



Inventors and Unemployment Insurance:

UNDERSTANDING THE SAFETY NET FOR INNOVATORS

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Executive Summary

Innovation is a key engine of economic growth. Yet, for the individuals and firms driving it, the path to innovation involves risk. Developing new ideas requires time, effort, and substantial financial investment. When those ideas do not succeed, the costs can fall on the inventor in the form of a job loss. However, public safety-net programs can help cushion these risks. For inventors employed in the private sector, Unemployment Insurance (UI) offers temporary income support during periods of involuntary job loss. However, it is unknown how often inventors utilize UI and what their outcomes are. Do they frequently access the UI program despite being higher-income workers? How does their unemployment experience compare to that of regular UI claimants?

This report examines how inventors interact with the UI program in California. To study this previously unexplored intersection, we link patent filing data with California earnings and UI data. This allows us to build work histories for over 300,000 patent filers employed in California between 2002 and 2021Q1. Among these, we identify more than 50,000 inventors who filed a patent before claiming UI, whom we define as inventor-claimants. We then show the demographics, industry, and UI experiences of these inventor-claimants, and their labor market outcomes after they apply for UI.

Key Research Findings

1. **Inventors experience layoffs and interact with UI at substantial rates.** Between 2002 and 2021Q1, among the 305,193 inventors who were employed in California at some point, 50,300 (16%) had claimed UI after filing for a patent, reflecting significant engagement with the UI system. Since UI can only be claimed after a layoff — and not all eligible workers apply — the true number of inventors experiencing layoffs is likely higher.
2. **Inventor claims appear more responsive to the business cycle.** In general, UI claims rise during recessions, but inventor UI claims are especially sensitive to economic downturns — except during COVID-19, when they were less affected than in prior recessions. Being an inventor does not confer immunity from recession-driven layoffs.
3. **Inventor claimants are demographically distinct and economically advantaged.** They are older, predominantly male, and more likely to identify as White or Asian. Compared to typical UI claimants, they are over three times as likely to hold a graduate degree and earn nearly three times more in quarterly wages.

4. **The companies that inventor-claimants worked at are not typical.**
Inventors had worked in smaller firms that paid higher wages on average, and they experienced 50% longer job tenure at these companies than that of the tenure of the average UI claimant (15 quarters). Their industry distribution is more concentrated compared to regular UI claimants: 45% were employed in Professional, Scientific, and Technical Services or Manufacturing, with less representation in Healthcare, Construction, Administrative Services, and Retail Trade.
5. **Inventors receive higher UI benefits, but have similar durations.**
Due to higher earnings, their weekly and maximum benefit amounts are larger than those of typical claimants. However, their replacement rates — benefits as a share of prior earnings — are lower. The amount of time they receive UI is comparable to other claimants.
6. **Inventor-claimants experience slower employment recovery after they start receiving UI.** After adjusting for demographic differences, their employment rates remain lower for up to 16 quarters after the start of their claim. At the same time, their earnings spike in the claim quarter — driven by the top 5% of claimants by earnings — likely reflecting severance pay, bonuses, or deferred compensation. These patterns suggest two reinforcing mechanisms: (1) search frictions from specialized skill matching can delay reemployment, and (2) liquidity from the earnings spike eases short-term financial constraints, enabling longer job searches. Star inventors — those whose patents are highly cited — by contrast, show greater resilience and stronger reemployment prospects relative to the average inventor-claimant.

I. Introduction

Innovation is a cornerstone of long-term economic growth. Innovation-driven technological progress, accompanied by capital and labor, generates sustained improvements in productivity and living standards (Solow, 1956; Romer, 1990). Historically, the United States has benefited from a rapid pace of innovation, delivering extraordinary gains in output, efficiency, and overall welfare (Romer, 2000). A robust patent and copyright system has long served as a key mechanism for compensating inventors and promoting continued innovation.

Most innovation today is generated by inventors working within firms (Lamoreaux & Sokoloff, 2005). The individuals and firms driving innovation face inherently risky paths. Developing new ideas demands time, expertise, and substantial financial investment. When innovations fail to gain traction, the costs can fall disproportionately on the inventor, including job loss or business closure. For inventors employed in the private sector, the Unemployment Insurance (UI) system can help cushion these risks.

The UI system provides temporary income support to employees who lose their jobs through no fault of their own. In California, UI claimants can receive weekly payments that replace 50% of their pre-UI earnings¹ up to a maximum of \$450/week, and they can typically receive these payments for up to 26 weeks. This financial assistance can help inventors meet their living expenses while unemployed, and enable a longer and more deliberate search for a job that matches their skills.

While UI can be an important source of security for inventors, the extent to which inventors use UI remains unclear. Do they frequently access the UI program despite being higher-income workers? How does their unemployment experience compare to regular UI claimants? This policy brief combines patent records with administrative UI data to show how inventors interact with UI — exploring patterns of access, engagement, and labor outcomes, and drawing implications for innovation-supportive workforce policy.

