Online Appendix for "Innovation and Top Income Inequality"

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June 2018

A Theoretical appendix

A.1 Proofs of Proposition 2

The only claim we have not formally proved in the text is that $\frac{\partial^2}{\partial\theta_K \partial z}(1-z)x_E^* > 0$ (which immediately implies that the positive impact of an increase in R&D productivity on growth, entrepreneurial share and social mobility is attenuated when barriers to entry are high). Differentiating first with respect to θ_E, we get:

$$\frac{\partial (1-z)\, x_E^*}{\partial \theta_E} = -\frac{(1-z)\, x_E^*}{\theta_E - \frac{1}{L}(1-z)^2 \left(\frac{1}{\eta_L} - \frac{1}{\eta_H}\right)},$$

which is increasing in z since x_E^* and $(1-z)$ both decrease in z and the denominator $\theta_E + \frac{1}{L}(1-z)^2 \left[\frac{1}{\eta_H} - \frac{1}{\eta_L}\right]$ increases in z (recall that $\frac{1}{\eta_L} - \frac{1}{\eta_H} > 0$). Similarly, differentiating with respect to θ_I gives:

$$\frac{\partial (1-z)\, x_E^*}{\partial \theta_I} = \frac{\frac{1}{L}\left(\frac{1}{\eta_L} - \frac{1}{\eta_H}\right)(1-z)^2}{\theta_E - \frac{1}{L}(1-z)^2 \left(\frac{1}{\eta_L} - \frac{1}{\eta_H}\right)} \frac{\partial x_I^*}{\partial \theta_I},$$

which is increasing in z since $\frac{\partial x_I^*}{\partial \theta_I} < 0$, and $1-z$ and the denominator both decrease in z. This establishes the proposition.

A.2 Entrepreneurial share of income net of innovation costs

So far we have computed gross shares of income ignoring innovation expenditures. If we discount these expenditures, the ratio between net entrepreneurial income and labor income can be written as:

$$\begin{aligned} rel\_net\_share &= \left(Entrepreneur\_share_t - \theta_E \frac{x_E^2}{2} - \theta_I \frac{x_I^2}{2}\right) / \left(\frac{w_t L}{\tilde{Y}_t}\right) \\ &= \left(\pi_L + \frac{\pi_H - \pi_L}{2} x_I^* + \left(\frac{\pi_H}{2} + \frac{w_t}{2\tilde{Y}_t} - \pi_L\right)(1-z)\, x_E^*\right) / \left(\frac{w_t L}{\tilde{Y}_t}\right) \qquad \text{(A1)} \end{aligned}$$

where we used equations (2.5), (2.7), the equilibrium values (2.9) and (2.10) of the main text knowing that there are $M/(1+L)$ product lines. This expression shows that a higher rate of incumbent innovation will raise the net entrepreneur share of income, whereas a higher rate of entrant innovation will only raise the net entrepreneurial share of income if $\frac{1}{2}\pi_H \tilde{Y}_t + \frac{1}{2} w_t - \pi_L \tilde{Y}_t > 0$ (which occurs in particular if $\pi_H > 2\pi_L$). This in turn relates to the creative destruction nature of entrant's innovation: a successful entrant gains $\pi_H \tilde{Y}_t - w_t$ by innovating but she destroys the rents $\pi_L \tilde{Y}_t$ of the incumbent. Formally, we can show:

Proposition 1 *An increase in incumbent R&D productivity (lower θ_I) leads to an increase in the relative shares of net entrepreneurial income over labor income. An increase in entrant R&D productivity (lower θ_E) also leads to an increase in the relative shares of net entrepreneurial income over labor income whenever $\frac{1}{2}\pi_H + \frac{1}{2}\frac{w_t}{\tilde{Y}_t} - \pi_L > 0$.*

On the other hand, we find that when L is large and π_H is close enough to π_L, then an increase in the productivity of entrant R&D will shift income towards workers instead of entrepreneurs, and therefore will contribute to a reduction in inequality. This result is in the vein of Jones and Kim (2017).

Proof 2 *Using equation (2.6), we rewrite:*

$$\frac{w_t}{\tilde{Y}_t} = \frac{1}{L}\left(1-\pi_L-(\pi_H-\pi_L)\left(x_I^*+(1-z)\,x_E^*\right)\right)$$

We then obtain

$$\frac{\partial\left(w_t/\tilde{Y}_t\right)}{\partial x_I^*} = -\frac{1}{L}\left(\pi_H-\pi_L\right) \text{ and } \frac{\partial\left(w_t/\tilde{Y}_t\right)}{\partial x_E^*} = -\frac{1-z}{L}\left(\pi_H-\pi_L\right).$$

Using (A1), we get:

$$\frac{\partial rel\_net\_share}{\partial x_I^*} = \left(\frac{1}{2}\left(\pi_H-\pi_L\right)\frac{w_t}{\tilde{Y}_t}+\frac{\pi_H-\pi_L}{L}\left(\begin{array}{c}\pi_L+\frac{1}{2}\left(\pi_H-\pi_L\right)x_I^*\\ +\left(\frac{1}{2}\pi_H-\pi_L\right)(1-z)\,x_E^*\end{array}\right)\right)\left(\frac{\tilde{Y}_t}{w_t}\right)^2\frac{1}{L_t}$$

$$\frac{\partial rel\_net\_share}{\partial x_E^*} = \left(\begin{array}{c}\left(\frac{1}{2}\pi_H+\frac{1}{2}\frac{w_t}{\tilde{Y}_t}-\pi_L\right)(1-z)\,\frac{w_t}{\tilde{Y}_t}+\\ \frac{(1-z)(\pi_H-\pi_L)}{L}\left(\pi_L+\frac{1}{2}\left(\pi_H-\pi_L\right)x_I^*+\left(\frac{1}{2}\pi_H-\pi_L\right)(1-z)\,x_E^*\right)\end{array}\right)\left(\frac{\tilde{Y}_t}{w_t}\right)^2\frac{1}{L_t}$$

Note that

$$\begin{aligned} A &= \pi_L+\frac{1}{2}\left(\pi_H-\pi_L\right)x_I^*+\left(\frac{1}{2}\pi_H-\pi_L\right)(1-z)\,x_E^* \\ &= \pi_L\left(1-\frac{1}{2}(1-z)\,x_E^*\right)+\frac{1}{2}\left(\pi_H-\pi_L\right)\left(x_I^*+(1-z)\,x_E^*\right)\end{aligned}$$

is positive since $(1-z)\,x_E^*<1$. Then $\frac{\partial rel\_net\_share}{\partial x_I^*}>0$ and $\frac{\partial rel\_net\_share}{\partial x_E^*}>0$ if $\frac{1}{2}\pi_H+\frac{1}{2}\frac{w_t}{\tilde{Y}_t}-\pi_L>0$.

We know that an increase in θ_E has no impact on x_I^* but decreases x_E^*, therefore we get that it reduces the relative net shares whenever $\frac{1}{2}\pi_H+\frac{1}{2}\frac{w_t}{\tilde{Y}_t}-\pi_L>0$. An increase in θ_I affects both x_I^* but also x_E^*, as we have:

$$\frac{\partial x_E^*}{\partial\theta_I} = \frac{\frac{1}{L}\left(\pi_H-\pi_L\right)}{\theta_E-\frac{1}{L}(1-z)^2\left(\pi_H-\pi_L\right)}\frac{\partial x_I^*}{\partial\theta_I},$$

We can then write

$$\begin{aligned} &\frac{\partial rel\_net\_share}{\partial\theta_I^*} \\ =\;& \frac{\partial rel\_net\_share}{\partial x_I^*}\frac{\partial x_I}{\partial\theta_I}+\frac{\partial rel\_net\_share}{\partial x_E^*}\frac{\partial x_E}{\partial\theta_E} \\ =\;& \left(\frac{\left(\pi_H-\pi_L\right)w_t}{2\tilde{Y}_t}\frac{\theta_E-\frac{1}{L}(1-z)^2\left(\pi_L-\frac{w_t}{\tilde{Y}_t}\right)}{\theta_E-\frac{1}{L}(1-z)^2\left(\pi_H-\pi_L\right)}+\frac{A}{L}\frac{\theta_E\left(\pi_H-\pi_L\right)}{\theta_E-\frac{1}{L}(1-z)^2\left(\pi_H-\pi_L\right)}\right)\left(\frac{\tilde{Y}_t}{w_t}\right)^2\frac{1}{L_t}\frac{\partial x_I^*}{\partial\theta_I}\end{aligned}$$

Note that $x_E^*<1$, requires $\left(\pi_H-\frac{w_t}{\tilde{Y}_t}\right)(1-z)<\theta_E$. Moreover as $L>1$, we must have

$$\theta_E-\frac{1}{L}(1-z)^2\left(\pi_L-\frac{w_t}{\tilde{Y}_t}\right) > \frac{1}{L}(1-z)^2\left(\pi_H-\pi_L\right).$$

Hence the relative net share is always decreasing in θ_I.

Finally assume that L is large such that $w_t/\tilde{Y}_t$ is small relative to π_H, then we have

$$\frac{w_t}{\tilde{Y}_t} \approx \frac{1}{L}\left(1-\pi_L-\left(\pi_H-\pi_L\right)\left(\frac{\pi_H-\pi_L}{\theta_I}+(1-z)\,\frac{\pi_H}{\theta_E}\right)\right)$$

therefore

$$\begin{aligned}
\frac{\partial rel_net_share}{\partial x_E^*} &\approx \left(\left(\frac{1}{2}\pi_H-\pi_L\right)\frac{w_t}{\tilde{Y}_t}+\frac{(\pi_H-\pi_L)}{L}\left(\begin{array}{c}\pi_L+\frac{1}{2}(\pi_H-\pi_L)x_I^*\\+\left(\frac{1}{2}\pi_H-\pi_L\right)(1-z)x_E^*\end{array}\right)\right)\left(\frac{\tilde{Y}_t}{w_t}\right)^2\frac{1-z}{L}\\
&\approx \left(\begin{array}{c}\left(\frac{1}{2}\pi_H-\pi_L\right)\left(1-\pi_L-(\pi_H-\pi_L)\left(\frac{\pi_H-\pi_L}{\theta_I}+(1-z)\frac{\pi_H}{\theta_E}\right)\right)\\+(\pi_H-\pi_L)\left(\pi_L+\frac{1}{2}\frac{(\pi_H-\pi_L)^2}{\theta_I}+\left(\frac{1}{2}\pi_H-\pi_L\right)(1-z)\frac{\pi_H}{\theta_E}\right)\end{array}\right)\left(\frac{\tilde{Y}_t}{w_tL}\right)^2(1-z)\\
&\approx \left(\left(\frac{1}{2}\pi_H-\pi_L\right)(1-\pi_L)+(\pi_H-\pi_L)\pi_L+\frac{1}{2}\frac{\pi_L(\pi_H-\pi_L)^2}{\theta_I}\right)\left(\frac{\tilde{Y}_t}{w_tL}\right)^2(1-z)
\end{aligned}$$

Then, for L large enough, $\left(\frac{\pi_H}{2}-\pi_L\right)(1-\pi_L)+(\pi_H-\pi_L)\pi_L+\frac{\pi_L(\pi_H-\pi_L)^2}{2\theta_I}>0$ *is a necessary and sufficient condition under which a decrease in* θ_E *increases the relative net share.*

A.3 Proofs for subsection 2.3.2

From equation (2.9), we have: $\frac{\partial x_I^*}{\partial \eta_L}=-\frac{1}{\eta_L^2}\frac{1}{\theta_I}<0$, whereas:

$$\frac{\partial x_E^*}{\partial \eta_L}=(1-z)\frac{\begin{array}{c}\left[(1-2x_I^*)\left(\theta_E-(1-z)^2\left(\frac{1}{\eta_L}-\frac{1}{\eta_H}\right)\right)\right.\\ \left.-\left(\pi_H-\frac{1}{\eta_L}(1-x_I^*)-\frac{1}{\eta_H}x_I^*\right)(1-z)^2\right]\end{array}}{\eta_L^2\left(\theta_E-(1-z)^2\left(\frac{1}{\eta_L}-\frac{1}{\eta_H}\right)\right)^2},$$

whose sign is ambiguous. Indeed, entrant innovation depends on the wage rate, and a higher η_L directly reduces wages but also decreases incumbent innovation which increases wages.

Yet, if $\theta_E=\theta_I$, the overall effect of a higher η_L on aggregate innovation is negative:

$$\begin{aligned}
&\frac{\partial x_I^*}{\partial \eta_L}+\frac{\partial x_E^*}{\partial \eta_L}\\
=\;& -\frac{1}{\eta_L^2}\frac{1}{\theta}+\frac{(1-z)(1-x_I^*)}{\eta_L^2\left(\theta-(1-z)^2\left(\frac{1}{\eta_L}-\frac{1}{\eta_H}\right)\right)}\\
&-(1-z)\frac{x_I^*\left(\theta-(1-z)^2\left(\frac{1}{\eta_L}-\frac{1}{\eta_H}\right)\right)+\left(\pi_H-\frac{1}{\eta_L}(1-x_I^*)-\frac{1}{\eta_H}x_I^*\right)(1-z)^2}{\eta_L^2\left(\theta-(1-z)^2\left(\frac{1}{\eta_L}-\frac{1}{\eta_H}\right)\right)^2}\\
=\;& -\frac{1}{\eta_L^2\left(\theta-(1-z)^2\left(\frac{1}{\eta_L}-\frac{1}{\eta_H}\right)\right)}\\
&\left(\begin{array}{c}\frac{z}{\theta}\left(\theta+(1-z)\left(\frac{1}{\eta_L}-\frac{1}{\eta_H}\right)\right)\\+(1-z)\frac{x_I^*\left(\theta-(1-z)^2\left(\frac{1}{\eta_L}-\frac{1}{\eta_H}\right)\right)+\left(\pi_H-\frac{1}{\eta_L}(1-x_I^*)-\frac{1}{\eta_H}x_I^*\right)(1-z)^2}{\left(\theta-(1-z)^2\left(\frac{1}{\eta_L}-\frac{1}{\eta_H}\right)\right)}\end{array}\right)\\
<\;& 0.
\end{aligned}$$

Overall, we therefore have:

$$\frac{\partial entrepreneur\_share_t}{\partial \eta_L}=\frac{1}{\eta_L^2}(1-(1-z)x_E^*-x_I^*)+\left(\frac{1}{\eta_L}-\frac{1}{\eta_H}\right)\frac{\partial}{\partial \eta_L}((1-z)x_E^*+x_I^*),$$

where the second term is dominated by the first term for θ large enough.

