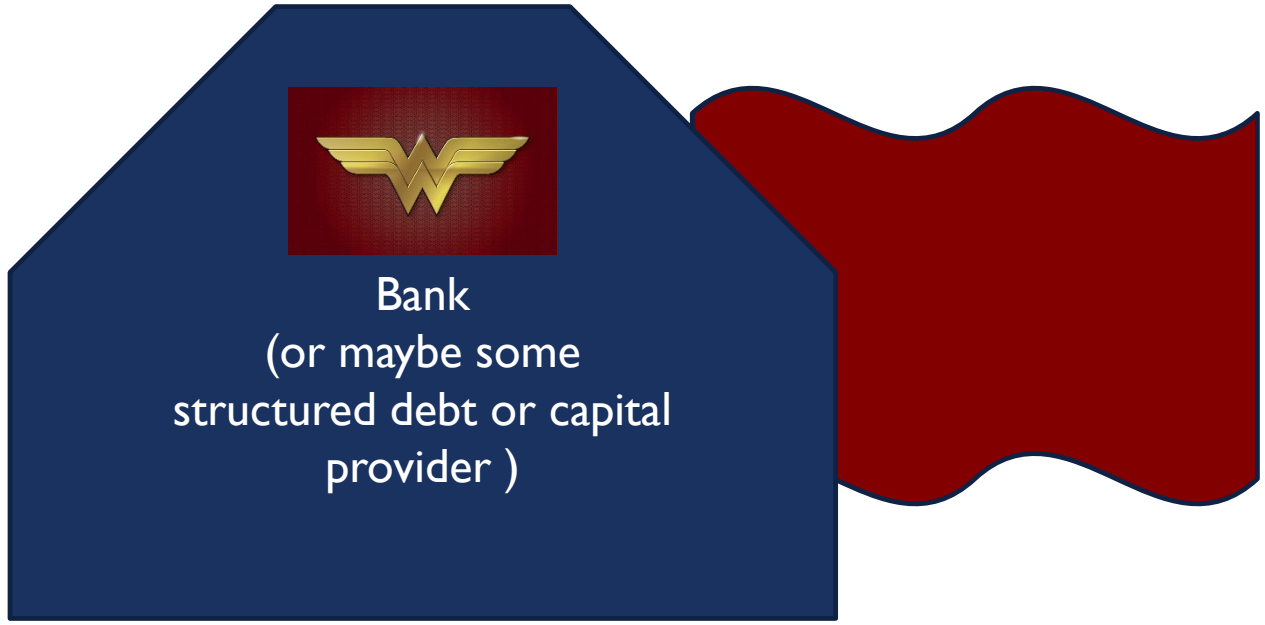
- Shareholders want incubation done outside of firm.
  - Green Division is not core sector, and risk is not well understood (or maybe just appreciated) vis-à-vis sector role played by incumbent.
  - Known.

- $X may not be enough capital for the incubation.
  - Not discussed



Enter our hero

- Why is the bank a hero?
  - Banks (and other providers of structured capital) have strong motives to place **large** checks in green economy

