Causal Inference for Asset Pricing

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Discussed by
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Motivation

How elastic is the stock market?

Neoclassical view: the stock market is perfectly elastic

- "…shares a firm sells are not unique works of art but abstract rights to an uncertain income stream for which **close counterparts exist** either directly or indirectly **via combinations of assets** of various kinds"

  Scholes (1972)

For any stock of interest, there is a portfolio of close substitutes.

- If the stock is undervalued due to selling pressure, arbitrageurs buy the stock and short the substitute portfolio for profit.

- As a result, the stock's price is unresponsive to demand pressures, i.e., elastic

Motivation

How elastic is the stock market?

Neoclassical view: the stock market is perfectly elastic

Empirically stock market appears to be inelastic

- Shleifer (1986)
- Wurgler and Zhuravskaya (2002). More elasticity for stocks with close substitutes
- Koijen and Yogo (2019), and subsequent lit. Demand system approach

Motivation

How elastic is the stock market?

Neoclassical view: the stock market is perfectly elastic

Empirically, the stock market appears to be inelastic

However, the cross-substitutability is not accounted for in the empirics:

- Fuchs, Fukuda and Neuhann (2025)

Comment 3

From my 2022 discussion of
"How competitive is the stock market…"

The estimates of elasticity are biased. (Likely downward)

This is because the structural model ignores cross-elasticities

$$\log \frac{w_{ik}}{w_{i0}} - p_k = \underline{d}_{0i} + \underline{d}'_{1i} X_k^{(d)} - \mathcal{E}_{ik} p_k + \epsilon_{ik}$$

The problem is inherited from Koijen and Yogo'19.

The key force behind why we think individual demands are flat, "arbitrage across close substitutes" (Sholes, 1972) is switched off
⇒ true elasticity is likely larger.

“In the face of this challenge, one can deem causal inference hopeless for asset pricing and throw their hands in the air.”

HHHKL (2025)

What the paper does

Shows that, under some assumptions, one can identify relative elasticity

$$\hat{\mathcal{E}} = \frac{\Delta D_1 - \Delta D_2}{\Delta P_1 - \Delta P_2}$$

By running the standard IV regression

$$\Delta D_i = \hat{\mathcal{E}} \Delta P_i + \theta' X_i + e_i$$
$$\Delta P_i = \lambda Z_i + \eta' X_i + u_i$$