A.4 Shared rents

A.4.1 Profit sharing between inventor and developer

Here, we assume that once an innovation has been researched, it still needs to be implemented and that this development phase depends on a CEO's effort. Since we are separating the firm owner from the firm manager, we now consider that a firm's owner does not have the outside option of working as a production worker if her firm does not produce. For simplicity we assume that $M = 1 + L$, so that the economy is populated by a mass L of workers and a mass 1 of firm owners (who own both the incumbent firm but also the potential entrant firm). For simplicity, the CEO is assumed to be a worker who gets the opportunity to be CEO for a potential entrant or the incumbent in addition to his work as a production workers.

Hence for the owner of an incumbent firm, expected income (net of research spending and CEO wages) is given by:

$$\begin{aligned}\widetilde{\Pi}^{inc}\left(x_I, e_I, R_{I,H}, R_{I,L}\right) &= e_I x_I \left(\pi_H - R_{I,H}\right) Y_t + \left(1 - e_I x_I - (1-z)\, e_E^* x_E^*\right) \pi_L Y_t \\ &\quad - \left(1 - e_I\right) x_I R_{I,L} Y_t - \theta_I \frac{x_I^2}{2} Y_t,\end{aligned}$$

where e_I denotes the likelihood that the CEO succeeds in ensuring that the company implements the new technology—and similarly e_E^* is the equilibrium likelihood that the CEO of an entrant company manages to set-up a new firm. $R_{I,H} Y_t$ is the income that the CEO obtains in case of a success, and $R_{I,L} Y_t$, his income if he fails.

To obtain a success rate e_I, a CEO has to incur a utility effort cost $\psi \frac{e_I^2}{2} Y_t$. The CEOs outside option is 0 (we assume that he can always reject a negative payment). A CEO of an incumbent firm will then solve the following program:

$$\underset{e_I}{Max} \left\{ e_I R_{I,H} Y_t + \left(1 - e_I\right) R_{I,L} - \psi \frac{e_I^2}{2} Y_t \right\}.$$

We then obtain that the constraint $R_{I,L} \geq 0$ will bind. As a result the CEO will choose a success probability:

$$e_I^* = R_{I,H}^* / \psi.$$

This implies that the firm's owner will decide on a payment

$$R_{I,H}^* = \left(\pi_H - \pi_L\right)/2.$$

Therefore, in case of a success, the CEO obtains half of the gains from innovation.

Similarly for an entrant firm owner, we find that her expected income is given by:

$$\widetilde{\Pi}^{ent}\left(x_E, e_E, R_{E,H}, R_{E.L}\right) = (1-z)\, e_E x_E \left(\pi_H - R_{E,H}\right) Y_t - (1-z)\, x_E \left(1 - e_E\right) R_{E,L} Y_t - \theta_E \frac{x_E^2}{2} Y_t.$$

e_E is now the likelihood that the CEO succeeds in setting up a new firm (here we assumed that the CEO effort is undertaken after the innovation has been potentially blocked, this is without loss of generality). As above the constraint that $R_{E,L} = 0$ binds must be satisfied. We then obtain that $e_E^* = R_{E,H}^* / \psi$ as before, which now leads to

$$R_{E,H}^* = \pi_H / 2.$$

Here as well the CEO gets half of the gains from innovation in case of success.[1]

We obtain that as a share of gross output, CEOs income is given by

$$CEO\_share = x_I^* e_I^* R_{I,H} + (1-z)\, x_E^* e_E^* R_{E.H}^* = \frac{1}{\theta_I} \frac{\left(\pi_H - \pi_L\right)^4}{16\psi^2} + \frac{(1-z)^2}{\theta_E} \frac{\pi_H^4}{16\psi^2}.$$

Therefore it decreases with both entrant and incumbent innovation costs. As long as the labor force is large enough, top income earners will be the owners and the CEO. As a share of gross output, their joint income (net of innovation costs) will be given by:

$$Top\_share = \pi_H \mu^* + \pi_L \left(1 - \mu^*\right) - \frac{\theta_E x_E^2}{2} - \frac{\theta_I x_I^2}{2}, \tag{A2}$$

[1] The gains from an innovation for the owner of an entrant firm is $\pi_H Y_t$, while it was $\pi_H Y_t - w_t$ when she had the outside option of becoming a worker.

where the share of high-mark up sectors satisfies:

$$\mu^* = x_I^* e_I^* + (1-z)\, x_E^* e_E^*.$$

It is then straightforward to show that this top share decreases with the incumbent innovation costs θ_I, whereas the labor share increases with both entrant and incumbent innovation costs. Furthermore, a decrease in entrant innovation cost θ_E shifts income towards top earners relative to workers (i.e. it increases $Top\_share/wage\_share$) if and only if $3\pi_H - 4\pi_L + \pi_L\pi_H + \pi_L \frac{(\pi_H-\pi_L)^4}{8\theta_I\psi^2} > 0$, which is satisfied if profits of innovative firms are large enough relative to the non-innovative ones. Indeed, entrant innovation can potentially reduce the owner share for the same reasons as above. This establishes:

Proposition 3 *A reduction in incumbents innovation costs favors top income earners. A reduction in entrant's innovation costs favors top income earners if and only if* $3\pi_H - 4\pi_L + \pi_L\pi_H + \pi_L \frac{(\pi_H-\pi_L)^4}{8\theta_I\psi^2} > 0$.

Proof 4 *Solving for the innovation decision we obtain that incumbents invest:*

$$x_I^* = \frac{1}{\theta_I}\frac{(\pi_H-\pi_L)^2}{4\psi} = \frac{1}{4\psi\theta_I}\left(\frac{1}{\eta_L} - \frac{1}{\eta_H}\right)^2.$$

Entrants invest

$$x_E^* = \frac{1-z}{4\psi\theta_E}\pi_H^2 = \frac{1-z}{4\psi\theta_E}\left(1 - \frac{1}{\eta_H}\right)^2.$$

We can then express the share of high mark-up sector as:

$$\mu^* = \frac{1}{\theta_I}\frac{(\pi_H-\pi_L)^3}{8\psi^2} + \frac{(1-z)^2}{8\psi^2\theta_E}\pi_H^3.$$

Since the wage share is given by

$$\begin{aligned}
\frac{w_t L}{Y_t} &= 1 - \pi_L - (\pi_H - \pi_L)\,\mu^* \\
&= 1 - \pi_L - (\pi_H - \pi_L)\left(\frac{1}{\theta_I}\frac{(\pi_H-\pi_L)^3}{8\psi^2} + \frac{(1-z)^2}{8\psi^2\theta_E}\pi_H^3\right),
\end{aligned}$$

both innovation costs increase the labor share of gross output. The top earners share (using (A2) and the values for the innovation rates) can then be expressed as:

$$\begin{aligned}
Top_share &= 1 - \frac{w_t L}{Y_t} - \left(\frac{(\pi_H-\pi_L)^4}{32\theta_I\psi^2} + \frac{(1-z)^2\,\pi_H^4}{32\theta_E\psi^2}\right), \\
&= \pi_L + \frac{3\,(\pi_H-\pi_L)^4}{32\theta_I\psi^2} + \frac{(1-z)^2\,\pi_H^3\,(3\pi_H - 4\pi_L)}{32\psi^2\theta_E}.
\end{aligned}$$

Hence we get that Top_share is decreasing in θ_I. Further, we get that

$$\frac{\partial}{\partial\theta_E}\left(\frac{Top\_share}{(w_t L/Y_t)}\right) = -\frac{(1-z)^2\,\pi_H^3}{32\psi^2\theta_E^2}\left(\frac{Y_t}{w_t L}\right)^2\left(3\pi_H - 4\pi_L + \pi_L\pi_H + \pi_L\frac{(\pi_H-\pi_L)^4}{8\theta_I\psi^2}\right)$$

Hence an increase in θ_E shifts income towards workers to the detriment of the top earners if $3\pi_H - 4\pi_L + \pi_L\pi_H + \pi_L\frac{(\pi_H-\pi_L)^4}{8\theta_I\psi^2} > 0$ *(which is satisfied if π_H/π_L is large enough).*

A.4.2 Profit sharing between firm owner and inventor

To distinguish between the firm owner and the innovator we now consider that the set of potential firm owners is given. For simplicity we assume that $M = 1 + L$. There is a mass 1 of capitalists who inherit incumbent firms and can each set up an entrant firm, while innovators are drawn from the population, and there is a mass L of potential workers. Workers are identical when in production but differ in the quantity of human capital they can produce in innovation (each worker can produce h units of human capital and h is distributed uniformly over $\left[0, \overline{h}\right]$).

To innovate with probability x an incumbent firm needs to hire $\theta e^2/2$ units of human capital. Similarly an entrant firm needs to hire $\theta e^2/2$ units of human capital.[2] Denoting by v the price of 1 unit of innovative human capital normalized by Y_t, we obtain that there will be a threshold $\widehat{h}$, such that individuals whose h is below $\widehat{h}$ will be production workers and those above will be innovators. That threshold obeys

$$\frac{w}{Y} = v\widehat{h}. \tag{A3}$$

Solving for the profit maximization problem, we find the optimal innovation rates as:

$$x_I^* = \frac{\pi_H - \pi_L}{\theta v} \text{ and } x_E^* = \pi_H \frac{1-z}{\theta v}, \tag{A4}$$

for the incumbent and the entrant respectively. These rates are similar to those in the baseline model, except that they depend on the wage rate v and the entrant rate does not depend on w (as a firm owner does not have the possibility to become a worker if he fails).

Market clearing for human capital implies:

$$\begin{aligned} \theta\left(\frac{x_I^{*2}}{2} + \frac{x_E^{*2}}{2}\right) &= L\int_{\widehat{h}}^{\overline{h}} h dh \Leftrightarrow \\ \left(\pi_H - \pi_L\right)^2 + \pi_H^2\left(1-z\right)^2 &= \theta v^2 L \frac{\overline{h}^2 - \widehat{h}^2}{\overline{h}}. \end{aligned} \tag{A5}$$

This equation establishes the demand for innovative human capital as a function of the wage rate and the cost of innovation. The supply-side equation can be determined by combining (A3) with the production labor share equation:

$$\frac{wL\widehat{h}}{Y\overline{h}} = \frac{\mu}{\eta_H} + \frac{1-\mu}{\eta_L},$$

as $L\widehat{h}$ is the labor force in production. We then obtain:

$$vL\frac{\widehat{h}^2}{\overline{h}} = 1 - \pi_L + \frac{\pi_L - \pi_H}{\theta v}\left(\pi_H - \pi_L + \pi_H\left(1-z\right)^2\right). \tag{A6}$$

Plugging (A6) into (A5), we obtain that the wage rate for innovative human capital is uniquely defined by:

$$vL\overline{h} = 1 - \pi_L + \pi_L\pi_H\frac{\left(1-z\right)^2}{\theta v}. \tag{A7}$$

Hence v is decreasing in θ (i.e. the lower is the cost of innovation, the higher is the level of wage per unit of human capital).

As shown below, a decrease in the innovation cost boosts innovation both by entrants and incumbents. In addition, the threshold $\widehat{h}$ decreases, so that when innovation costs go down, more workers end up working as innovators.

[2] We assume that the innovation cost is the same for entrants and incumbents. Without this assumption a reduction in entrant's cost could lead to a reduction in overall innovation through its impact on the price of human capital for some extreme parameter assumptions.

Two measures of inequality can be derived here: the share of income going to the firm owners (here we implicitly assume that firm ownership is concentrated at the top of the income distribution) and a measure of top labor income inequality.

The income share of innovators can be derived as:

$$Innov\_share = \int_{\widehat{h}}^{\overline{h}} vLhdh = vL\left(\overline{h}^2 - \widehat{h}^2\right) / \left(2\overline{h}\right). \tag{A8}$$

One can show that this expression is decreasing in θ (hence lower innovation costs increase the share of income going to innovators).

We show below that the owner share of GDP must satisfy:

$$\begin{aligned} Owner\_share &= \pi_L (1-\mu) + \pi_H \mu - Innov\_share \\ &= \pi_L + \frac{1}{2\theta v}\left((\pi_H - \pi_L)^2 + (\pi_H - 2\pi_L)\pi_H (1-z)^2\right). \end{aligned} \tag{A9}$$

Hence a reduction in innovation costs will increase the owner share of income as long as $(\pi_H - \pi_L)^2 + (\pi_H - 2\pi_L)\pi_H (1-z)^2 > 0$ (the intuition is still that entrant innovations may decrease overall owner's net share of income by suppressing the rents of an incumbent). If firm owners are disproportionately concentrated in the top of the income distribution, this predicts that a reduction in innovation will increase top income inequality.