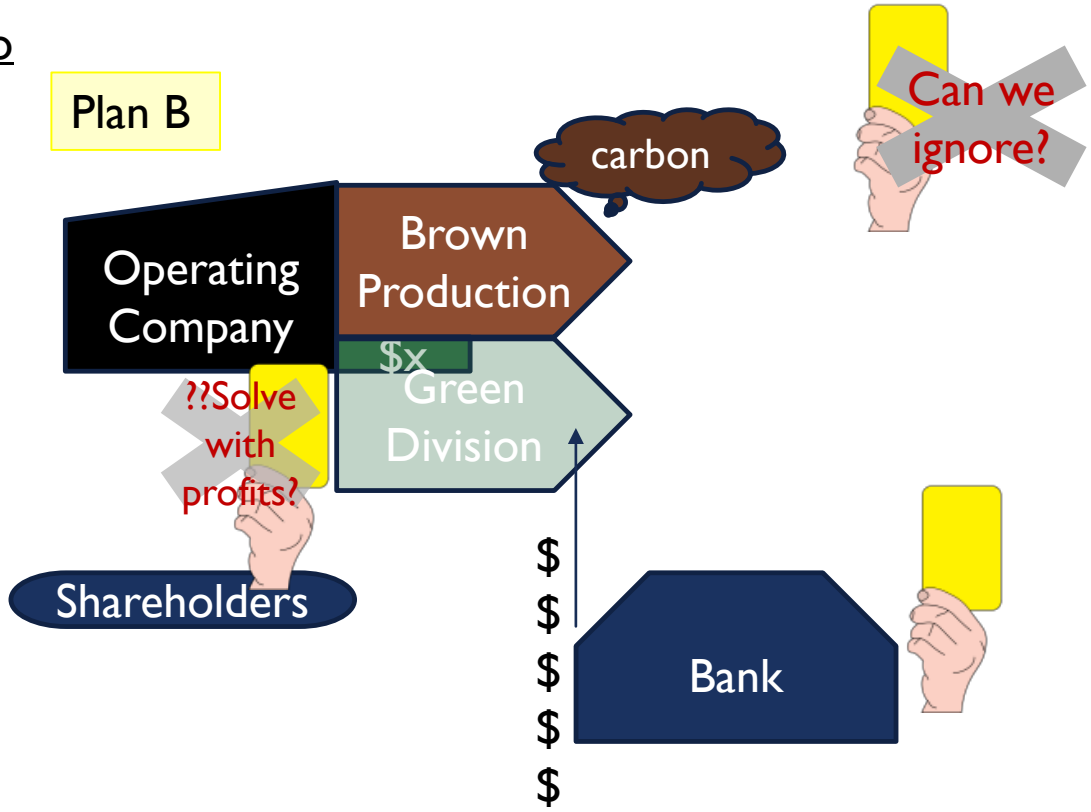


What is $x? Let's call it GREEN DIVISION INCUBATION INVESTMENT

What are the problems with Green Division Incubating (could also be corporate VC) ?