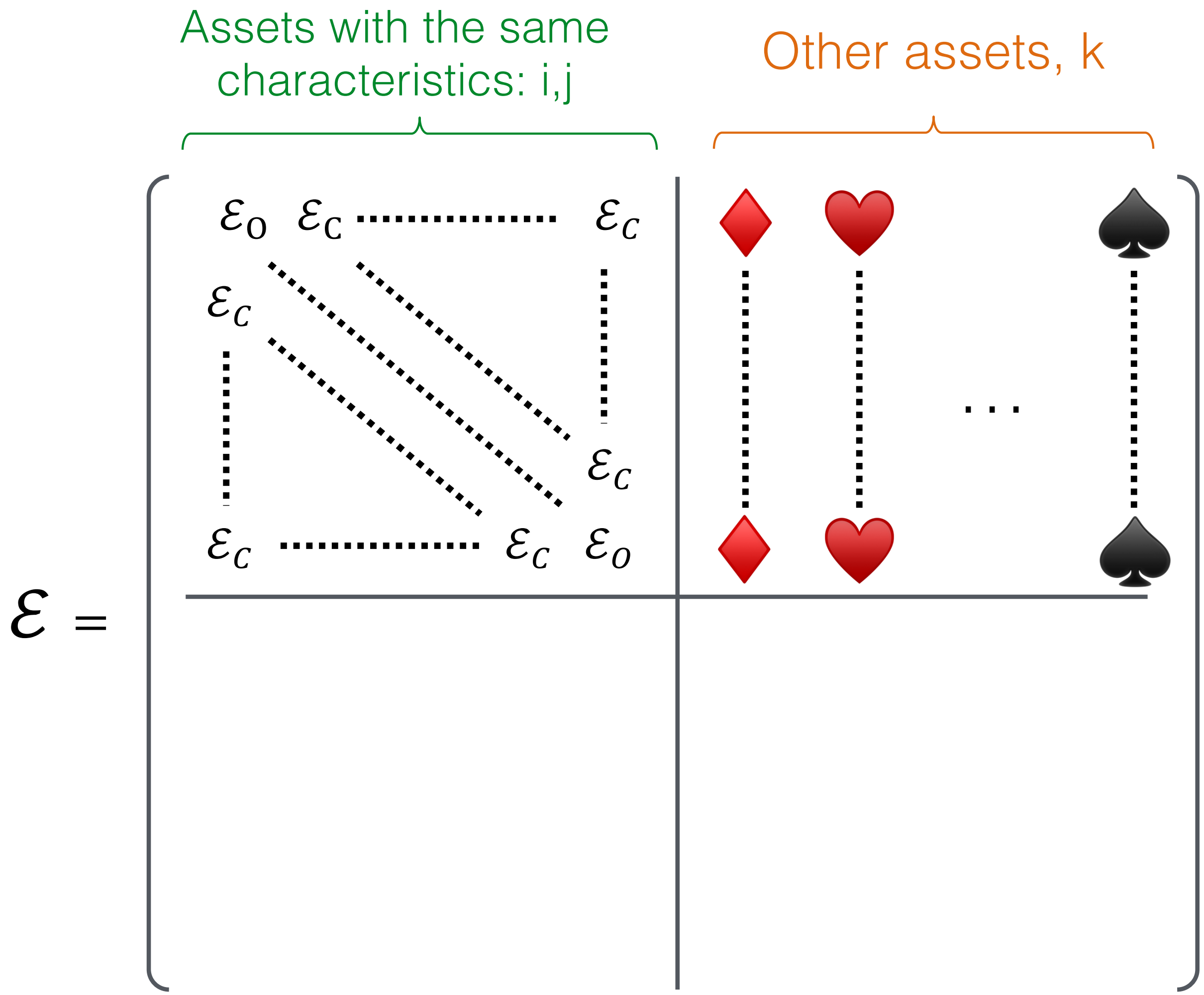
The paper shows that, under some assumptions, one can identify relative elasticity $\hat{\mathcal{E}} = \mathcal{E}_{ii} - \mathcal{E}_{ij}$

Two natural questions

- How strong are these assumptions?
- Do we care about relative elasticity?
  (As opposed to own elasticity $\mathcal{E}_{ii}$)

*Going forward, comments are underlined.

How strong are these assumptions?



A1: $\mathcal{E}_{ik} = \mathcal{E}_{jk}$, for all i, j such that $X_i = X_j$, and $k \neq i, j$

A2: $\mathcal{E}_{ii} - \mathcal{E}_{ji} = \mathcal{E}_{\text{relative}}$, for all i, j such that $X_i = X_j$

How strong are these assumptions?

They are **weaker** than those in Koijen and Yogo (2019) (KY19 hereafter)

Have a more explicit comparison to KY19

- KY19 amounts to $\mathcal{E}_{\mathrm{C}} = 0$? (elasticity is defined as elasticity of relative weights, $\log \frac{w_{ik}}{w_{i0}}$).
  So that $\mathcal{E}_{\mathrm{relative}} = \mathcal{E}_{\mathrm{own}}$
- How inelastic is the stock market?
  KY19: it is inelastic in a sense of small $\mathcal{E}_{\mathrm{own}}$.
  This paper: it is inelastic in the sense of small $\mathcal{E}_{\mathrm{relative}}$.
  It's an interesting punchline!

