Stock based compensation, intangible capital & monetary policy

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Intangibles & stock based compensation

- Intangible capital has become a large and increasingly important part of firms' capital stocks and assets, especially over the last three decades.
- This shift in the production function poses a challenge to firms financing due to some of the characteristics of intangible assets
  * *non-rivaliry in use*
  * *limited excludability*
- Stock based compensation (SBC) is an alternative form of financing to these high-intangible firms that partly solves this problem by creating incentives to retain key employees.
  * Over the period of 2006q1 to 2015q1, more than 90% of the publicly traded firms recognize expenses in SBC (Sun and Xiaolan, 2019)
  * Moreover, the use of this type of financing has increased in importance over the last two decades (Morgan Stanley, 2023)

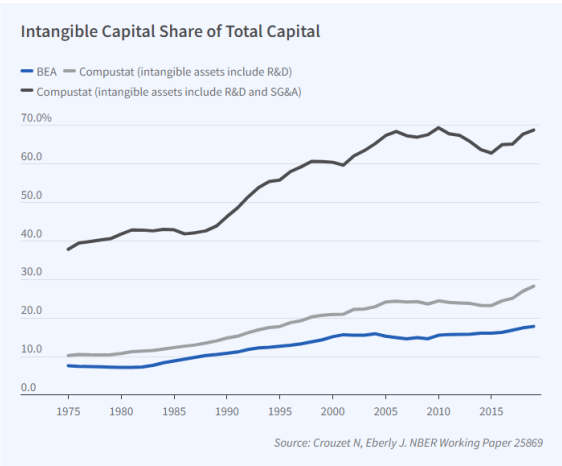
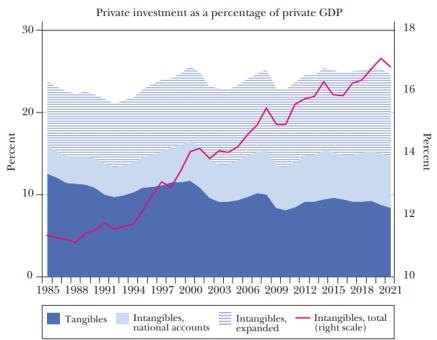


Figure 1

Rates of Private Nonresidential Investment in the United States, Tangible and Intangible, 1987 to 2021

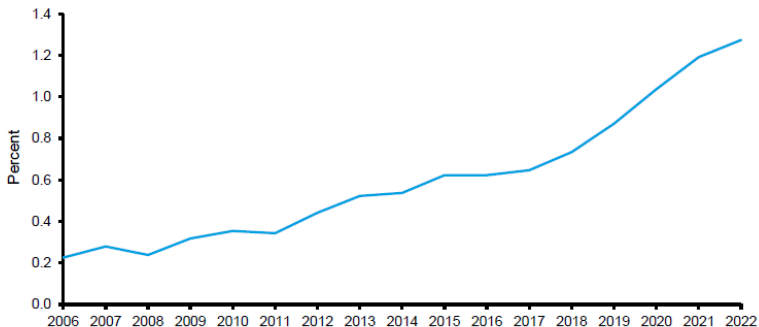


Source: Authors' elaboration of data on investment by broad category from the US national accounts and US intangibles module of EU KLEMS & INTANProd.
Note: GDP includes all intangible investment.

Morgan Stanley | INVESTMENT MANAGEMENT

COUNTERPOINT GLOBAL

Exhibit 1: SBC as a Percent of Sales for the Russell 3000, 2006-2022



Source: FactSet and Counterpoint Global.
Note: Data for calendar years.

Stock based compensation

- **Definition:** *stock based compensation is a form of firm financing through compensation contracts by which the firm offers stock options to employees instead of cash (traditional wages). It can be taught of as internal equity and is typically a scheme to retain key employees.*

- There are clear **sectorial differences** (high tech vs. traditional industries) in the usage of these types of contracts.

- **Firm characteristics** of high SBC-to-assets ratios
  * Firms with higher SBC-to-assets ratios have lower average leverage ratios and higher average market to book ratios.
  * Debt financing is not predominant across these firms.
  * The R&D investment ratio is monotonically increasing in SBC ranking groups, but it is not for CAPX-to-assets.

- R&D **comoves** with SBC $(\rho = 0.65)$, but its correlation with equity issuance $(\rho = 0.32)$ and debt issuance $(\rho = -0.07)$ is much weaker.

