Bank Pay Caps, Bank Risk, and Macroprudential Regulation

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Remuneration of Bankers is the focus of significant regulatory attention in the UK, EU, US and globally.

- 1-to-1 EU bonus caps;
- FSB “Principles for Sound Compensation Practices.”
- Adoption in Basel III of the Capital Conservation Buffer.

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The pay bill is sometimes in excess of 80% of total shareholder equity, and often in excess of 30% of shareholder equity. (Thanassouli 2012).
I propose and study effect of a cap on total pay in proportion to assets.

- Variable cap lowers salary costs directly; and
- Cap stops negative externality in labour market so lowering market pay.
- So cap lowers bank costs and hence improves bank resilience.
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  - Achieved without reduced lending from a Tier 1 increase.
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  - Achieved whilst increasing bank values.
  - Achieved without reduced lending from a Tier 1 increase.
- Encourages diversification by reducing need to focus on limited asset classes.
- A tool for Macroprudential Regulation to encourage retail banking.
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Express as a proportion of Risk Weighted Assets — i.e. equivalent Tier 1 increase:
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<table>
<thead>
<tr>
<th>Reduction in aggregate bank remuneration</th>
<th>5%</th>
<th>10%</th>
<th>15%</th>
<th>20%</th>
<th>25%</th>
<th>30%</th>
</tr>
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<tbody>
<tr>
<td>Average equivalent increase in Tier 1 levels (basis points)</td>
<td>9</td>
<td>19</td>
<td>28</td>
<td>37</td>
<td>47</td>
<td>56</td>
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Remuneration: A Targeted Intervention

Gain in Tier 1 from 20% Reduction in Remuneration (20 Most Affected)
Objective of paper is to investigate the consequences of a regulatory pay cap on bank risk, bank value and bank asset allocation decisions.

- Complementary to studies of bank competition and individual risk taking:
  - Fraud: Foster and Young (2010);
  - Myopia: Thanassoulis (2013a);
  - Bonus: Raith (2003);
  - Screening: Benabou and Tirole (2013);
Related Literature

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The Model

- $N$ banks with assets in a given class $S_1 > S_2 > \cdots > S_N$ who maximize expected value.
  - Bank incurs extra costs if assets shrink to less than $\eta \cdot S$ (where $\eta < 1$)
    - Forced asset sales to reimburse creditors; or
    - Increased costs of capital.
  - Extra costs from such ‘default event’ proportional to assets: $\lambda S$.
    - Functional form convenient. Key is costs incurred if assets shrink sufficiently.
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    - Functional form convenient. Key is costs incurred if assets shrink sufficiently.
- $N$ bankers who expect to grow assets by factor $\alpha_1 > \cdots > \alpha_N > 1$.
  - e.g. banker $i$ at bank $j$ then expected bank $j$ assets at end: $\alpha_i S_j$.
  - Distribution of realized growth factor $F_n(\cdot)$, supported on $[0, \infty]$. [Limited liability].
  - Outside option of 0. Risk neutral.
    - Bankers might actually be risk loving (cf. medical evidence & Thanassoulis (2012)).
The density $f_n$ is a proportional scaling of some standard (mean = 1) distribution $f$ such that $f_n(x) = (1/\alpha_n) f(x/\alpha_n)$.

Banks risk neutral, so distribution of realized assets only relevant if default event triggered.

- In empirical calibration a low probability event.
- Tail probabilities can be approximated using Extreme Value Theory [cf. Gabaix and Landier 2008, Thanassoulis 2012]

$$F_n(v) = G \cdot (v/\alpha_n)^\gamma$$

- Restrict to $\gamma \geq 1$ with $G$ a positive constant so density bdd near zero.
Banks bid against each other to hire one banker in a competitive auction.

- Banks only pay in bonuses. Bid rate $q$ applying to realized asset levels.
- Pay individual specific. Better banker offered better package.
- Banks here would prefer bonuses to wages – risk sharing. Thanassoulis (2012).
- Also modelling robust to incentivisation issues.
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Bankers hired convert assets into \( aS_n(1-q) \). \((a \text{ is realized growth})\).

- If realized bank value \(< \eta S_n \text{ then default event.}\)
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<tr>
<th>Tot. compensation</th>
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<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>% base salary</td>
<td>% bonus</td>
<td>% base salary</td>
</tr>
<tr>
<td>£500K to £1mn</td>
<td>19%</td>
<td>81%</td>
</tr>
<tr>
<td>&gt; £1mn</td>
<td>9%</td>
<td>91%</td>
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\[ F \left( \frac{\eta}{1 - q} \right) = G \cdot \left[ \frac{\eta}{\alpha (1 - q)} \right]^\gamma \]
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Expected bank value is

\[ \alpha (1 - q) S - \lambda SG \cdot \left[ \frac{\eta}{\alpha (1 - q)} \right]^\gamma \]

A cap on remuneration in proportion to assets equivalent to a cap on bonus rate, \( q \).
1. Risk profile of bank decided by Board and not the banker.
   - Board determine risk profile given target RoE. Use corporate governance levers to realize:
     - Value at Risk controls; asset allocation; hedging decisions.
     - This study assumes these levers are sufficient.