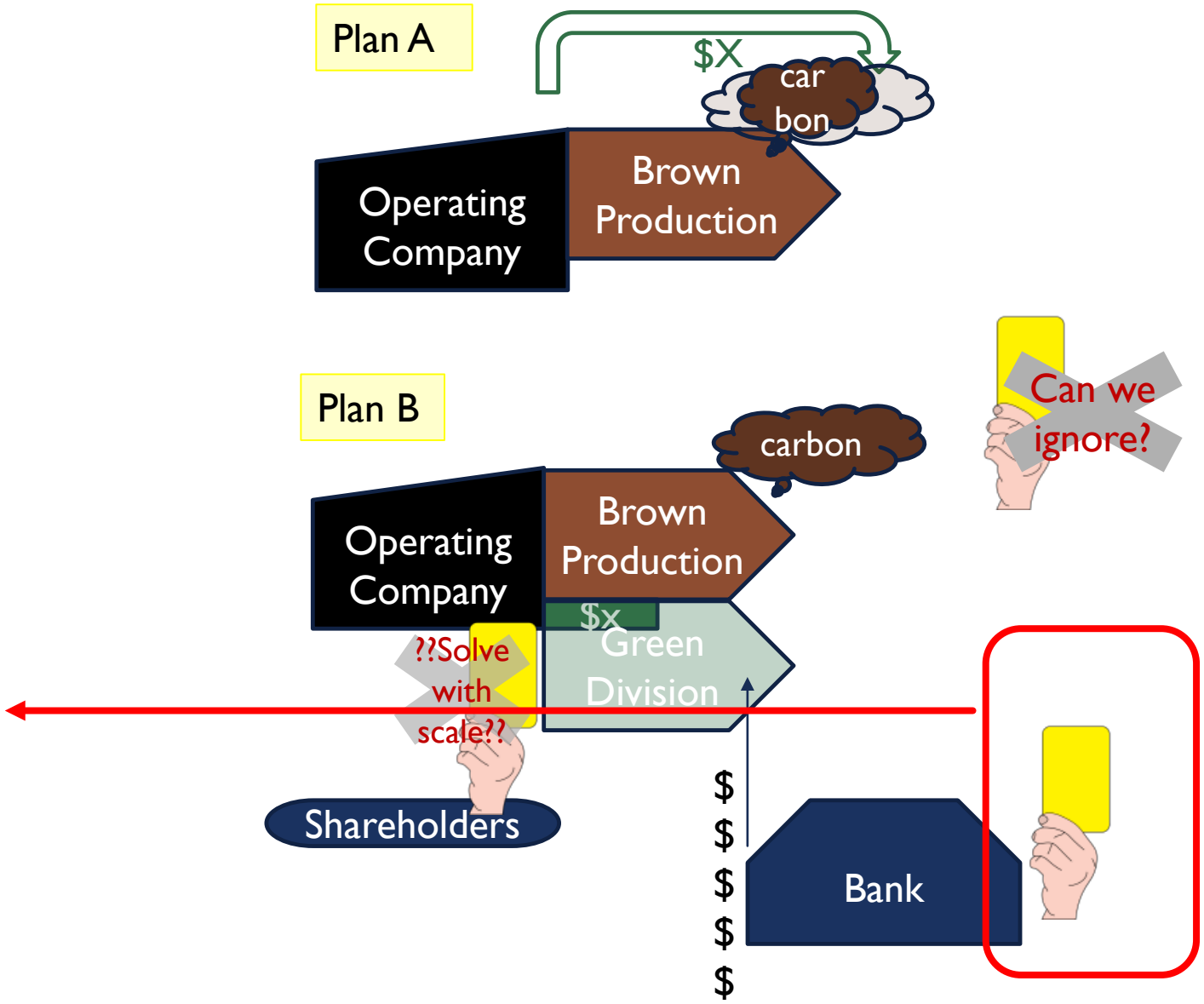
- Shareholders want incubation done outside of firm.
  - Thus this is solvable: if green division shows to be profit center, shareholders will get on board, but there is an inherent conflict in short term that must be intentionally proven to be incorrect.

- $X may not be enough capital for the incubation.
  - This is my topic and is solvable:
    - **Banks want to place investment in transition economy opportunity**
    - Both in direct financing and structured debt



Punchlines: Parameters

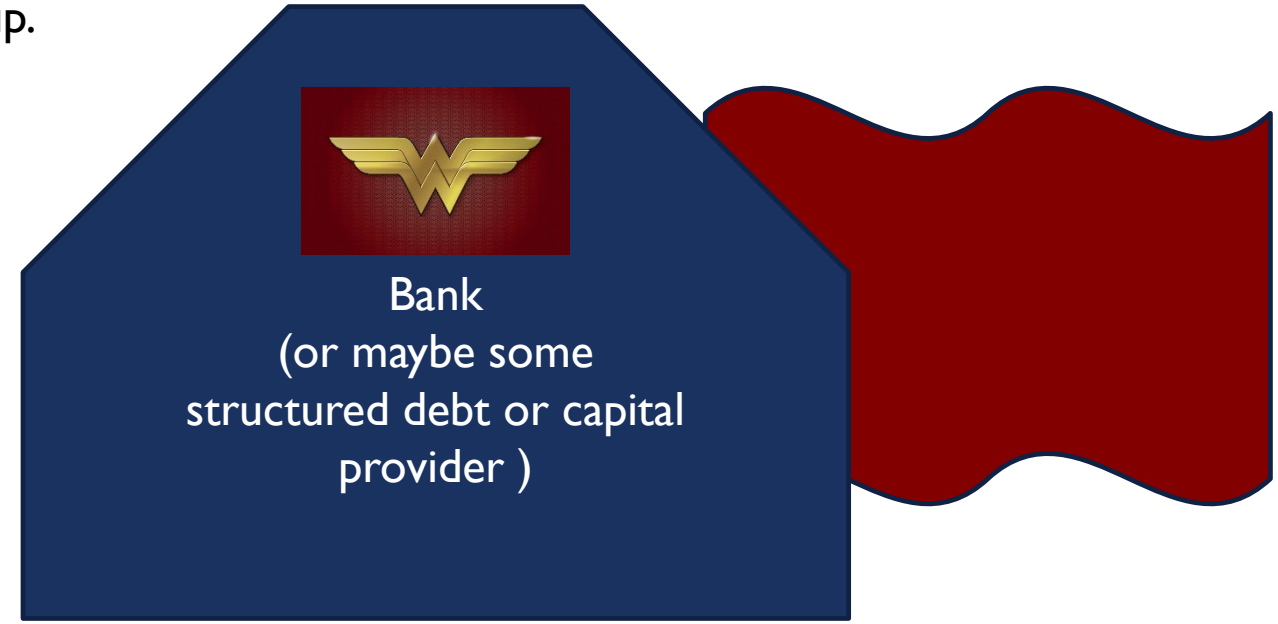
- Why did I put a penalty function there?
- Unclear to banks (certainly in U.S.) if they will get enough credit for this to offset the green exposure