The labor income share going to individuals above some ratio $\widetilde{h}/\overline{h}$ can be expressed as

$$\begin{aligned} TopLincome(\widetilde{h}) &= \frac{\int_{\widetilde{h}}^{\overline{h}} vhdh}{\frac{w}{Y}\frac{\widehat{h}}{\overline{h}} + \int_{\widehat{h}}^{\overline{h}} vhdh} = \frac{\overline{h}^2 - \widetilde{h}^2}{\widehat{h}^2 + \overline{h}^2} \text{ if } \widetilde{h} \geq \widehat{h} \\ &= 1 - \frac{\frac{w}{Y}\frac{\widetilde{h}}{\overline{h}}}{\frac{w}{Y}\frac{\widehat{h}}{\overline{h}} + \int_{\widehat{h}}^{\overline{h}} vhdh} = 1 - \frac{2\widehat{h}\widetilde{h}}{\widehat{h}^2 + \overline{h}^2} \text{ if } \widetilde{h} \leq \widehat{h}. \end{aligned}$$

In both cases, $TopLincome$ is decreasing in $\widehat{h}$ and therefore also in innovation costs. One can then prove the following proposition.

Proposition 5 *A reduction in innovation costs leads to an increase in innovation, an increase in top labor income inequality and an increase in the owners' share of income if* $(\pi_H - \pi_L)^2 + (\pi_H - 2\pi_L)\pi_H (1-z)^2 > 0$.

Proof: Using (A7) we have:

$$\frac{dv}{d\theta} = \frac{v}{\theta}\frac{-\pi_L \pi_H \frac{(1-z)^2}{\theta v^2}}{L\overline{h} + \pi_L \pi_H \frac{(1-z)^2}{\theta v^2}}.$$

Hence we get:

$$\frac{d(\theta v)}{d\theta} = v\frac{L\overline{h}}{L\overline{h} + \pi_L \pi_H \frac{(1-z)^2}{\theta v^2}} > 0.$$

Using (A4) we then obtain that both entrant innovation x^* and incumbent innovation x_I^* decrease with θ. Differentiating (A5) we get:

$$\begin{aligned} \frac{d\widehat{h}}{d\theta} &= \frac{\overline{h}^2 - \widehat{h}^2}{2\theta}\left(1 + 2\frac{\theta}{v}\frac{dv}{d\theta}\right) \\ &= \frac{\overline{h}^2 - \widehat{h}^2}{2\theta}\frac{L\overline{h} - \pi_L \pi_H \frac{(1-z)^2}{\theta v^2}}{L\overline{h} + \pi_L \pi_H \frac{(1-z)^2}{\theta v^2}} \\ &= \frac{\overline{h}^2 - \widehat{h}^2}{L\overline{h} + \pi_L \pi_H \frac{(1-z)^2}{\theta v^2}}\frac{1-\pi_L}{2\theta v} > 0, \end{aligned}$$

where we used (A7) to obtain the latter equality.

Using (A5) in (A8), we obtain that the share of income that goes to innovators obeys:

$$Innov\_share = \frac{(\pi_H - \pi_L)^2 + \pi_H^2 (1-z)^2}{2\theta v},$$

which is decreasing in θ since θv is increasing in θ.

To compute the owner share we use the previous equation and (A4) in (A9) to obtain:

$$\begin{aligned} Owner\_share &= \pi_L + (\pi_H - \pi_L)(x_I^* + (1-z) x_E^*) - Innov\_share \\ &= \pi_L + (\pi_H - \pi_L)\left(\frac{\pi_H - \pi_L}{\theta v} + (1-z)\pi_H \frac{1-z}{\theta v}\right) - \frac{(\pi_H - \pi_L)^2 + \pi_H^2 (1-z)^2}{2\theta v} \\ &= \pi_L + \frac{1}{2\theta v}\left((\pi_H - \pi_L)^2 + (\pi_H - 2\pi_L)\pi_H (1-z)^2\right). \end{aligned}$$

Therefore the owner share is increasing in θ if and only if $(\pi_H - \pi_L)^2 + (\pi_H - 2\pi_L)\pi_H (1-z)^2 > 0$, which establishes the Proposition.

A.5 CES production technology

For simplicity we assume that $M = 1 + L$, and we change the production function to:

$$Y_t = \left(\int_0^1 y_{it}^{\frac{\sigma-1}{\sigma}} di\right)^{\frac{\sigma}{\sigma-1}}, \tag{A10}$$

with $y_{it} = q_{it} l_{it}$ and $\sigma > 1$. A competitive fringe has access (at the beginning of the period) to productivity level q_{it}/η_L. We focus only on productive innovations here, so that an when a firm innovates, q_{it} increases by a factor η_H and the fringe gets access to (the previous) q_{it}. We assume that η_H is small enough that the firm is forced to limit pricing.

We take the final good as the numeraire. Then we get that the equilibrium prices are:

$$p_{it}^L = \eta_L \frac{w_t}{q_{it}} \text{ in sectors without innovation} \tag{A11}$$

$$p_{it}^H = \eta_H \frac{w_t}{q_{it}} \text{ in sectors with innovation} \tag{A12}$$

Moreover $y_{it} = p_{it}^{-\sigma} Y_t$ so that $\pi_{it} = \left(p_{it} - \frac{w_t}{q_{it}}\right) p_{it}^{-\sigma} Y_t$. Hence:

$$\pi_{it}^L = \frac{\eta_L - 1}{\eta_L^\sigma}\left(\frac{w_t}{q_{it}}\right)^{1-\sigma} Y_t = \frac{\eta_L - 1}{\eta_L^\sigma}\left(\frac{w_t}{q_{it}^0}\right)^{1-\sigma} Y_t,$$

$$\pi_{it}^H = \frac{\eta_H - 1}{\eta_H^\sigma}\left(\frac{w_t}{q_{it}}\right)^{1-\sigma} Y_t = \frac{\eta_H - 1}{\eta_H}\left(\frac{w_t}{q_{it}^0}\right)^{1-\sigma} Y_t.$$

Here the superscript "0" indicates productivities pre-innovation.

A natural assumption (e.g. Aghion and Howitt, 1998, Chapter 9) is that pre-innovation, all agents in the economy have access to the technology $q_{it}^0 = \int_0^1 q_{i(t-1)} di = Q_{t-1}$. Then

$$\Pi_t^L = \frac{\eta_L - 1}{\eta_L^\sigma}\left(\frac{w_t}{Q_{t-1}}\right)^{1-\sigma} Y_t \text{ and } \Pi_t^H = \frac{\eta_H - 1}{\eta_H}\left(\frac{w_t}{Q_{t-1}}\right)^{1-\sigma} Y_t$$

so that $\Pi_t^H > \Pi_t^L$.

Note that $\Pi_t^H / \Pi_t^L = \frac{\eta_H - 1}{\eta_H} / \frac{\eta_L - 1}{\eta_L^\sigma}$ is bigger than in the Cobb-Douglas case. Another difference with the Cobb-Douglas case is the term $\left(\frac{w_t}{Q_{t-1}}\right)^{1-\sigma}$ which reflects a competition effect whereby innovation by others increases the wage and therefore raises the price of my own good because the production cost has increased.

To express the entrepreneur share of income, we need to solve for the equilibrium wage w_t. (A11), (A12) and the dynamics of q_{it} give

$$p_t^L = \eta_L \frac{w_t}{q_{t-1}} \text{ and } p_t^H = \frac{w_t}{q_{t-1}},$$

which together with the price normalization

$$\mu_t p_{t,H}^{1-\sigma} + (1-\mu_t)\, p_{t,L}^{1-\sigma} = 1,$$

immediately yields:

$$\mu_t \left(\frac{w_t}{q_{t-1}}\right)^{1-\sigma} + (1-\mu_t)\left(\eta_L \frac{w_t}{q_{t-1}}\right)^{1-\sigma} = 1,$$

so that:

$$\left(\frac{w_t}{q_{t-1}}\right)^{1-\sigma} = \frac{1}{\mu_t + (1-\mu_t)\,\eta_L^{1-\sigma}}. \tag{A13}$$

The entrepreneur share of income can then be written as:

$$\begin{aligned} \textit{entrepreneur\_share}_t &= \frac{\mu_t \Pi_{H,t} + (1-\mu_t)\,\Pi_{L,t}}{Y_t} \\ &= 1 - \frac{1}{\eta_L} + \left(\frac{1}{\eta_L} - \frac{1}{\eta_H}\right) \frac{\mu_t}{\mu_t + (1-\mu_t)\,\eta_L^{1-\sigma}} \end{aligned} \tag{A14}$$

This expression is increasing in μ_t, which is still given by $\mu_t = x_{It} + (1-z)\, x_{Et}$. In addition, we know that social mobility is still equal to $\Psi_t = x_{Et}\,(1-z)\,/L$. Therefore, we still get:

Proposition 6 *(i) A higher rate of innovation by a potential entrant, x_{Et}, is associated with a higher entrepreneur share of income and a higher rate of social mobility, but less so the higher the entry barriers z are; (ii) A higher rate of innovation by an incumbent, x_{It}, is associated with a higher entrepreneur share of income but has no direct impact on social mobility.*

We now turn to the endogenous determination of the innovation rates of entrants and incumbents. We use the same innovation function as in the baseline model. The maximization problem of the incumbent is:

$$\max_{x_I} \left\{ x_I \frac{\eta_H - 1}{\eta_H} \left(\frac{w_t}{q_{t-1}}\right)^{1-\sigma} + (1 - x_I - (1-z)\, x_E^*) \frac{\eta_H - 1}{\eta_H} \left(\frac{w_t}{q_{t-1}}\right)^{1-\sigma} + (1-z)\, x_E^* \frac{w_t}{Y_t} - \theta_I \frac{x_I^2}{2} \right\} Y_t.$$

We then obtain that the optimal innovation decision is simply

$$x_{I,t} = x_I^* = \frac{1}{\theta_I}\left(1 - \frac{1}{\eta_H} - \eta_L^{1-\sigma}\left(1 - \frac{1}{\eta_L}\right)\right)\left(\frac{w_t}{q_{t-1}}\right)^{1-\sigma}. \tag{A15}$$

A potential entrant in sector i solves the following maximization problem:

$$\max_{x_E} \left\{ (1-z)\, x_E \frac{\eta_H - 1}{\eta_H} \left(\frac{w_t}{q_{t-1}}\right)^{1-\sigma} + (1 - x_E\,(1-z)) \frac{w_t}{Y_t} - \theta_E \frac{x_E^2}{2} \right\} Y_t,$$

Therefore, we get

$$x_{E,t} = x_E^* = \left(\frac{\eta_H - 1}{\eta_H}\left(\frac{w_t}{q_{t-1}}\right)^{1-\sigma} - \frac{w_t}{Y_t}\right)\frac{(1-z)}{\theta_E}. \tag{A16}$$

Using (A14), we get:

$$\frac{w_t}{Y_t} = \frac{1 - \textit{entrepreneur\_share}_t}{L} = \frac{1}{L}\frac{\mu_t \frac{1}{\eta_H} + (1-\mu_t)\,\eta_L^{1-\sigma}\frac{1}{\eta_L}}{\mu_t + (1-\mu_t)\,\eta_L^{1-\sigma}}.$$

Plugging this expression and (A13) into (A15) and (A16) we obtain:

$$x_{I,t} = \frac{1}{\theta_I} \frac{1 - \frac{1}{\eta_H} - \eta_L^{1-\sigma}\left(1 - \frac{1}{\eta_L}\right)}{\mu_t\left(1 - \eta_L^{1-\sigma}\right) + \eta_L^{1-\sigma}}, \tag{A17}$$

$$x_{E,t} = x_E^* = \frac{1 - \frac{1}{\eta_H} - \frac{1}{L}\left[\mu_t \frac{1}{\eta_H} + (1-\mu_t)\,\eta_L^{1-\sigma}\frac{1}{\eta_L}\right]}{\mu_t + (1-\mu_t)\,\eta_L^{1-\sigma}} \frac{1-z}{\theta_E}. \tag{A18}$$

The above expression shows that a change in μ_t (for instance because of a change in incumbent innovation x_I) has an ambiguous effect on entrant innovation x_{Et}. On the one hand as in the Cobb-Douglas case, an increase in μ_t reduces w_t/Y_t and therefore makes the outside option of the entrant less appealing, which leads to higher innovation by the entrant. On the other hand, an increase in μ_t also increases w_t/q_{t-1}. This is the competition effect mentioned above which decreases entrant innovation. As a result, a reduction in incumbent innovation costs (θ_I), which increases incumbent innovation may reduces entrant innovation and thereby social mobility. Overall, we obtain:

Proposition 7 *An increase in entrant innovation costs θ_E reduces entrant innovation x_E, incumbent innovation x_I and social mobility. An increase in incumbent innovation costs θ_I reduces incumbent innovation x_I and total innovation μ but has an ambiguous impact on entrant innovation and social mobility.*

Proof 8 *To solve for the the total number of innovations, combine (A17) and (A18) to get:*

$$\mu_t = \frac{1}{\theta_I} \frac{1 - \frac{1}{\eta_H} - \eta_L^{1-\sigma}\left(1 - \frac{1}{\eta_L}\right)}{\mu_t\left(1 - \eta_L^{1-\sigma}\right) + \eta_L^{1-\sigma}} + \frac{1 - \frac{1}{\eta_H} - \frac{1}{L}\left[\mu_t \frac{1}{\eta_H} + (1-\mu_t)\,\eta_L^{1-\sigma}\frac{1}{\eta_L}\right]}{\mu_t + (1-\mu_t)\,\eta_L^{1-\sigma}} \frac{(1-z)^2}{\theta_E}.$$

This expression can be rewritten as:

$$\frac{1}{\theta_I} \frac{1 - \frac{1}{\eta_H} - \eta_L^{1-\sigma}\left(1 - \frac{1}{\eta_L}\right)}{\left(\mu_t\left(1 - \eta_L^{1-\sigma}\right) + \eta_L^{1-\sigma}\right)\mu_t} + \frac{\left(1 - \frac{1}{\eta_H} - \frac{1}{L}\frac{1}{\eta_L^{\sigma}}\right)\frac{1}{\mu_t} - \frac{1}{L}\left[\frac{1}{\eta_H} - \frac{1}{\eta_L^{\sigma}}\right]}{\mu_t + (1-\mu_t)\,\eta_L^{1-\sigma}} \frac{(1-z)^2}{\theta_E} = 1 \tag{A19}$$

As $1 - \frac{1}{\eta_H} - \frac{1}{L}\frac{1}{\eta_L^{\sigma}} > 0$ (which results from assuming that for any μ_t, $\Pi_H > w$), the LHS is decreasing in μ_t. Therefore this expression defines μ_t uniquely, and we get that total innovation μ_t decreases in the entrant and incumbent innovation costs θ_E and θ_I.