Tail risk, \( F \) a function of either \( q \) or total dollar remuneration. Ambiguous effect. Large bank can offer a lower bonus rate which, with poor risk control lowers institution risk. But large banks will pay more in dollar terms, potentially raising risk of institution. Externalities we describe will remain: marginal bidder increases fragility of employing bank. The intervention of a cap in pay lowers bonus rates and pay levels. If bank can't control tail risk then intervention mitigates adverse effects of poor risk control. Lower incentive to excessive risk, fraud, myopia, and churn.
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2. Bank incurs remuneration payment even if assets shrink enough for default event.
   - Might seem more realistic that a banker who shrunk assets she was managing would not get a bonus, and in fact would be fired.
   - So might conclude that remuneration payments do not add to bank fragility.

   Reduction in asset level may be due to bad luck (as in this model) and wider economic forces, rather than poor skill.
   Thanassoulis (2012) documents large pay even with negative RoE.

   Unless bank formally enters bankruptcy, remuneration contracts must be honoured.
   Bank may also honour implicit rather than explicit commitments to pay as otherwise all employees alter expectations of pay.
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No Intervention Benchmark

- Market rate of pay set by the marginal bidder for a banker.

Lemma

Bank of rank n will hire banker of same rank n. Positive assortative matching.

- Greater skill applied to a larger pot of assets; and delivers larger reduction in expected costs of default.
- Hence a larger bank would be willing (if forced) to outbid a smaller bank for a better banker.
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- Robust to some banks being more attractive:
  - Suppose bank specific differences raise utility of bank i by a factor of $1 + \tau_i$.
  - So if bonus $q$ banker’s expected utility is $(1 + \tau_i) q \alpha S_i$.
  - As if banker runs utility weighted assets of $\Sigma_i = (1 + \tau_i) S_i$.
  - Reorder banks according to $\{\Sigma_i\}$: results of the paper remain.
Proposition

Banker rank $i$ employed by bank $i$ with expected payment of $q_i \cdot \alpha_i S_i$ with:

\[
q_i = \frac{\sum_{j=i+1}^{N} S_j (\alpha_{j-1} - \alpha_j)}{\alpha_i S_i}
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- Market works like a pyramid.
- Delivers equilibrium rate of pay.
Consider cap in pay of at most proportion $\chi$ of assets.

Study assumes good risk control – desired bank risk profile unchanged. Analysis of new market equilibrium yields:

1. Lower bank risk and raises bank values for all except the smallest banks.
2. The lower the remuneration cap, the greater the positive impact: higher bank values and lower bank risk.
3. Equilibrium allocation of bankers to banks is not affected, preserving allocative efficiency.
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Banks compete to hire scarce talent. Marginal bidder sets market rate.
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But also increase to employing bank’s fragility to stress:
  - Larger costs and so greater probability of default event and associated costs.

Lowers bank value – a negative externality.
Cap impacts marginal bidder more than employing bank.

- Banker wants to run more money assets. So bank with smaller assets had to offer larger bonus rate to compensate for smaller size/less attractive place to work.

Cap forces marginal bidder to bid less hard.
- Hence employing bank’s value is raised.
  - Same banker, hired for less.
  - Bank more robust to bad asset realisations.

Macroprudential: no single bank can do this alone.

Potential concern of departure of workers from finance – (Philippon and Reshef (2012)) pay premium of 50% to 250%; long way before a serious concern.
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Pay Cap Corrects Labour Market Externality

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- Bank has securities with returns \( \{ \tilde{r}_j \} \). If invest \( \{ x_j \} \) dollars then next period’s assets will be \( \tilde{S} = \sum_j x_j \tilde{r}_j \)
- Returns jointly normally distributed, expected returns \( \rho \) and variance-covariance matrix \( V \).
- Bank has utility \( U(\mu, \sigma^2) \). Implies optimal allocation proportional to \( V^{-1} \rho \).
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Suppose pay cap applies to weighted sum of security values \( \langle \beta, x \rangle \)

Banker’s problem:

\[
\max_{\{x_1, \ldots, x_m\}} \chi \cdot \langle \beta, x \rangle \quad \text{subject to} \quad R = U \left( \langle x, \rho \rangle, \langle x, \mathbf{V}x \rangle \right)
\]
Proposition