Juxtapose to KY19

Two ways to juxtapose with KY19

1. Estimate $\mathcal{E}_{\text{own}}$ and compare directly to KY19

    - Some ideas on how to do it in the paper, but might be tough

2. Show that KY19 estimates $\mathcal{E}_{\text{reilatve}}$ instead

    - Argue that $\mathcal{E}_{\text{relatve}}$ is an interesting object (more on this later).

    - Shift literature's focus from $\mathcal{E}_{\text{own}}$ to $\mathcal{E}_{\text{relatve}}$

How strong are these assumptions?

They are **weaker** than those in Koijen and Yogo (2019)
However, they are still (relatively) strong

1. How do we identify the set of similar assets — (i, j) such that $X_i = X_j$?

One approach is to "replicate" the characteristics of a stock of interest by constructing a portfolio of other stocks (a rotation of the asset space).

Discuss how $X_{portfolio}$ is related X_j, for all assets $j \in portfolio$.

For "additive" characteristics, i.e. those with $X_{portfolio} = \sum_{j \in portfolio} X_j$ (e.g., asset betas) what do A1 and A2 imply?

How strong are these assumptions?

They are still (relatively) strong

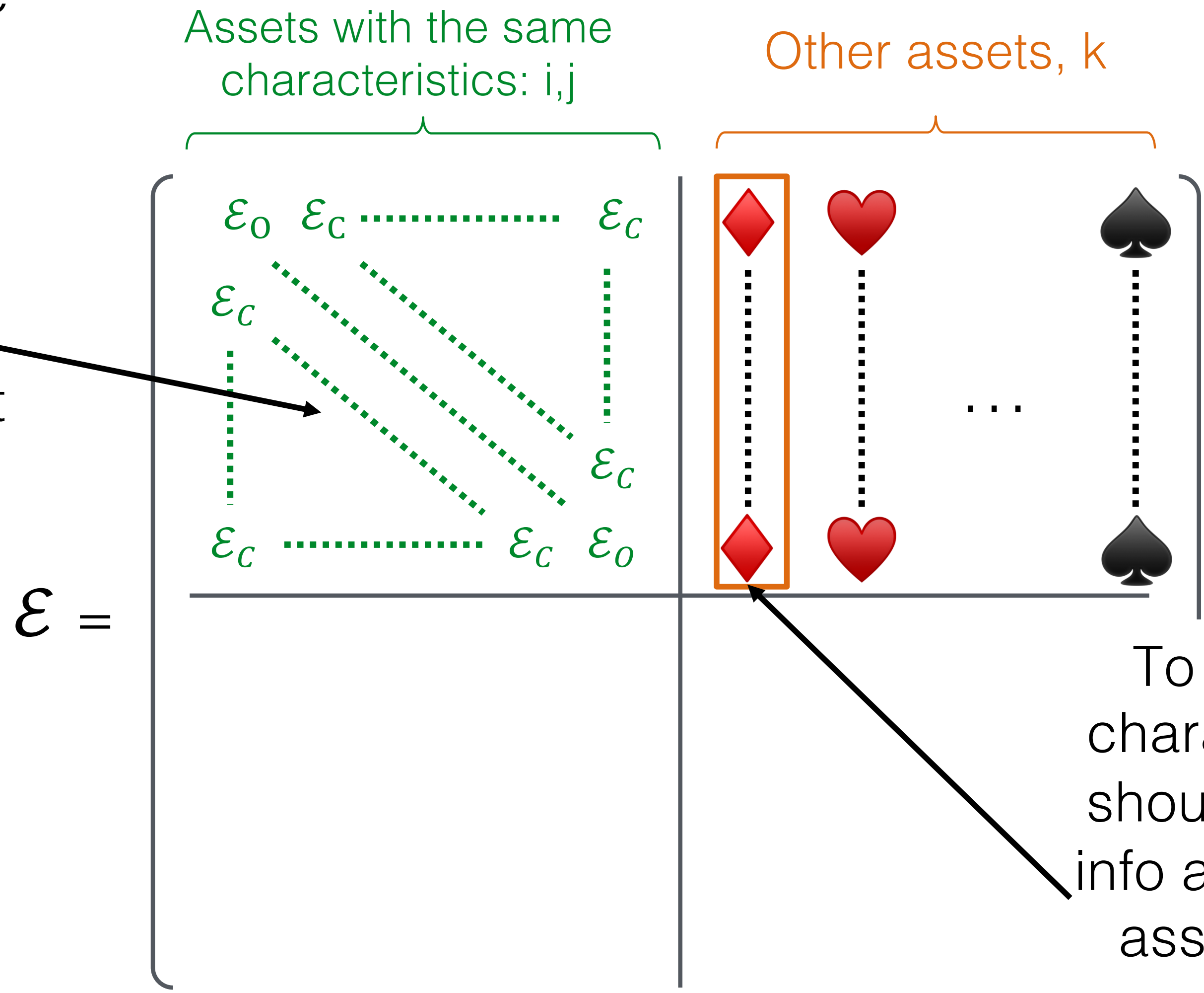
2. Section 2.3.3 considers the case of additive characteristics, betas.