Since μ is decreasing in θ_E and x_I is decreasing in μ, we have that x_I is increasing in θ_E. Assume by contradiction that x_E is also increasing in θ_E, then μ is increasing in θ_E which is impossible. Therefore x_{Et} and so Ψ (social mobility) are decreasing in θ_E. Rewrite (A19) as:

$$\frac{x_{It}}{\mu_t} + \frac{\left(1 - \frac{1}{\eta_H} - \frac{1}{L}\frac{1}{\eta_L^{\sigma}}\right)\frac{1}{\mu_t} - \frac{1}{L}\left[\frac{1}{\eta_H} - \frac{1}{\eta_L^{\sigma}}\right]}{\mu_t + (1-\mu_t)\,\eta_L^{1-\sigma}} \frac{(1-z)^2}{\theta_E} = 1, \tag{A20}$$

an increase in θ_I decreases μ_t which increases the LHS, therefore it must decrease x_{It}. Hence x_{It} is decreasing in θ_I. Yet, since x_{Et} is ambiguous in μ, it is also ambiguous in θ_I, and so is Ψ_t.

B Empirical Appendix

B.1 Industry composition

Our regressions so far have (mostly) abstracted from industry composition. Here, we look more closely at two sectors (Finance and Natural resources) which are likely to have a large impact on top income shares.

Patents as a tool to appropriate innovation The role played by patents in appropriating innovation is heterogeneous across sectors. In particular Cohen et al. (2000) conducted a survey analysis to assess the role played by patents versus other means such as trade secrecy in protecting innovation. Based on their results (specifically Tables 1 and 2), we measure the use of patents as an appropriability mechanisms for product and process innovations at the SIC level. From this, and using the state-industry composition, we are able to compute a state level measure of the use of patents in appropriating innovation weighting the sector specific score by the share of the sector in the state GDP. We then split states into two groups of equal size each year based on this measure. Table C15 reports the results: we find that the correlation is positive for both groups of states, but it is stronger in states which use patents more intensively to appropriate innovation. That is, the effect of patents on top income inequality is stronger when they are more used to protect innovation."

Role of the financial sector The financial sector is heavily represented in the top 1% income share: Bakija et al. (2008) find that 13.2% of primary tax payers belonging to the top 1% worked in the financial sector in 2005. The above regressions already controlled for the share of the financial sector in state GDP. Tables C16 and C17 perform additional tests in OLS and IV regressions respectively. First, we control for the average employee compensation in the financial sector to capture any direct effect of this variable on the top 1% income share (column 1). Second, we exclude states in which financial activities account for a large fraction of GDP, namely New York, Connecticut, Delaware and Massachusetts (column 2). Third, we exclude financial innovations (patents belonging to the class 705: "Financial, Business Practice") in column 3. In each case, the effect of innovation on the top 1% income share is significant and positive, showing very stable values when moving from one specification to another (innovation is measured as the number of citations within 5 years per capita). Relatedly financial development may impact both innovation (by providing easier access to credit to potential innovators) and income inequality at the top (by boosting high wages). We build a specific variable to control for this channel. We map patents to 16 NAICS industries and for each state we compute the share of patents in each industry. Then, knowing the industry-level of external financial dependence, we compute the average level of external financial dependence of innovations in each state.[3] This variable (denoted EFD) should capture a variation in innovation at state-level driven by a sector that is highly dependent on external finance. Regression results are presented in column 4: the effect of innovation remains significant with a slightly lower coefficient than in the baseline regression.

Role of the oil industry Natural resources, notably oil extraction, represent a large share of GDP in certain states (in Wyoming, West Virginia and particularly Alaska, oil extraction activities account for almost 30% of total GDP in 2010), so that in these states the top 1% income share is likely to be affected by these sectors which are quite volatile. To address this issue, we control for the share of natural resources and oil extraction in GDP in column 5 of Table C16 and C17. Moreover, we remove patents from class 208 (Mineral oils: process and production) and 196 (Mineral oils: Apparatus) in column 6. Here again, our results remain significant.

Role of other sectors Finally, we check whether our results are driven by certain sectors which are particularly innovative. We use the mapping between patent technological classes and NAICS sectors to remove patents related to category 334: "Computer and Electronic Products" to exclude the fast-growing computer industries. Similarly, we remove patents from the pharmaceutical sector (NAICS 3254) and from

[3] We use the mapping between technological classes and NAICS codes from the `http://www.uspto.gov/web/offices/ac/ido/oeip/taf/data/naics_conc/` USPTO website. To measure external financial dependence at the industry level, we use the numbers computed by Kneer (2013) and averaged over the period 1980-1989 (external financial dependence is defined as the ratio of capital expenditure minus cash flow divided by capital expenditure as in Rajan and Zingales, 1998).

the electrical equipment sector (NAICS 335). Next, we add controls for the share of these three sectors.[4] Then, we use the COMTRADE database to look at the extent to which our effect of innovation on top income inequality is driven more by more export-intensive sectors. Over the period from 1976 to 2013, we identify three such sectors (Transportation, Machinery and Electrical Machinery), and we check whether our results are robust to excluding them. The results are shown in Table C18, where we conduct OLS regressions using the number of citations within five years to measure innovation. Innovation remains positively and significantly correlated with the top 1% income share, and the coefficient remains stable across specifications.

B.2 Moving inventors and agglomeration effects

Moving inventors. Talented and rich inventors may decide to move to states that are more innovative or to benefit from lower taxes. This could enhance the positive correlation between top income inequality and innovation but through a very different mechanism from the one in our model. However, using disambiguated information on the inventors of patents from the USPTO, we are able to identify the location of successive patents by a same inventor. This in turn allows us to delete patent from inventors that patented in various states. Our results still hold with slightly lower coefficients than in our baseline (see Table C19 and C20 for OLS and IV results using only patents by single-state inventors).

Agglomeration effects. One may wonder whether our results do not reflect agglomeration effects: for example, suppose that some exogenous investment taking place in one particular location (say the Silicon Valley), makes that location more attractive to skilled/talented individuals from other parts of the US. The resulting increased agglomeration of high-skill individuals should lead to both a higher top 1% income share and a higher level of innovation in the corresponding US state, but without the former necessarily resulting from the latter. Glaeser et al. (2009) and Baum-Snow and Pavan (2013) point to higher density cities displaying more income inequality while Carlino et al. (2007) and Gyourko et al. (2013) point at a positive correlation between population density and innovation and the importance of superstar cities.

Figure 1b in the introduction suggests that this should not be such a big concern for our analysis: neither California nor Massachusetts are among the states that show the fastest increase in both innovation and top income inequality over the period we analyze. To address the agglomeration objection head on, we need a measure of density that is not distorted by large rural areas like upstate New York. In the spirit of Ciccone and Hall (1996), we proceed as follows: in any state, we consider the 10 percent most populated counties in 1970, in 2015, and on average over the period 1970-2015 from the BEA regional accounts. We then compute the population density in these counties every year. This yields three indicators of urban density that are meant to capture the fact that some states were more attractive over the corresponding periods. Running our previous regressions with these additional control variables does not affect our results as seen in Table C21 (OLS regression results in columns 1, 2, 3 and IV results in columns 4, 5, 6).

[4] In order to obtain complete series, we replace the pharmaceutical sector by the whole chemistry manufacturing sector (NAICS 325).

C Additional empirical results

Table C1: Top 0.1% and Top 0.01% income share and innovation from incumbents and entrants

Dependent variable	Log of Top 0.1% Income Share			Log of Top 0.01% Income Share		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Measure of innovation	Cit5	Cit5	Cit5	Cit5	Cit5	Cit5
Innovation						
by entrants	0.030***		0.025**	0.037***		0.030**
	(0.010)		(0.010)	(0.014)		(0.014)
by incumbents		0.041***	0.036***		0.059***	0.053***
		(0.009)	(0.009)		(0.012)	(0.012)
Gdppc	0.063	0.024	0.025	0.048	-0.010	-0.008
	(0.094)	(0.097)	(0.095)	(0.131)	(0.133)	(0.131)
Popgrowth	4.047***	3.823***	3.920***	5.491***	5.169***	5.305***
	(1.382)	(1.361)	(1.378)	(1.923)	(1.895)	(1.916)
Finance	0.139***	0.178***	0.173***	0.139**	0.195***	0.189***
	(0.048)	(0.050)	(0.050)	(0.064)	(0.068)	(0.067)
Government	-0.017	-0.025	-0.014	0.011	0.002	0.016
	(0.032)	(0.032)	(0.032)	(0.041)	(0.041)	(0.041)
Unemployment	-0.007	-0.010*	-0.009*	-0.011	-0.016**	-0.015*
	(0.006)	(0.006)	(0.006)	(0.008)	(0.008)	(0.008)
TaxK	-0.057***	-0.058***	-0.059***	-0.074***	-0.076***	-0.076***
	(0.008)	(0.007)	(0.007)	(0.010)	(0.010)	(0.010)
TaxL	0.026***	0.027***	0.029***	0.028**	0.029**	0.032**
	(0.010)	(0.010)	(0.010)	(0.013)	(0.013)	(0.013)
R^2	0.826	0.827	0.829	0.785	0.787	0.789
Observations	1377	1377	1377	1377	1377	1377

Notes: Variable description is given in Appendix A. Innovation is taken in log and lagged by two years. Panel data OLS regressions with state and year fixed effects. Time span for innovation: 1980-2006. Autocorrelation and heteroskedasticity robust standard errors using the Newey-West variance estimator are presented in parentheses. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Figure C1: Distribution of the lag between patent's application and patent's grant

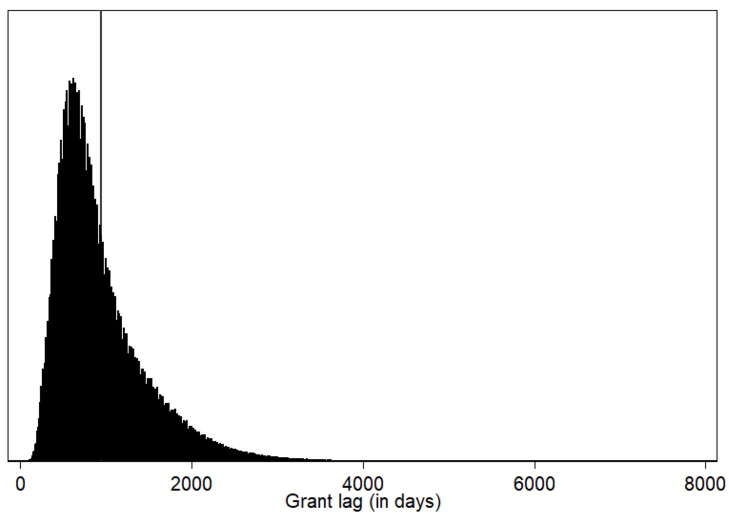


Table C2: Distribution of patents located by inventors and assignees

State	Inventors	Assignees	State	Inventors	Assignees
AK	0.1%	0.0%	**MT**	0.1%	0.1%
AL	0.4%	0.3%	**NC**	2.3%	1.4%
AR	0.2%	0.1%	**ND**	0.1%	0.0%
AZ	1.8%	0.7%	**NE**	0.2%	0.2%
CA	22.8%	24.0%	**NH**	0.7%	0.4%
CO	2.2%	1.1%	**NJ**	4.1%	5.1%
CT	2.0%	2.9%	**NM**	0.4%	0.3%
DC	0.1%	1.2%	**NV**	0.4%	0.6%
DE	0.4%	1.9%	**NY**	7.1%	11.6%
FL	2.8%	1.9%	**OH**	3.5%	3.8%
GA	1.7%	1.0%	**OK**	0.5%	0.3%
HI	0.1%	0.0%	**OR**	1.8%	0.7%
IA	0.7%	0.7%	**PA**	3.5%	2.9%
ID	1.8%	2.2%	**RI**	0.3%	0.2%
IL	3.9%	5.0%	**SC**	0.6%	0.4%
IN	1.5%	0.9%	**SD**	0.1%	0.0%
KS	0.5%	0.3%	**TN**	0.8%	0.6%
KY	0.5%	0.4%	**TX**	7.0%	6.6%
LA	0.5%	0.2%	**UT**	0.8%	0.6%
MA	4.4%	4.1%	**VA**	1.4%	0.9%
MD	1.7%	1.1%	**VT**	0.4%	0.1%
ME	0.2%	0.1%	**WA**	2.9%	2.6%
MI	4.2%	4.8%	**WI**	2.0%	1.8%
MN	3.0%	3.0%	**WV**	0.1%	0.0%
MO	1.0%	0.8%	**WY**	0.1%	0.0%
MS	0.2%	0.1%			

Notes: Distribution granted patent with an application year equal to 2000 by state whether the allocation is based on the address of the inventors or the address of the assignees.