The ratio of allocations to individual securities is unaffected by a pay cap if the cap weights securities proportionally to their expected returns ($\beta$ parallel to the vector of expected returns $\rho$).
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- Banker will be tempted to alter the investment profile he targets if doing so allows more to be paid under the cap whilst preserving returns net of risk.
- Not possible if weights proportional to expected returns of the assets.
  - Implies (CAPM) weights proportional to asset’s systematic risk.
- Parallels optimal risk weights in capital adequacy regulation (Rochet (1992)).
  - Basel risk weights a convenient (but not perfect) approximation.
Marger Incentives and a Pay Cap

- The financial sector has undergone sustained consolidation and merger activity dating back to before the 1990s.
  - Accompanied by large increases in balance sheets.
- This model captures one reason: desire to grow balance sheet to allow more talented managers to be hired.

**Lemma**

*Absent any pay cap, bank mergers are profitable.*
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- Bank mergers reorder ranking – so competitive bidding of all banks changed.
  - Direction of change ambiguous:
    - Big banks leap-frogged by merger must hire less well.
    - Smaller banks can now target better bankers.
- Merger allows skills of a more talented banker to be deployed on a larger balance sheet.
- And pay commanded by banker hired by merged bank does not grow in proportion to bank size
  - It depends on size of smaller bidding banks.
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- And pay commanded by banker hired by merged bank does not grow in proportion to bank size
  - It depends on size of smaller bidding banks.
- Bonus caps have ambiguous effects – can lower incentive to merge.
  - Consider merger to monopoly: Ex post unaffected by cap, ex ante cap raises value of larger bank.
Asset Allocation Responses To Pay Cap

- Even absent regulation, banker wants to run more assets and so grow pay.
- So banks will raise asset allocations to areas where they wish to hire the best bankers.

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Model Extension To Multiple Assets

- Two symmetric banks, balance sheet size $T$.
- Two available asset classes and bankers $\alpha > \beta$.
  - Interesting case of neither bank so big it can get both $\alpha$ bankers.

Banks gain value $c \cdot S(T - S)$ from diversification. Captures: Volatility reduction good for employee stock holders/investors not fully diversified; Decreasing returns to scale.

John Thanassoulis (WBS)
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- To understand suppose cap is gradually removed:
  - Cap affected marginal bidder most – so now bank employing $\alpha$-banker subject to more intense bidding.
  - Bank responds by re-allocating assets to keep $\alpha$-banker allowing pay to increase without increase in default risk.
Cap on remuneration need not apply to all business lines: e.g. wholesale/retail banking.

Cap might also apply to banks and not hedge funds.

So pay regulation can be used to re-target banks’ activities.

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**Model Extension To Asymmetrically Applied Regulation**

- Bank with total assets $T_b$ can invest $S_b$ wholesale and $T_b - S_b$ retail.
  - Bank gains value $c \cdot S_b \left(T_b - S_b\right)$ from diversification.
- Bank’s pay on wholesale (only) regulated.
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- Hedge fund $S_h$ in wholesale market – unregulated pay.

- $\beta$-banker for retail banking, and $\alpha > \beta$ bankers for wholesale.

- Absent regulation, bank would get best $\alpha$-banker:

$$S_h < T_b/2$$
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- Bank can secure bankers for wholesale – but regulation prevents them getting best ones.
- So returns available from wholesale banking fall slightly.
- Bank chooses to divert some funds to retail banking and secure greater diversification benefits.
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- Bank chooses to divert some funds to retail banking and secure greater diversification benefits.
- By adjusting cap through the cycle, the regulator can manipulate the assets used for retail banking.
- Microprudential intervention applied generally delivers macroprudential goal.
Conclusion

- Variable cap in proportion to Risk Weighted Assets lowers bank risk and raises bank values.
- Impacts marginal bidder most and so lowers market rates of pay.
- Targeted intervention: A 20% reduction in the remuneration bill would equate to extra Tier 1 of 150 basis points for most affected banks.
- Cap encourages institutions to diversify more and so adds further to robustness.
- Cap forms a Macroprudential tool.
Conclusion

- Cap applied at easier to implement bank level will likely be implemented by senior management as a top down rule.
  - Numbers of employees involved make micro-managing deviations from a general rule impractical

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>UBS</td>
<td>13,047</td>
</tr>
<tr>
<td>Credit Suisse</td>
<td>9,520</td>
</tr>
<tr>
<td>Morgan Stanley</td>
<td>12,278</td>
</tr>
<tr>
<td>Deutsche Bank</td>
<td>15,411</td>
</tr>
<tr>
<td>Goldman Sachs</td>
<td>6,500</td>
</tr>
<tr>
<td>Citigroup</td>
<td>53,060</td>
</tr>
</tbody>
</table>

**Table:** Numbers of Employees Targeted By Intervention On Top 20% Of Earners