$$R_{i,t} = \beta_i' F_t + \nu_{i,t}, \nu_i \perp \nu_j, \mathrm{var}(\nu_i) = \sigma_{idio}^2.$$

This is a case of constant idiosyncratic risk. Arguably, not very realistic.

How strong are these assumptions?

If $\mathcal{E}$ is positive definite and symmetric, symm $\mathcal{E}$ etry here can be achieved by rotating asset space



To get this, characteristics should include info about other assets, e.g., cov(i,k)

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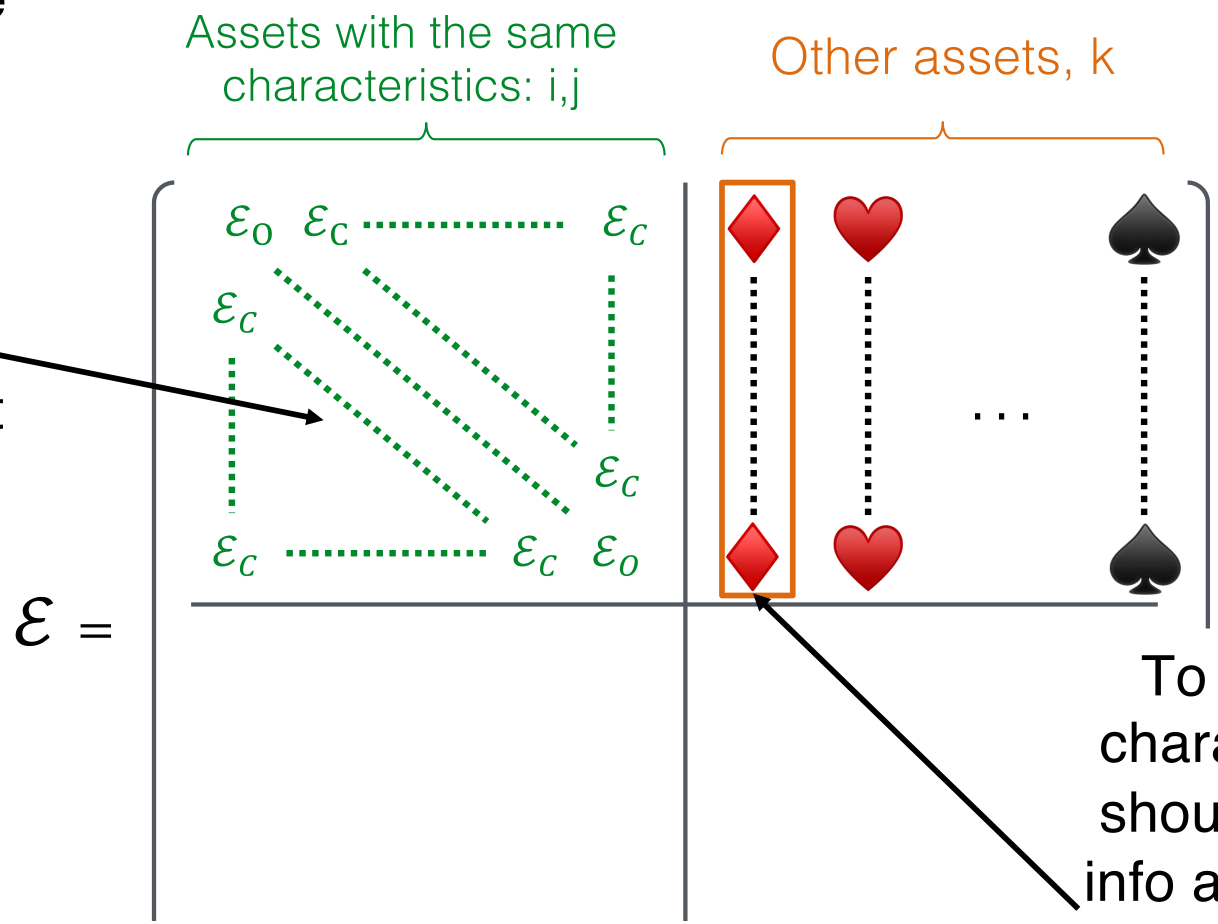