Table C3: Top 1% income share and innovation allocation by assignee

Dependent variable	Log of Top 1% Income Share					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Measure of innovation	Patents	Cit5	Claims	Generality	Top5	Top1
Innovation	0.016**	0.025***	0.019***	0.016**	0.020***	0.022***
	(0.007)	(0.006)	(0.006)	(0.007)	(0.005)	(0.004)
Gdppc	0.106**	0.112**	0.107**	0.111**	0.093**	0.097**
	(0.041)	(0.045)	(0.043)	(0.045)	(0.044)	(0.044)
Popgrowth	0.850	0.923	0.901	0.929	0.918	0.937
	(0.640)	(0.678)	(0.646)	(0.664)	(0.688)	(0.666)
Finance	0.071**	0.084**	0.072**	0.071**	0.085**	0.089**
	(0.034)	(0.035)	(0.034)	(0.034)	(0.035)	(0.036)
Government	-0.020*	-0.025**	-0.021*	-0.021*	-0.023**	-0.025**
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Unemployment	-0.005*	-0.005	-0.005	-0.005	-0.005	-0.005
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
TaxK	-0.038***	-0.038***	-0.038***	-0.038***	-0.037***	-0.038***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
TaxL	0.017***	0.014**	0.017***	0.017***	0.013**	0.013**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
R^2	0.889	0.895	0.889	0.889	0.895	0.895
Observations	1734	1581	1734	1734	1581	1581

Notes: Innovation is taken in log and lagged by two years and is assigned to a state using the assignee location. Panel data OLS regressions with state and year fixed effects. Time span for innovation: 1976-2009 (columns 1, 3 and 4) and 1976-2006 (columns 2, 5 and 6). Autocorrelation and heteroskedasticity robust standard errors using the Newey-West variance estimator are presented in parentheses. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Table C4: Descriptive statistics by state in two distinctive years

	1980		2005			1980		2005	
	Top 1%	**Innovation**	**Top 1%**	**Innovation**		**Top 1%**	**Innovation**	**Top 1%**	**Innovation**
AK	5.33	29	12.47	44	**MT**	8.02	46	16.35	144
AL	10.01	40	18.48	138	**NC**	9.03	68	17.04	428
AR	10.05	37	16.68	69	**ND**	9.62	58	13.23	303
AZ	8.56	174	22.66	511	**NE**	9.33	46	15.24	192
CA	9.91	252	24.20	1571	**NH**	8.48	229	18.01	853
CO	9.31	209	19.56	855	**NJ**	9.83	475	20.77	618
CT	12.24	417	31.02	1051	**NM**	8.90	55	15.63	310
DC	14.48	100	23.94	160	**NV**	11.09	118	33.30	574
DE	10.19	588	21.38	406	**NY**	12.08	229	30.25	549
FL	12.23	104	31.78	246	**OH**	8.98	208	15.86	582
GA	8.95	64	19.11	310	**OK**	11.44	228	17.74	357
HI	7.52	29	16.47	125	**OR**	8.25	109	16.91	1251
IA	8.24	113	12.92	318	**PA**	9.37	218	18.71	373
ID	7.68	86	18.08	1483	**RI**	10.25	133	17.36	389
IL	9.63	220	21.67	462	**SC**	8.16	76	17.74	162
IN	8.44	179	15.52	346	**SD**	8.58	32	16.94	113
KS	10.17	74	16.09	410	**TN**	10.09	75	18.76	219
KY	9.69	83	15.76	129	**TX**	12.18	169	21.90	562
LA	11.22	63	17.65	82	**UT**	7.79	124	18.49	768
MA	10.03	324	23.79	1392	**VA**	7.97	119	17.12	295
MD	8.13	183	17.34	441	**VT**	7.97	180	16.31	1614
ME	8.55	73	15.66	140	**WA**	8.37	134	19.69	1689
MI	8.91	233	16.12	678	**WI**	8.21	167	16.48	529
MN	9.31	260	18.24	1154	**WV**	9.54	81	14.97	49
MO	9.96	85	17.11	228	**WY**	9.00	27	28.52	161
MS	10.48	21	15.81	52					

Notes: Number of citations within a five-year window per million of inhabitants and top 1% income share for all 51 states in 1980 and 2005.

Table C5: Top 1% income share and innovation with clustered standard errors

Dependent variable	Log of Top 1% Income Share					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Measure of innovation	Patents	Cit5	Claims	Generality	Top5	Top1
Innovation	0.031	0.049***	0.017	0.024	0.026***	0.020***
	(0.020)	(0.014)	(0.014)	(0.016)	(0.007)	(0.005)
Gdppc	0.089	0.063	0.096	0.093	0.074	0.087
	(0.086)	(0.084)	(0.088)	(0.087)	(0.084)	(0.088)
Popgrowth	0.943	1.089*	0.943	0.934	0.990	1.074*
	(0.637)	(0.661)	(0.640)	(0.645)	(0.648)	(0.647)
Finance	0.080	0.109*	0.072	0.078	0.098	0.094
	(0.064)	(0.063)	(0.065)	(0.064)	(0.061)	(0.061)
Government	-0.018	-0.019	-0.018	-0.018	-0.018	-0.016
	(0.027)	(0.026)	(0.028)	(0.028)	(0.025)	(0.025)
Unemployment	-0.006	-0.006	-0.005	-0.006	-0.006	-0.005
	(0.004)	(0.005)	(0.004)	(0.004)	(0.005)	(0.005)
TaxK	-0.038***	-0.039***	-0.038***	-0.038***	-0.038***	-0.037***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
TaxL	0.017	0.014	0.017	0.018	0.013	0.013
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
R^2	0.889	0.896	0.889	0.889	0.895	0.895
Observations	1734	1581	1734	1734	1581	1581

Notes: Variable description is given in Appendix A. Innovation is taken in log and lagged by two years. The dependent variable is the log of the top 1% income share. Panel data OLS regressions with state and year fixed effects. Time span for innovation: 1976-2009 (columns 1, 3 and 4) and 1976-2006 (columns 2, 5 and 6). Heteroskedasticity robust standard errors clustered at the state level are presented in parenthesis. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Table C6: Top 1% income share and innovation

Dependent variable	Log of Top 1% Income Share				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Measure of innovation	Cit5	Cit5	Cit5	Cit5	Cit5
Innovation	0.039***	0.036***	0.043***	0.045***	0.049***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Gdppc		0.075	0.055	0.052	0.063
		(0.054)	(0.053)	(0.052)	(0.044)
Popgrowth		1.146	1.255*	0.864	1.089
		(0.720)	(0.731)	(0.739)	(0.700)
Finance			0.110***	0.118***	0.109***
			(0.041)	(0.043)	(0.036)
Government			-0.007	-0.010	-0.019*
			(0.013)	(0.013)	(0.011)
Unemployment				-0.006*	-0.006*
				(0.004)	(0.003)
TaxK					-0.039***
					(0.004)
TaxL					0.014**
					(0.006)
R^2	0.880	0.882	0.884	0.884	0.896
Observations	1581	1581	1581	1581	1581

Notes: Variable description is given in Appendix A. Innovation is taken in log and lagged by two years. The dependent variable is the log of the top 1% income share. Panel data OLS regressions with state and year fixed effects. Time span for innovation: 1976-2006. Autocorrelation and heteroskedasticity robust standard errors using the Newey-West variance estimator are presented in parentheses. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Table C7: Top 1% income share and number of entrepreneurs

Dependent variable	Log of Top 1% Income Share			
	(1)	**(2)**	**(3)**	**(4)**
Measure of innovation	Log of entrepreneurs per capita			
Innovation	0.021*	0.019*	0.024**	0.022**
	(0.011)	(0.010)	(0.010)	(0.010)
Gdppc		0.194**	0.147	0.127
		(0.087)	(0.090)	(0.095)
Popgrowth		3.369***	2.019**	2.090**
		(0.912)	(0.848)	(0.839)
Finance			-0.045	-0.052
			(0.062)	(0.062)
Government			-0.027	-0.024
			(0.045)	(0.046)
Unemployment			-0.026***	-0.024***
			(0.005)	(0.005)
TaxK				-0.005
				(0.005)
TaxL				-0.009
				(0.007)
R^2	0.868	0.878	0.887	0.889
Observations	507	507	507	507

Notes: Variable description is given in Appendix A. The number of entrepreneurs is taken from Guzman and Stern (2016) and is available for 34 states from 1988. Panel data OLS regressions with state and year fixed effects. Autocorrelation and heteroskedasticity robust standard errors using the Newey-West variance estimator are presented in parentheses. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Table C8: Top 1% income share and innovation by entrants and incumbents - alternative definition of entrants

Dependent variable	Log of Top 1% Income Share					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Measure of innovation	Patents	Patents	Patents	Cit5	Cit5	Cit5
Innovation						
by entrants	0.012		0.006	0.019***		0.015**
	(0.009)		(0.009)	(0.007)		(0.007)
by incumbents		0.021***	0.019***		0.025***	0.022***
		(0.007)	(0.007)		(0.005)	(0.006)
Gdppc	0.123**	0.076	0.100*	0.086	0.049	0.055
	(0.053)	(0.056)	(0.054)	(0.059)	(0.060)	(0.059)
Popgrowth	2.085***	2.011***	2.155***	2.233***	2.182***	2.192***
	(0.751)	(0.752)	(0.760)	(0.833)	(0.823)	(0.841)
Finance	0.095***	0.114***	0.108***	0.108***	0.136***	0.131***
	(0.032)	(0.032)	(0.032)	(0.033)	(0.033)	(0.033)
Government	-0.022	-0.024	-0.021	-0.021	-0.028	-0.021
	(0.021)	(0.021)	(0.021)	(0.020)	(0.021)	(0.021)
Unemployment	-0.001	-0.003	-0.003	-0.001	-0.003	-0.003
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
TaxK	-0.037***	-0.039***	-0.038***	-0.038***	-0.039***	-0.039***
	(0.005)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
TaxL	0.025***	0.027***	0.027***	0.023***	0.023***	0.024***
	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
R^2	0.851	0.851	0.853	0.859	0.861	0.862
Observations	1530	1530	1530	1377	1377	1377

Notes: Variable description is given in Appendix A. Innovation by entrants is a count of innovation that restricts to patents whose assignee first patented less than 5 years ago. Other patents enter in the count of Innovation by incumbents. Both these measures of innovation are taken in log and lagged by two years. Panel data OLS regressions with state and year fixed effects. Time span for innovation: 1980-2009 (columns 1 to 3) and 1980-2006 (columns 4 to 6). Autocorrelation and heteroskedasticity robust standard errors using the Newey-West variance estimator are presented in parentheses. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Table C9: Descriptive statistics on the Senate appropriation committee composition

	Number of years with			Number of years with	
	1 Senator	2 Senators		1 Senator	2 Senators
AK	28	0	**MT**	22	0
AL	14	0	**NC**	2	0
AR	29	0	**ND**	25	10
AZ	20	0	**NE**	17	0
CA	14	0	**NH**	32	0
CO	17	0	**NJ**	27	0
CT	12	0	**NM**	37	0
DE	3	0	**NV**	32	1
FL	21	0	**NY**	14	0
GA	10	0	**OH**	6	0
HI	33	6	**OK**	16	0
IA	20	2	**OR**	25	0
ID	24	0	**PA**	36	0
IL	12	0	**RI**	11	0
IN	9	0	**SC**	34	0
KS	7	0	**SD**	17	0
KY	26	0	**TN**	20	0
LA	33	0	**TX**	20	0
MA	8	0	**UT**	27	0
MD	29	1	**VA**	0	0
ME	3	0	**VT**	30	2
MI	1	0	**WA**	21	10
MN	0	0	**WI**	31	8
MO	30	0	**WV**	39	0
MS	31	8	**WY**	7	0

Notes: The table gives the number of years between 1970 and 2008 with exactly one (resp. 2) senator seating in the appropriation committee. The exact composition can be found in http://www.gpo.gov/fdsys/pkg/CDOC-110sdoc14/pdf/CDOC-110sdoc14.pdfthe appropriation committee official website.