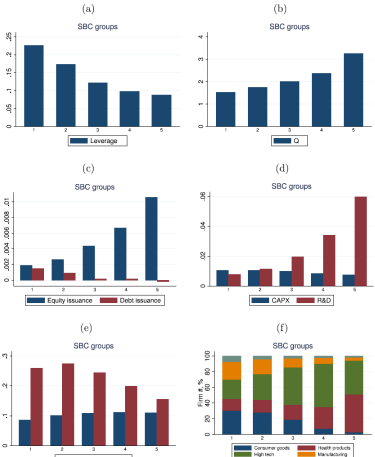


Fig. 1. This figure shows the firm characteristics of SBC groups. Panel (a)–(e) shows the average leverage, Tobin's q, equity issuance, debt issuance, investments, sales, and cash flows (CF–oibdpr×tga) within each SBC-to-assets quintile. Panel (f) shows the percentage of firms in different industries within each SBC-to-assets quintile. All variables are first scaled by quarterly book assets; then, they are averaged across firms at each quarter. Data source: Compustat-CRSP Merged Database Quarterly 2006q1–2015q1. A detailed description of the variables is in Appendix A.1.

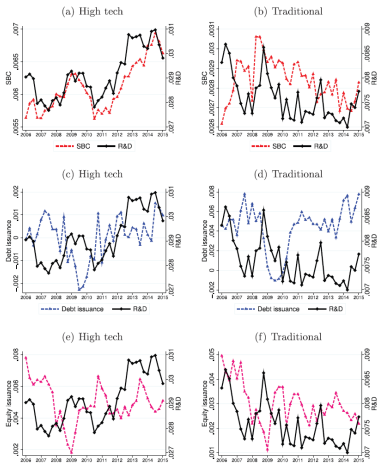


Fig. 3. This figure shows the time series of average firm-level SBC, debt issuance, equity issuance, and intangible capital investment (R&D expenses), separately for the high tech and traditional industries. All the time series are seasonal adjusted. Data source: Compustat-CRSP Merged Database Quarterly 2006q1–2015q1.

Stock Based Compensation & Investment

- There are **two channels** through which **stock based compensation can affect investment**: a substitution channel (between wages and stock options), and a cash flow channel (Babenko, Lemmon and Tserlukevich, 2011)
- **Substitution channel**
  * Stock options substitute for cash compensation and free up additional internal resources
  * Option grants are positively correlated with (intangible) investment
- **Cash flow channel**
  * The exercise of previously granted stock options provide cash inflows that can substitute costly external finance.
  * Options are typically exercised when the stock price is high and the firms presumably has good investment opportunities.
- These two channels differ on whether **stock options have or not been executed**, which leads us to the important question of how is stock based compensation measured in the data?

Measurement

- Granted but yet not executed options
  * No actual cash flows occur at the time SBC was granted. Hence, measuring is difficult.
  * After the revised SFAS No. 123R, which become effective in 2006, all US companies, both public and private, are required to recognize the cost of stock based compensation using a *fair value based method*.
  * The fair value is generally determined using an option-pricing model, such as Black-Scholes.
- Executed options
  * The proceeds and tax benefits arising from exercises of previously granted options are measured more easily.
  * The proceeds from option exercises are non-linear: options typically executed when strike price $<$ market price.

Implications for monetary policy I

- Dottling and Ratnovski (2023) study monetary policy and intangible investment, and show that stock prices and investment of firms with relatively more intangible assets respond less to monetary policy.
    * Their results can be explained by a weaker credit channel as intangible capital cannot be collateralized.
- Haskel (2020) argue that against this weaker credit channel, there is stronger sensitivity at the margin to changes in borrowing costs since intangible firms that face more stringent conditions on their borrowing.
    * Intangible firm's investment is more sensitive to an increase in the house value of their directors.
    * Employment of high intangible firm's is also most responsive to monetary policy.
- Stock based compensation as a new form of firms financing can lead to a biger role for monetary policy when trying to incentivize intangible firm's investment.

Implications for monetary policy II

- For the **substitution effect** one needs to know what's the effect of monetary policy on worker's expected asset prices.
  * If a monetary policy shifts expectations towards higher asset prices, then workers will be willing to take on the SBC contract and allow firms to free up some cash, which can be used for investment.
  * The substitution effect has potentially a reinforcement effect on the cash flow effect. Investment increases the value of the firms, pushing stock prices upward and increasing the likelihood of workers eventually executing their options.
- For the **cash flow effect** one needs to estimate the cash flow sensitivity to monetary policy.
  * It is known that monetary policy shocks affect asset prices contemporaneously.
  * For example, a expansionary shock that increases asset prices will lead to larger cash inflows via the execution of stock option contracts. The extra cash can be used for investment since internal funds are the cheapest financing alternative.