To get this, characteristics should include info about other assets, e.g., cov(i,k)

Answer depends on what included in characteristics, how the set of similar assets is constructed, etc.
Can be strong in some empirical applications and ok in others.
<u>Show one empirical application where assumptions are ok.</u>

How strong are these assumptions?

They are still (relatively) strong

3. In Glebkin, Malamud and Teguia (2024), we show that **in the presence of wealth effects and market power**, the **price impact (multiplier) matrix** may be neither **symmetric** ($\mathcal{M}_{ij} \neq \mathcal{M}_{ji}$) nor positive-definite. In this case, there is **no rotation of asset space** that would make the price impact matrix satisfy **A1** and **A2**.

How strong are these assumptions?

They are still (relatively) strong.

It will be challenging to validate them solely on theoretical grounds.

<u>You would need empirical validation</u>:

- Either show a setting where these assumptions hold reasonably well

- Or argue that these assumptions represent a **relaxation** of the current status quo and that this relaxation helps gain traction and obtain interesting results

Do we care about relative elasticity?

Koijen and Yogo (2019) and Gabaix and Koijen (2024) argue that the **object of interest** is the **own elasticity** or **own multiplier**.

- If there is a **$1m inflow into equities**, how does the **price of the stock market as a whole** adjust? (Gabaix and Koijen, 2024: it increases by $\mathcal{M}_o \approx 5$).

But:

- Where does this **$1m inflow originate**?
- What if it comes from a **not perfectly liquid asset class**?
- The **outflow from the origin asset class** may also have a **price effect** —on top of the price effect of **inflows into the destination asset class.**

Do we care about relative elasticity?

Consider a flow of \$1m from asset class B to A.
How does the price of asset class A adjust?

$$\Delta P_A = \mathcal{M}_{AA} \cdot \$1m - \mathcal{M}_{AB} \cdot \$1m = \mathcal{M}_{relative} \cdot \$1m$$

So, yes — perhaps we do care about the relative multiplier / elasticity.

Conclusion

This is a great paper

- Makes a good progress in a very important direction

Last bullet point from my 2022 discussion of “How competitive is the stock market…”:

How inelastic is the stock market?

- We don’t know. Existing structural models do not allow for cross-elasticities.

- But we will hopefully know from authors’ future work..

Currently, we know the <u>relative elasticity,</u> and it might be good enough