Table C10: Innovation and various measures of inequality - IV results

Dependent Variable	Top 1%	Avgtop	Top 10 %	Overall Gini	G99	Atkinson
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Measure of innovation	Cit5	Cit5	Cit5	Cit5	Cit5	Cit5
Innovation	0.185**	0.076*	0.033	-0.017	-0.047	0.072*
	(0.078)	(0.046)	(0.033)	(0.028)	(0.036)	(0.037)
Gdppc	-0.079	-0.030	-0.032	0.001	-0.005	0.066
	(0.093)	(0.053)	(0.045)	(0.034)	(0.044)	(0.047)
Popgrowth	1.663*	0.815	0.461	-0.274	-0.467*	0.587
	(0.969)	(0.578)	(0.455)	(0.203)	(0.281)	(0.370)
Finance	0.213***	0.109***	0.045	0.000	-0.044	0.080**
	(0.068)	(0.039)	(0.031)	(0.023)	(0.031)	(0.033)
Government	-0.078***	-0.046***	-0.022*	-0.003	0.014	-0.038***
	(0.024)	(0.015)	(0.012)	(0.010)	(0.012)	(0.011)
Unemployment	-0.012**	-0.004	-0.000	-0.000	0.003	-0.004*
	(0.005)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
TaxK	-0.039***	-0.016***	-0.001	-0.006***	-0.001	-0.018***
	(0.005)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
TaxL	0.016**	0.007*	-0.001	0.004**	0.001	0.013***
	(0.007)	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)
Highways	0.511	0.197	-0.044	-0.009	-0.127	0.203
	(0.464)	(0.265)	(0.182)	(0.131)	(0.170)	(0.243)
Military	-0.004	-0.008	-0.010**	-0.009**	-0.009**	-0.007**
	(0.008)	(0.005)	(0.004)	(0.004)	(0.004)	(0.003)
R^2	0.874	0.807	0.427	0.865	0.714	0.933
F-stat on excluded instruments	14.2	14.2	14.2	14.2	14.2	14.2
Observations	1550	1550	1550	1550	1550	1550

Notes: Variable description is given in Appendix A. Innovation is taken in log and lagged by two years. The dependent variables are also taken in log. Panel data IV 2SLS regressions with state and year fixed effects. Innovation is instrumented by the number of senators that seat on the appropriation committee. The lag between the instrument and the endogenous variable is set to 3 years. Time span for innovation: 1976-2009 for columns 1, 3 and 4 and 1976-2006 for columns 2, 5 and 6. DC is removed from the sample because it has no senators. Autocorrelation and heteroskedasticity robust standard errors using the Newey-West variance estimator are presented in parentheses. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Table C11: Top 1% income share and innovation at different lags - IV results

Dependent variable	Log of Top 1% Income Share				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Measure of innovation	Cit5	Cit5	Cit5	Cit5	Cit5
Lag of innovation	2 years	3 years	4 years	5 years	6 years
Innovation at $t-2$	0.211***				
	(0.077)				
Innovation at $t-3$		0.143*			
		(0.075)			
Innovation at $t-4$			0.142*		
			(0.077)		
Innovation at $t-5$				0.034	
				(0.070)	
Innovation at $t-6$					-0.004
					(0.075)
Gdppc	-0.133	-0.098	-0.099	0.025	0.073
	(0.099)	(0.106)	(0.107)	(0.094)	(0.098)
Popgrowth	2.684**	2.784***	2.730***	2.570***	2.435***
	(1.085)	(1.038)	(0.972)	(0.920)	(0.901)
Finance	0.283***	0.221***	0.202***	0.131***	0.110**
	(0.074)	(0.066)	(0.059)	(0.049)	(0.047)
Government	-0.084***	-0.088***	-0.088***	-0.109***	-0.115***
	(0.030)	(0.029)	(0.029)	(0.028)	(0.029)
Unemployment	-0.014**	-0.008	-0.008	-0.003	-0.001
	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)
TaxK	-0.037***	-0.036***	-0.036***	-0.035***	-0.035***
	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)
TaxL	0.023***	0.023***	0.022***	0.017**	0.015**
	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)
Highways	2.029***	1.355***	1.342***	0.928*	0.783
	(0.606)	(0.497)	(0.513)	(0.490)	(0.501)
Military	-0.012	-0.010	-0.010	-0.007	-0.006
	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)
R^2	0.867	0.881	0.875	0.880	0.864
F-stat on excluded instruments	16.3	13.2	12.8	13.4	11.8
Observations	1500	1500	1450	1400	1350

Notes: Variable description is given in Appendix A. Innovation is taken in log and lagged by 2 to 6 years. Panel data IV 2SLS regressions with state and year fixed effects. Innovation is instrumented by the number of senators that seat on the appropriation committee. The lag between the instrument and the endogenous variable is set to 3 years. Time span for innovation: 1979-2006. DC is removed from the sample because it has no senators. Autocorrelation and heteroskedasticity robust standard errors using the Newey-West variance estimator are presented in parentheses. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Table C12: Robustness 1: regression of innovation on top 1% income share using two instruments

Dependent variable	Log of Top 1% Income Share					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Measure of Innovation	Patents	Cit5	Claims	Generality	Top5	Top1
Innovation	0.196***	0.162***	0.125***	0.135***	0.124***	0.152***
	(0.054)	(0.035)	(0.034)	(0.035)	(0.028)	(0.039)
Gdppc	-0.116	-0.087	-0.085	-0.072	-0.114	-0.090
	(0.091)	(0.077)	(0.084)	(0.078)	(0.085)	(0.082)
Popgrowth	2.978***	2.682***	3.022***	2.811***	2.637***	2.955***
	(1.024)	(1.030)	(0.962)	(0.923)	(1.018)	(1.028)
Finance	0.184***	0.226***	0.145***	0.155***	0.200***	0.255***
	(0.042)	(0.041)	(0.037)	(0.038)	(0.042)	(0.058)
Government	-0.113***	-0.091***	-0.113***	-0.120***	-0.040	-0.028
	(0.026)	(0.027)	(0.026)	(0.026)	(0.033)	(0.037)
Unemployment	-0.012***	-0.012***	-0.009**	-0.009**	-0.011**	-0.007
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
TaxK	-0.037***	-0.036***	-0.035***	-0.037***	-0.037***	-0.035***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)
TaxL	0.025***	0.021***	0.023***	0.025***	0.018***	0.025***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)
Highways	1.260***	1.546***	1.004**	1.024**	1.421***	1.752***
	(0.441)	(0.444)	(0.414)	(0.413)	(0.451)	(0.528)
Military	0.003	0.000	0.001	-0.002	-0.000	0.011
	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.010)
R^2	0.836	0.851	0.844	0.847	0.816	0.749
F-stat on the excluded instruments	18.4	27.4	35.1	42.6	23.2	13.8
Sargan-Hansen J-stat (p-value)	0.233	0.392	0.134	0.178	0.494	0.731
Observations	1500	1350	1500	1500	1350	1350

Notes: Variable description is given in Appendix A. Innovation is taken in log and lagged by two years. Panel data IV 2SLS regressions with state and year fixed effects. Innovation is instrumented by the number of senators that seat on the appropriation committee and by a measure of spillover as described in subsection 6.1. The lag between the first instrument and the endogenous variable is set to 3 years while the lag between the second instrument and the endogenous variable is 1 year. Two additional controls for demand shocks are included, as explained in subsection 6.1. Time span: 1983-2011 for columns 1 1983-2008 for columns 2 to 6. DC is removed from the sample because it has no senators. Autocorrelation and heteroskedasticity robust standard errors using the Newey-West variance estimator are presented in parentheses. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Table C13: Regression of innovation on Top 1% income share using only the spillover instrument

Dependent variable	Log of Top 1% Income Share					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Measure of innovation	Patents	Cit5	Claims	Generality	Top5	Top1
Innovation	0.201***	0.168***	0.127***	0.138***	0.126***	0.165***
	(0.059)	(0.039)	(0.036)	(0.037)	(0.029)	(0.047)
Gdppc	-0.101	-0.071	-0.067	-0.050	-0.080	-0.103
	(0.089)	(0.073)	(0.080)	(0.074)	(0.076)	(0.082)
Popgrowth	2.530***	2.544**	2.538***	2.297***	2.240**	3.154***
	(0.937)	(0.999)	(0.865)	(0.823)	(0.976)	(1.056)
Finance	0.192***	0.237***	0.149***	0.158***	0.208***	0.276***
	(0.044)	(0.042)	(0.037)	(0.038)	(0.043)	(0.066)
Government	-0.023	-0.014	-0.030	-0.030	0.016	0.043
	(0.020)	(0.020)	(0.020)	(0.020)	(0.022)	(0.029)
Unemployment	-0.013***	-0.012***	-0.010**	-0.010***	-0.012***	-0.007
	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
TaxK	-0.036***	-0.034***	-0.033***	-0.035***	-0.034***	-0.031***
	(0.004)	(0.005)	(0.004)	(0.004)	(0.005)	(0.006)
TaxL	0.019***	0.015***	0.017***	0.017***	0.012***	0.015***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
R^2	0.824	0.838	0.834	0.836	0.804	0.710
F-stat on the excluded instruments	31.0	41.4	61.7	73.0	39.2	19.6
Observations	1530	1377	1530	1530	1377	1377

Notes: Variable description is given in Appendix A. Innovation is taken in log and lagged by 2 years. Panel data IV 2SLS regressions with state and year fixed effects. Innovation is instrumented by a measure of spillover as described in subsection 6.1. The lags between the instruments and the endogenous variable is set to 1 year. Control for spatial correlation involves adding two additional controls for demand shocks as explained in subsection 6.1. Time span for innovation: 1981-2006. Autocorrelation and heteroskedasticity robust standard errors using the Newey-West variance estimator are presented in parentheses. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Table C14: Innovation and social mobility at the Commuting Zone level. Entrants and incumbents innovation

Dependent variable	AM25	P1-5	P2-5	AM25	P1-5	P2-5	AM25
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Measure of innovation	Cit5	Cit5	Cit5	Cit5	Cit5	Cit5	Cit5
Innovation							
by entrants	0.023**	0.111***	0.048**				0.019*
	(0.009)	(0.039)	(0.022)				(0.010)
by incumbents				0.016**	0.075**	0.034*	0.006
				(0.008)	(0.033)	(0.020)	(0.007)
Gdppc	-0.081	-0.021	-0.137	-0.048	0.145	-0.072	-0.086
	(0.057)	(0.235)	(0.143)	(0.064)	(0.270)	(0.146)	(0.058)
Popgrowth	-1.770**	-4.074	-7.770***	-1.849**	-4.476	-7.948***	-1.825**
	(0.821)	(3.550)	(2.222)	(0.838)	(3.670)	(2.301)	(0.863)
Finance	0.018	-0.015	0.049	0.017	-0.021	0.046	0.018
	(0.018)	(0.070)	(0.053)	(0.019)	(0.073)	(0.054)	(0.019)
Government	0.035	0.210	0.081	0.039	0.231	0.090	0.035
	(0.033)	(0.136)	(0.094)	(0.034)	(0.145)	(0.096)	(0.033)
Unemployment	-0.225	-0.141	-0.805	-0.199	-0.028	-0.747	-0.203
	(0.208)	(0.866)	(0.549)	(0.217)	(0.900)	(0.564)	(0.210)
Tax	-0.001	-0.003	-0.003	-0.001	-0.004	-0.003	-0.001
	(0.002)	(0.006)	(0.005)	(0.002)	(0.006)	(0.005)	(0.002)
School Expenditure	0.009	0.035	0.028	0.007	0.024	0.023	0.009
	(0.009)	(0.033)	(0.024)	(0.009)	(0.036)	(0.025)	(0.009)
Employment Manuf	-0.334***	-1.400***	-1.037***	-0.385***	-1.640***	-1.146***	-0.358***
	(0.109)	(0.394)	(0.323)	(0.113)	(0.413)	(0.339)	(0.113)
R^2	0.197	0.225	0.214	0.185	0.207	0.209	0.201
Observations	662	670	670	662	670	670	662

Notes: Variable description is given in Appendix A. The number of citations per inhabitants is averaged over the period 1998-2008 and social mobility measures are taken when the child is 30 between 2011 and 2012 compared to his parents during the period 1996-2000, all these measures are taken in logs. Cross section OLS regressions with CZs weighted by population. Regressions also include a dummy for being an urban CZs. Heteroskedasticity robust standard errors clustered at the state level are reported in parentheses. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Table C15: The effectiveness of appropriability mechanisms for innovation

Dependent variable	Log of Top 1% Income Share		
	(1)	**(2)**	**(3)**
States	Above Median	Below Median	All
Measure of innovation	Cit5	Cit5	Cit5
Innovation	0.063***	0.036***	0.043***
	(0.016)	(0.009)	(0.008)
Innovation × Above Median			0.018**
			(0.008)
Above Median			0.121*
			(0.068)
Gdppc	0.194**	0.008	0.077*
	(0.097)	(0.038)	(0.045)
Popgrowth	1.305	0.670	1.186*
	(1.338)	(0.554)	(0.703)
Finance	0.088*	0.167***	0.096***
	(0.046)	(0.052)	(0.036)
Government	-0.047	-0.007	-0.018
	(0.055)	(0.011)	(0.011)
Unemployment	0.001	-0.013***	-0.005
	(0.005)	(0.004)	(0.003)
TaxK	-0.046***	-0.011**	-0.038***
	(0.006)	(0.005)	(0.004)
TaxL	0.023***	-0.018***	0.013**
	(0.008)	(0.006)	(0.006)
R^2	0.881	0.919	0.897
Observations	805	772	1581

Notes: Variable description is given in Appendix A. Innovation is taken in log and lagged by two years. Panel data OLS regressions with state and year fixed effects. Time span for innovation: 1980-2006. Above Median is a dummy variable equal to 1 if the state is above the yearly median in terms of its effectiveness of appropriability mechanisms, based on Cohen et al. (2000). Autocorrelation and heteroskedasticity robust standard errors using the Newey-West variance estimator are presented in parentheses. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Table C16: Robustness 2: financial sector and natural resources