Banks want to place investment in transition economy opportunity. Why, in more detail?

1. Japanese model:

   Government tells them to lead the transition. Staff up. Strategic corporate-banking relationship + built-in market share motives.
2. Europe: GAR etc acronyms
3. Net Zero Commitments (US, others)
   - US banks want their structure debt measured & counted, even in brown company divisions
   - Main reason U.S. banks not dropped out of commitment – want these deals
   - Main tension (in US): lawsuit exposure
4. Good risk
   - Need for this offsetting /upside risk to gain appreciation with credit regulators
   - In some countries, skin-in-the-game on upside



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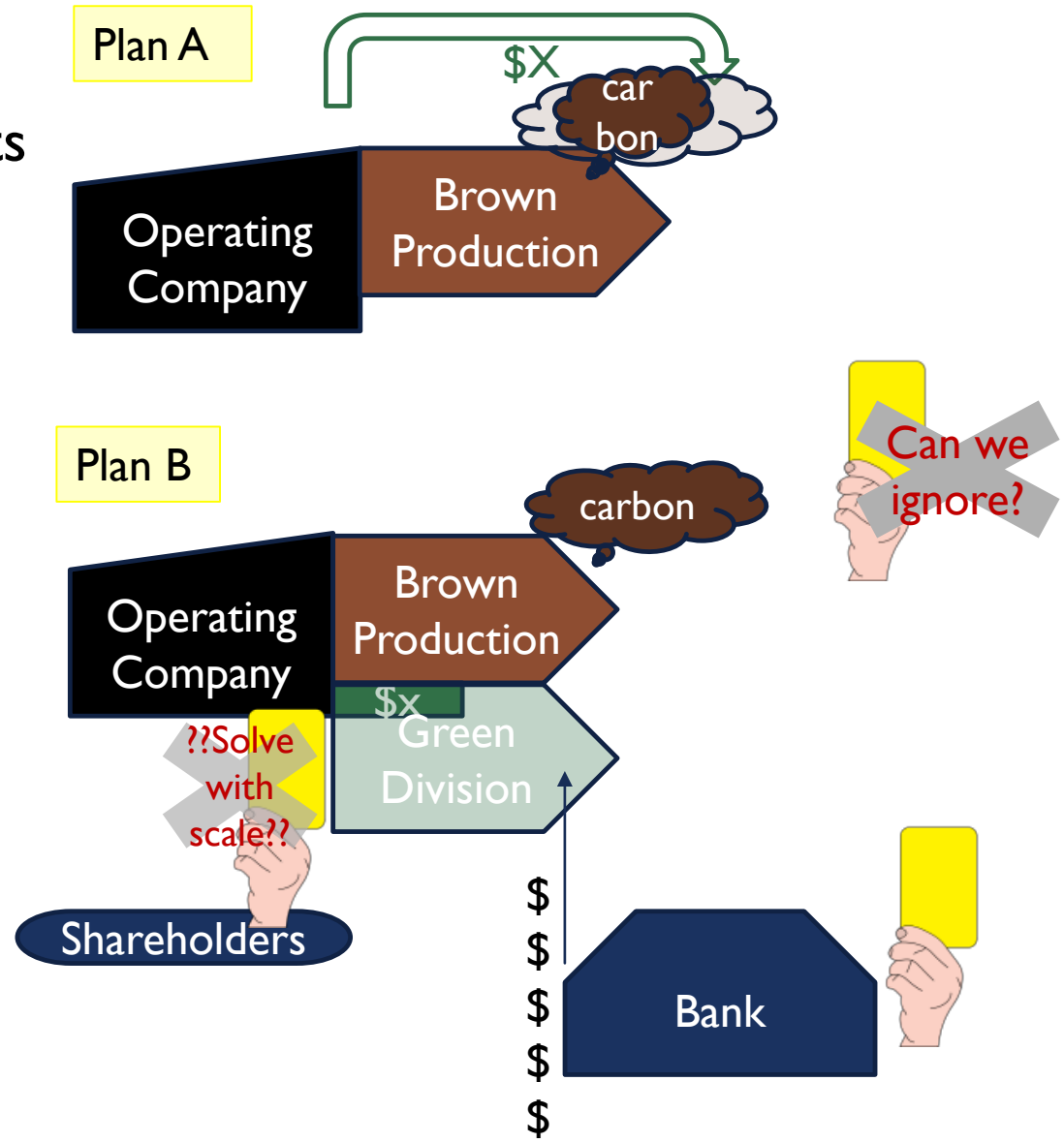
Some Resulting Parameters / Estimation Wish-lists