Dependent variable	Log of Top 1% Income Share					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Measure of innovation	Cit5	Cit5	Cit5	Cit5	Cit5	Cit5
Innovation	0.057***	0.056***	0.048***	0.030***	0.052***	0.048***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Gdppc	-0.106**	0.026	0.064	0.056	0.145***	0.066
	(0.015)	(0.544)	(0.142)	(0.176)	(0.000)	(0.135)
Popgrowth	1.036	1.101	1.086	1.030	1.229*	1.086
	(0.154)	(0.123)	(0.121)	(0.135)	(0.061)	(0.120)
Finance	0.043	0.155***	0.109***	0.105***	0.138***	0.109***
	(0.209)	(0.001)	(0.002)	(0.003)	(0.000)	(0.003)
Government	0.018	-0.015	-0.020*	-0.014	-0.015	-0.019*
	(0.128)	(0.173)	(0.063)	(0.196)	(0.151)	(0.080)
Unemployment	-0.011***	-0.010***	-0.006*	-0.008**	-0.005	-0.006*
	(0.000)	(0.005)	(0.053)	(0.014)	(0.108)	(0.054)
TaxK	-0.036***	-0.031***	-0.038***	-0.040***	-0.033***	-0.039***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
TaxL	0.008	0.002	0.014**	0.014**	0.019***	0.014**
	(0.147)	(0.763)	(0.022)	(0.015)	(0.000)	(0.023)
RemunFinance	0.337***					
	(0.000)					
EFD				0.651***		
				(0.000)		
Mining+Oil					0.037***	
					(0.000)	
R^2	0.906	0.897	0.896	0.899	0.902	0.896
Observations	1581	1457	1581	1581	1581	1581

Notes: Variable *Mining+oil* measure the share of oil related and natural resources extraction activities in GDP, variable *RemunFinance* measures the compensation per employee in the financial sector and variable *EFD* measures the financial dependence of innovation. Other variables description is given in Appendix A. Innovation is taken in log and lagged by two years. Column 1 controls for average compensation in the financial sector, column 2 drops NY, CT, DE and MA (the state with the largest financial sectors), column 3 removes finance-related patents, column 4 controls for financial dependence in the state as explained in section B.1, column 5 controls for the size of oil and mining sectors and column 6 removes oil-related patents from the count of citations. Time Span: 1976-2008. Panel data OLS regressions with state and year fixed effects. Innovation as well as the top 1% income share are taken in log. Autocorrelation and heteroskedasticity robust standard errors using the Newey-West variance estimator are presented in parentheses. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Table C17: Robustness 2: financial sector and natural resources - IV results

Dependent variable	Log of Top 1% Income Share					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Measure of innovation	Cit5	Cit5	Cit5	Cit5	Cit5	Cit5
Innovation	0.190***	0.260***	0.189**	0.191*	0.155**	0.188**
	(0.074)	(0.096)	(0.080)	(0.101)	(0.070)	(0.080)
Gdppc	-0.245**	-0.169	-0.079	-0.081	0.039	-0.075
	(0.098)	(0.111)	(0.093)	(0.098)	(0.081)	(0.091)
Popgrowth	1.594	1.764	1.608	1.687*	1.667*	1.667*
	(0.980)	(1.105)	(0.978)	(1.007)	(0.857)	(0.970)
Finance	0.127**	0.226***	0.218***	0.216***	0.217***	0.215***
	(0.060)	(0.068)	(0.070)	(0.077)	(0.062)	(0.069)
Government	-0.028	-0.064***	-0.080***	-0.079***	-0.071***	-0.078***
	(0.021)	(0.024)	(0.024)	(0.025)	(0.021)	(0.024)
Unemployment	-0.016***	-0.019***	-0.012**	-0.012**	-0.009*	-0.012**
	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)
TaxK	-0.037***	-0.034***	-0.039***	-0.039***	-0.032***	-0.039***
	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)
TaxL	0.009	0.010	0.016**	0.016**	0.019***	0.015**
	(0.006)	(0.009)	(0.007)	(0.007)	(0.006)	(0.007)
Highways	-0.180	0.309	0.535	0.531	0.674*	0.505
	(0.437)	(0.523)	(0.476)	(0.517)	(0.385)	(0.467)
Military	0.010	-0.004	-0.004	-0.004	-0.002	-0.004
	(0.007)	(0.008)	(0.008)	(0.008)	(0.007)	(0.008)
RemunFinance	0.420***					
	(0.049)					
EFD				-0.127		
				(0.509)		
Mining+Oil					0.040***	
					(0.007)	
R^2	0.886	0.838	0.872	0.872	0.892	0.873
F-stat on the excluded instruments	14.1	10.7	13.5	10.5	15.0	13.9
Observations	1550	1426	1550	1550	1550	1550

Notes: Variable *Mining+oil* measure the share of oil related and natural resources extraction activities in GDP, variable *RemunFinance* measures the compensation per employee in the financial sector and variable *EFD* measures the financial dependence of innovation. Other variables description is given in Appendix A. Innovation is taken in log and lagged by two years. Column 1 controls for average compensation in the financial sector, column 2 drops NY, CT, DE and MA (the state with the largest financial sectors), column 3 removes finance-related patents, column 4 controls for financial dependence in the state as explained in section B.1, column 5 controls for the size of oil and mining sectors and column 6 removes oil-related patents from the count of citations. Time Span for innovation: 1976-2008. Panel data IV 2SLS regressions with state and year fixed effects. Innovation is instrumented by the number of senators that seat on the appropriation committee. The lag between the instrument and the endogenous variable is set to 3 years. Time span for innovation: 1979-2006. DC is removed from the sample because it has no senators. Autocorrelation and heteroskedasticity robust standard errors using the Newey-West variance estimator are presented in parentheses. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Table C18: Robustness 3: controlling for industry composition

Dependent variable	Log of Top 1% Income Share				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Measure of innovation	Cit5	Cit5	Cit5	Cit5	Cit5
Innovation	0.035***	0.049***	0.048***	0.049***	0.047***
	(0.010)	(0.009)	(0.009)	(0.009)	(0.007)
Gdppc	0.087*	0.062	0.064	0.069	0.058
	(0.045)	(0.044)	(0.044)	(0.043)	(0.043)
Popgrowth	1.076	1.094	1.088	1.249*	1.082
	(0.697)	(0.700)	(0.700)	(0.702)	(0.697)
Finance	0.089**	0.110***	0.109***	0.131***	0.112***
	(0.036)	(0.036)	(0.036)	(0.044)	(0.036)
Government	-0.021*	-0.019*	-0.019*	-0.023**	-0.019*
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Unemployment	-0.005	-0.006**	-0.006*	-0.007**	-0.007**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
TaxK	-0.037***	-0.039***	-0.039***	-0.037***	-0.038***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
TaxL	0.013**	0.014**	0.014**	0.013**	0.013**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Size of Sector					
Computer and Electronic				0.501	
				(0.484)	
Chemistry				-0.642***	
				(0.186)	
Electrical Component				3.884*	
				(2.002)	
R^2	0.894	0.896	0.896	0.898	0.897
Observations	1581	1581	1581	1578	1581

Notes: Variable description is given in Appendix A. Innovation is taken in log and lagged by 2 years. Column 1 excludes patents from the computer sectors (NAICS: 334), column 2 excludes patents from the pharmaceutical sectors (NAICS: 3254) and column 3 excludes patents from the electrical equipment sectors (NAICS: 335), column 4 adds the share of three sectors as additional controls and column (5) excludes citations to patents belonging to three highly exporting sectors: Transportation, Machinery and Electrical Machinery. The size of a sector (see column 4) is defined as the share of GDP from the corresponding sector. Panel data OLS regressions with state and year fixed effects. Time span for innovation: 1979-2006. Autocorrelation and heteroskedasticity robust standard errors using the Newey-West variance estimator are presented in parentheses. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Table C19: Top 1% income share and innovation for single state inventors

Dependent variable	Log of Top 1% Income Share					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Measure of innovation	Patents	Cit5	Claims	Generality	Top5	Top1
Innovation	0.020*	0.040***	0.025**	0.022**	0.020***	0.019***
	(0.012)	(0.009)	(0.010)	(0.011)	(0.005)	(0.004)
Gdppc	0.099**	0.072	0.087**	0.096**	0.090**	0.096**
	(0.043)	(0.044)	(0.044)	(0.043)	(0.043)	(0.043)
Popgrowth	0.915	1.075	0.956	0.947	0.902	0.895
	(0.651)	(0.701)	(0.650)	(0.649)	(0.701)	(0.681)
Finance	0.075**	0.101***	0.080**	0.079**	0.092**	0.093***
	(0.035)	(0.036)	(0.035)	(0.035)	(0.036)	(0.036)
Government	-0.018	-0.020*	-0.018	-0.018	-0.016	-0.018
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Unemployment	-0.005*	-0.006*	-0.006*	-0.005*	-0.006*	-0.006*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
TaxK	-0.038***	-0.039***	-0.038***	-0.038***	-0.038***	-0.038***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
TaxL	0.017***	0.014**	0.017***	0.017***	0.012**	0.012**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
R^2	0.889	0.895	0.889	0.889	0.894	0.894
Observations	1734	1581	1734	1734	1581	1581

Notes: This table shows similar results as the one from Table 3 but patents from inventors that have changed its state of residence over the period are removed. All the innovation measures as well as the dependent variable are taken in log. Time span for innovation: 1976-2009 (columns 1, 3 and 4) and 1976-2008 (columns 2, 5 and 6). Variable description is given in Appendix A. Autocorrelation and heteroskedasticity robust standard errors using the Newey-West variance estimator are presented in parentheses. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Table C20: Regression of innovation on top 1% income share using instrument based on Appropriation Committee composition in the Senate. Single state inventors

Dependent variable	Top 1% Income Share					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Measure of innovation	Patents	Cit5	Claims	Generality	Top5	Top1
Innovation	0.212**	0.167**	0.172**	0.215**	0.116**	0.104**
	(0.097)	(0.068)	(0.076)	(0.100)	(0.049)	(0.043)
Gdppc	-0.096	-0.060	-0.116	-0.119	-0.016	0.037
	(0.105)	(0.085)	(0.110)	(0.116)	(0.071)	(0.054)
Popgrowth	1.987**	1.689*	2.011**	2.204**	0.778	0.723
	(0.966)	(0.968)	(0.915)	(1.059)	(0.912)	(0.744)
Finance	0.176***	0.196***	0.178***	0.207***	0.180***	0.181***
	(0.060)	(0.061)	(0.059)	(0.072)	(0.059)	(0.058)
Government	-0.097***	-0.079***	-0.090***	-0.111***	-0.042	-0.055**
	(0.025)	(0.024)	(0.024)	(0.028)	(0.029)	(0.026)
Unemployment	-0.012**	-0.010**	-0.011**	-0.012**	-0.011**	-0.010**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)
TaxK	-0.042***	-0.040***	-0.040***	-0.041***	-0.037***	-0.037***
	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
TaxL	0.023***	0.016**	0.021***	0.023***	0.009	0.010
	(0.008)	(0.007)	(0.007)	(0.008)	(0.007)	(0.006)
Highways	0.304	0.359	0.328	0.424	0.468	0.453
	(0.416)	(0.408)	(0.412)	(0.440)	(0.439)	(0.404)
Military	-0.004	-0.005	-0.006	-0.007	-0.006	-0.002
	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)	(0.008)
R^2	0.866	0.878	0.871	0.858	0.863	0.866
F-stat on the excluded instruments	17.6	18.2	21.6	13.5	17.3	16.7
Observations	1700	1550	1700	1700	1550	1550

Notes: This table shows similar results as the one from Table 10 but patents from inventors that have changed its state of residence over the period are removed. Time span for innovation: 1976-2009 (columns 1, 3 and 4) and 1976-2006 (columns 2, 5 and 6). Autocorrelation and heteroskedasticity robust standard errors using the Newey-West variance estimator are presented in parentheses. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

Table C21: Robustness 4: controlling for agglomeration effect - OLS and IV results

Dependent variable	Log of Top 1% Income Share					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Measure of innovation	Cit5	Cit5	Cit5	Cit5	Cit5	Cit5
Innovation	0.046***	0.047***	0.046***	0.196**	0.194**	0.195**
	(0.008)	(0.008)	(0.008)	(0.076)	(0.076)	(0.076)
Gdppc	0.048	0.046	0.044	-0.098	-0.097	-0.100
	(0.044)	(0.044)	(0.044)	(0.092)	(0.092)	(0.092)
Popgrowth	1.164	1.162	1.163	1.709*	1.706*	1.710*
	(0.713)	(0.714)	(0.712)	(1.004)	(1.002)	(1.002)
Finance	0.098***	0.102***	0.101***	0.214***	0.215***	0.216***
	(0.035)	(0.035)	(0.035)	(0.067)	(0.067)	(0.067)
Government	-0.055***	-0.054***	-0.055***	-0.072***	-0.073***	-0.073***
	(0.011)	(0.011)	(0.011)	(0.023)	(0.023)	(0.023)
Unemployment	-0.008**	-0.008**	-0.008**	-0.014***	-0.013***	-0.014***
	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)
TaxK	-0.037***	-0.037***	-0.037***	-0.040***	-0.040***	-0.040***
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
TaxL	0.016***	0.016***	0.016***	0.020***	0.020***	0.020***
	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
Agglomeration	0.190***	0.179***	0.183***	0.153***	0.145***	0.146***
	(0.019)	(0.018)	(0.018)	(0.021)	(0.021)	(0.022)
Highways				0.343	0.346	0.341
				(0.480)	(0.476)	(0.480)
Military				-0.003	-0.003	-0.003
				(0.008)	(0.007)	(0.008)
R^2	0.903	0.902	0.903	0.873	0.874	0.873
F-stat on the excluded instruments				14.4	14.3	14.3
Observations	1581	1581	1581	1550	1550	1550

Notes: Variable description is given in Appendix A. Innovation is taken in log and lagged by 2 years. We look at the effect of agglomeration as captured by the variable *Agglo*. *Agglo* is the log of the number of firms in the most (columns 1 and 4), the two most (columns 2 and 5), and the three most (columns 3 and 6) innovative sectors for each state and year. Time span: 1976-2008. Variable description is given in Appendix A. Panel data OLS (columns 1 to 3) and IV 2SLS (columns 4 to 6) regressions with state and year fixed effects. DC is removed from the sample in columns 4, 5 and 6 because it has no senators. Innovation is instrumented by the number of senators that seat on the appropriation committee. The lag between the instrument and the endogenous variable is set to 3 years. t/z statistics in parentheses, computed with autocorrelation and heteroskedasticity robust standard errors using the Newey-West variance estimator. ***, ** and * respectively indicate 0.01, 0.05 and 0.1 levels of significance.

D Details on the calibration

In this section we explain how the 6 moments in the data determine the 6 parameters of the model (θ_I, θ_E, ϕ, L, η_H, η_L). For convenience, we introduce the following notations: $t = M_1$denotes the top 1% income share, $R = M_2$ denotes the ratio of entrant to incumbent innovations, $e = M_3$ denotes the elasticity of the top 1% share with respect to innovation, $\widetilde{\eta} = M_4$ denotes the average mark-up, $E = M_5$ denotes the entrants' employment share and $g = M_6$ denotes the growth rate. By definition the innovation ratio obeys $x_E = Rx_I$,the growth rate of the economy is given by:

$$(\phi x_I + x_E)\ln \eta_H = g, \tag{A21}$$

and the average mark-up by:

$$\mu\eta_H + (1-\mu)\,\eta_L = \widetilde{\eta}. \tag{A22}$$

Provided that $\mu/(1+L) < 1/100 < 1/(1+L)$ (which ex-post ends up being the relevant range), equation (2.12) implies that the top 1% share obeys:

$$\mu\left(\frac{1}{\eta_L} - \frac{1}{\eta_H}\right) + \frac{1+L}{100}\left(1 - \frac{1}{\eta_L}\right) = t, \tag{A23}$$

and, using equation (2.13), the semi-elasticity of the top 1% share with respect to innovation is given by:

$$\mu\left(\frac{1}{\eta_L} - \frac{1}{\eta_H}\right) = et. \tag{A24}$$

The semi-elasticity of innovation with respect to the top 1 % share depends on the innovation rate μ and on the extra-profit share made by innovating entrepreneurs, namely $1/\eta_L - 1/\eta_H$.

Finally, using that labor costs equal revenues divided by the mark-up, we obtain that the entrant employment share is given by:

$$E = \frac{x_E \frac{1}{\eta_H}}{\mu\frac{1}{\eta_H} + (1-\mu)\,\frac{1}{\eta_L}}. \tag{A25}$$

In the above equations, we have that $\mu = x_I + x_E$ (since $z = 0$), x_I is given by (2.9) and, using (2.11), x_E is given by:

$$x_E = \frac{1 - \frac{1}{\eta_H} - \frac{1}{L}\frac{1}{\eta_L} + \frac{1}{L}\left(\frac{1}{\eta_L} - \frac{1}{\eta_H}\right)^2 \frac{1}{\theta_I}}{\theta_E - \frac{1}{L}\left(\frac{1}{\eta_L} - \frac{1}{\eta_H}\right)}. \tag{A26}$$

Assume that one knows μ, η_L and η_H. Then one obtains $x_E = \frac{R}{1+R}\mu$ and $x_I = \frac{1}{1+R}\mu$. Given the innovation rates and the innovation step-size, the rate of productive incumbent innovations, ϕ, is identified by the measured growth rate in the economy, following (A21). Given the extra profits made by innovative entrepreneurs ($\mu\left(\frac{1}{\eta_L} - \frac{1}{\eta_H}\right)$), the top 1% share in (A23) determines the number of non-innovative entrepreneurs that are in the top 1% share and thereby identifies the ratio of workers to entrepreneurs L. Given x_I, x_E, η_L and η_H, the R&D parameters θ_I and then θ_E are directly given by (2.9) and (A26).

In return, the innovation rate μ and the mark-ups η_L and η_H are determined solely by 3 equations. Equation (A22) gives the average mark-up. Equation (A24) gives a relationship between the innovation rate and the difference in inverse mark-ups. (A25) can be rewritten as

$$\frac{R}{1+R}\mu\frac{1}{\eta_H} = E\left(\mu\frac{1}{\eta_H} + (1-\mu)\,\frac{1}{\eta_L}\right). \tag{A27}$$

Given the harmonic average of mark-ups, a high innovation rate increases the entrant employment share but a high innovation step reduces it.

In fact, we can go a bit further, combining (A24) and (A22), we get:

$$\eta_L = \widetilde{\eta}/\left(et\eta_H + 1\right). \tag{A28}$$

Table D1: Simulation results

Moment	Empirics	Simulation	Affected by the s.d. of:
s.d. of the state fixed effects	0.173	0.163	$\varepsilon_{\delta,i}$, $\varepsilon_{\theta,i}$ and $\varepsilon_{\eta,i}$
s.d. of the year fixed effects	0.325	0.319	$\varepsilon_{\delta,t}$
s.d. of log Cit5	1.348	1.107	$\varepsilon_{\theta,i,t}$, $\varepsilon_{\theta,i}$, $\varepsilon_{\eta,i,t}$, $\varepsilon_{\eta,i}$ and $\varepsilon_{\mu.i,t}$
s.d.of log Cit5 controlling for state fixed effects	0.744	0.889	$\varepsilon_{\theta,i,t}$, $\varepsilon_{\eta,i,t}$ and $\varepsilon_{\mu.i,t}$
s.d. of predicted log Cit5	1.057	0.959	$\varepsilon_{\theta,i,t}$, $\varepsilon_{\theta,i}$, and $\varepsilon_{\eta,i}$
s.d.of predicted log Cit5 controlling for state fixed effects	0.702	0.697	$\varepsilon_{\theta,i,t}$
s.d. of top income inequality	0.046	0.056	all except $\varepsilon_{\mu,i,t}$
OLS coefficient	0.049	0.051	$\nearrow$ with the s.d. of $\varepsilon_{\theta,i,t}$ $\swarrow$ with the s.d. of $\varepsilon_{\eta,i,t}$ and $\varepsilon_{\mu,i,t}$

Notes: OLS coefficient and standard deviation of various variables in the data and on average in 500 draws of our simulated data.

Using this equation and (A24), in (A27), we get:

$$\left(\frac{et\eta_H+1}{\widetilde{\eta}}-et\right)\left(\frac{\eta_H\left(et\eta_H+1\right)}{\widetilde{\eta}}-1\right)=\frac{R}{1+R}\frac{et}{E} \tag{A29}$$

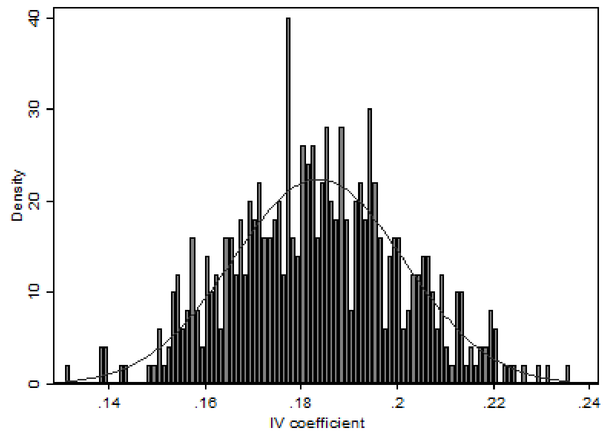
The left-hand side is an increasing function of η_H for $\eta_H \geq \widetilde{\eta}$ and for $\eta_H = \widetilde{\eta}$, it is equal to et, which is lower than the right-hand side since $\frac{R}{1+R} > E$. Therefore this equation identifies η_H uniquely. And everything else equal, a higher E and a higher R lead to a lower η_H. It is then easy to obtain η_L through (A28), where a higher $\widetilde{\eta}$ and lower et and η_H lead to a higher η_L. Finally given η_L and η_H, the innovation rate is determined by (A24): a higher semi-elasticity of innovation et, leads to a higher innovation rate e. All parameters can then be identified as explained above and it can be checked that we are indeed in the case where $\mu/\left(1+L\right) < 1/100 < 1/\left(1+L\right)$.

Calibrating the shocks for the regression. We assume that the shocks to innovation are normally distributed with $\varepsilon_{\theta,i,t} \sim N\left(0.72^2/2, 0.72^2\right)$ and $\varepsilon_{\theta,i} \sim N\left(0.62^2/2, 0.62^2\right)$ (this implies that the R&D shock to $x_{I,i,t} = \frac{1}{\theta_{I,i,t}}\left(\frac{1}{\eta_{L,i,t}} - \frac{1}{\eta_H}\right)$ has mean 0). The shocks to non-innovator mark-ups are uniformly distributed with $\varepsilon_{\eta,i,t} \sim U\left(-0.6g, 0.6g\right)$ and $\varepsilon_{\eta,i,t} \sim U\left(-0.4g, 0.4g\right)$ where $g = \min\left(\eta_L - 1, \eta_H - 1\right)$ (so that we always have $\eta_H > \eta_{L,i,t} > 1$). With the different shocks it is possible that $x_{I,i,t}$ or $x_{E,i,t}$ are greater than 1 which, within the model, makes no sense, therefore we censor the two variables at 1. The "measurement error shocks" on top income inequality are normally distributed with $\varepsilon_{\delta,t} \sim N\left(-0.325^2/2, 0.325^2\right)$, $\varepsilon_{\delta,i,t} \sim N\left(-0.07^2/2, 0.07^2\right)$ and $\varepsilon_{\delta,i} = 0$ in the specific regressions we report on. The measurement error to innovation $\varepsilon_{\mu,i,t}$ is also normally distributed with $\varepsilon_{\mu,i,t} \sim N\left(-0.47^2/2, 0.47^2\right)$. The standard deviations are chosen so that the simulated data (an average of 500 draws) are in line with the actual data regarding the empirical moments reported in Table D1 below.[5]

This shows that "realistic" shocks in terms of the deviations observed in the data can reproduce the gap between the OLS and IV coefficient. The major deviation in the table above is that in our simulations, the standard deviation of the (unpredicted) innovation variable (log Cit5) is too large when one controls for state fixed effects and too small when one does not. This could be corrected for instance by introducing state-specific measurement errors on innovation.

[5] We do not try to identify what the standard deviations of the shocks are and therefore did not try to choose standard deviations so as to minimize the distance between empirical moments and simulated moments here.

Figure D1: Distribution of the IV coefficients



Notes: This figure plots the whole distribution of the IV coefficient of innovation obtained with 1000 draws. Average value is 0.183 and standard deviation is 0.0178.

E Computing top income shares at the CZ level

To compute top income shares at the CZ level, we need to estimate the expected income for individuals whose income is censored. To do so we expend on the methodology of Clemens et al. (2017) (see also Armour et al., 2016). The census reports separately individuals' labor income, capital income and business income and each income source is censored separately. We assume that above a certain total income level $\underline{x}$, income is Pareto distributed.

Denote by $\bar{l}$, $\bar{c}$ and $\bar{b}$ the levels above which the census data are censored. Then for an individual i, denote by l_i her labor income, c_i her capital income, and b_i her business income *as reported in the data* with $l_i = \bar{l}$ if labor income is censored and similarly $b_i = \bar{b}$ or $c_i = \bar{c}$ if another source of income is censored. Denote x_i the true total income of individual i. Then there are two cases. First, if $l_i < \bar{l}$, $c_i < \bar{c}$ and $b_i < \bar{b}$, then we know that her total income is $x_i = l_i + b_i + c_i$. Conditional on having $x_i > \underline{x}$, the conditional probability density function of observing an income x_i is given by $\alpha \underline{x}^{\alpha} / x_i^{\alpha+1}$ where α is the shape parameter of the Pareto distribution of income. Denote by $\mathcal{N}_{unc}$ the corresponding set of observations for which no information is censored and where $x_i > \underline{x}$, and by N_{unc} the cardinal of that set.

On the other hand, if one observation or more are censored, then we only know that her total income $x_i \geq \overline{x}_i \equiv l_i + b_i + c_i$. Conditional on having $\overline{x}_i \geq \underline{x}$, then the probability of observing $x_i \geq \overline{x}_i$ is given by $(\underline{x}/\overline{x}_i)^{\alpha}$. Denote by $\mathcal{N}_{cens}$ the corresponding set of observations for which at least one source of income is censored and with $\overline{x}_i \geq \underline{x}$ (we choose $\underline{x}$ low enough so that this is always the case when an observation is censored).

We can then write the likelihood function as

$$P = \prod_{i \in \mathcal{N}_{unc}} \alpha \left(\frac{\underline{x}}{x_i} \right)^{\alpha} \frac{1}{x_i} \prod_{i \in \mathcal{N}_{cens}} \left(\frac{\underline{x}}{\overline{x}_i} \right)^{\alpha}.$$

The resulting maximum log-likelihood estimate is given by

$$\frac{1}{\widehat{\alpha}} = \frac{1}{N_{unc}} \left(\sum_{i \in \mathcal{N}_{unc}} \ln \left(\frac{x_i}{\underline{x}} \right) + \sum_{i \in \mathcal{N}_{cens}} \ln \left(\frac{\overline{x}_i}{\underline{x}} \right) \right).$$

We can then compute top income shares by assuming that for any observation $i \in \mathcal{N}_{cens}$, we have that $x_i = \frac{\widehat{\alpha}}{\widehat{\alpha}-1} \overline{x}_i$.

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