Corporate operator side:

1. Is there a penalty for investing in $X plan B vs $X in plan A?
2. How can policy create carrots for operating company to invest $2X, $X in mitigation direct + $X in green division?
3. What is the magnitude of the role of shareholder short termism? How can this be made incentive compatible with greater green investment? What role is there for financiers?

Bank side:

4. What is the bank governance model that produces best climate investment outcome
5. Is there a bank penalty function at work? In which policy settings?
6. What is the incentive-side government policy for banks, in different policy settings, that produces best outcome?
7. What is the first best way to support investment with credit risk calculations?



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More to do

- There is a lot more to do on my clip art theory
  - Clarity: I am not saying that we should favor brown companies in Transition Economy opportunities
- Yet, importantly, contribute to thinking:
  - Can we use incentives for self-managed phaseout, based on access to new green opportunities?
  - Can brown companies be incentivized to use their scarce resources (skilled labor especially) for the transition?
  - Can financiers help to uncover more greening opportunities with both green and brown operators, especially if governments think through Bolton et al's "green industrial policy"
    - Aside: The U.S. Administration also speaks in the industrial policy for the transition language.

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Section C:
Business Schools & Climate Leadership Education

Just a single slide

Business/Management School Education

- Background: Efforts by some leading European institutions: pledge to integrate climate change tools into business education.
- Then @UN-PRME in June + series meetings starting with Columbia, Wharton, MIT, Berkeley, Duke, Harvard, then expanding
- Point: We probably all here agree that shift in tooling is needed, but may not agree on details.
- Goal is perhaps some reconciling of:

Debates: Common Denominator (to what extent each tree [should get] gets in the way of seeing the forest).

Business education = leadership for today's business incentives and long-term vision, aligned in Transition Economy opportunity.

Business education = leading businesses for a different set of stakeholders or policy values.

3 Messages (a California-like blending of above):

- A Message of Opportunity: The Transition Economy unsheathes vast new growth opportunities across huge swaths of the economy
- A Message of Solutions-focused Skills: Only by creating and deploying solutions, while getting to scale quickly with industrial and resource revolutions, will we be able to mitigate climate's accelerating change
- A Message of Democratization: The economic revolution of the Transition Economy is one of the democratization of wealth-building opportunities because of the nature of supply chain and labor shortfalls and disruptions.
- A call to action: Next step

THANKS

A lot more to do.

Thanks for your time.

As always, it is an honor to be part of this European Commission JRC event.