1. The weekly benefit amount (WBA) is based on 50% of their weekly earnings in the highest earning quarter of their base period (usually the first four of the last five completed calendar quarters before they filed for UI).

II. Data and Methods

This analysis draws on three linked datasets to examine how inventors interact with the UI system in California. First, we collect patent filings from the United States Patent and Trademark Office (USPTO), covering all patents and published applications from 1970 through Q1 of 2021.² This dataset includes the name, address, and state of each applicant, along with application outcomes, and the number of times the patent is cited in other patent applications. We define individuals listed on patent grants or published patent applications as inventors.³ Second, we use a proprietary dataset from Infutor, which provides longitudinal address histories for individuals who resided in California between 1980 and 2016. It includes names, Social Security Numbers (SSNs), and basic demographic information such as age and gender. Third, we use administrative records from the California Employment Development Department (EDD), including UI claims microdata, quarterly earnings records, and the Quarterly Census of Employment and Wages (QCEW). These datasets cover the universe of UI claims filed in California from January 1, 2000, through December 2024. They provide detailed claim- and person-level information, quarterly UI-covered earnings for each employer-employee pair, and firm-level data on earnings, employment, and industry. All linkage and analysis using identified data was conducted on secure CPL servers or within EDD's secure environment.

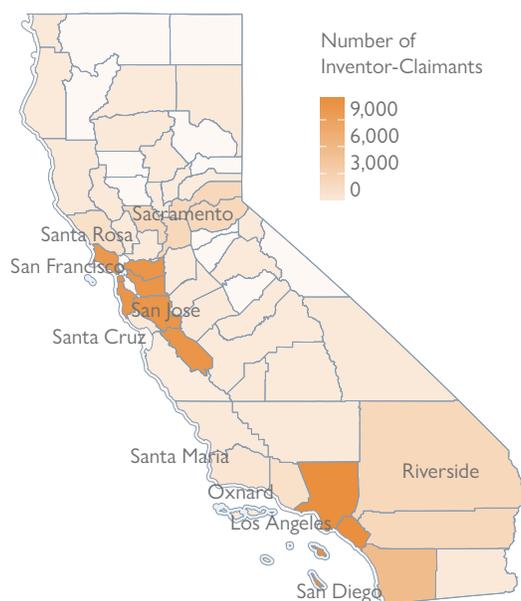
By linking these data, we construct a longitudinal dataset of workers who were employed in California at some point, enabling us to identify individuals who both filed for a patent and interacted with UI at any point between 2002 and 2021Q1. In this period, approximately 8.4 million Californians filed a first-time UI claim. By merging these records with patent filings using Infutor data, we identify 71,180 claimants who had filed at least one patent among the 305,193 who we observe employed in California at some point. This figure likely understates the true number of patent-filers due to missing Social Security Numbers (SSNs) in the Infutor dataset, which are required for accurate linkage (see [Appendix A](#) for a complete description of the matching procedure and its limitations). Because our goal is to understand the UI experiences of inventors, defined as workers who have filed a patent, we focus on the 50,300 individuals who had filed a patent *before* claiming UI.

2. Patent data are widely used as a proxy for innovation, offering advantages over measures such as R&D expenditure or expert surveys (Griliches, 1990; Nagaoka et al., 2010).

3. About 54% of patent applications are granted.

Figure 1 maps the number of inventor-claimants across California's core-based statistical areas (CBSAs). Darker regions indicate higher counts, with the largest concentrations in the Bay Area—especially around San Jose and San Francisco—and in the Los Angeles region. Mid-sized clusters appear near Sacramento, Santa Cruz, Santa Rosa, Oxnard, Riverside, and San Diego, while most other CBSAs show relatively few inventor-claimants. Together, these patterns underscore the strong geographic clustering of inventive talent across the state.

FIGURE 1: Geographic Distribution of Inventor-Claimants in California, 2022–2021 Q1



Our analysis compares inventor-claimants — individuals who filed for UI and appear in patent records — to the broader population of UI claimants.⁴ In addition to examining raw differences in employment and earnings outcomes, we construct a comparison group of UI claimants who are observationally similar to inventor-claimants.⁵ This approach helps isolate inventor-specific dynamics by controlling for differences in earnings, sectoral composition, and timing of unemployment (see [Appendix B](#) for details of the weighting procedure). For our event-study analyses, we focus on a subset of roughly 38,239 inventor-claimants who filed patents prior to 2015, allowing for a longer follow-up window to observe post-UI employment and earnings outcomes. To study heterogeneity among the inventor claimants, we define star inventors, who were in the top 5% of inventors by citation in at least one year since 1970.

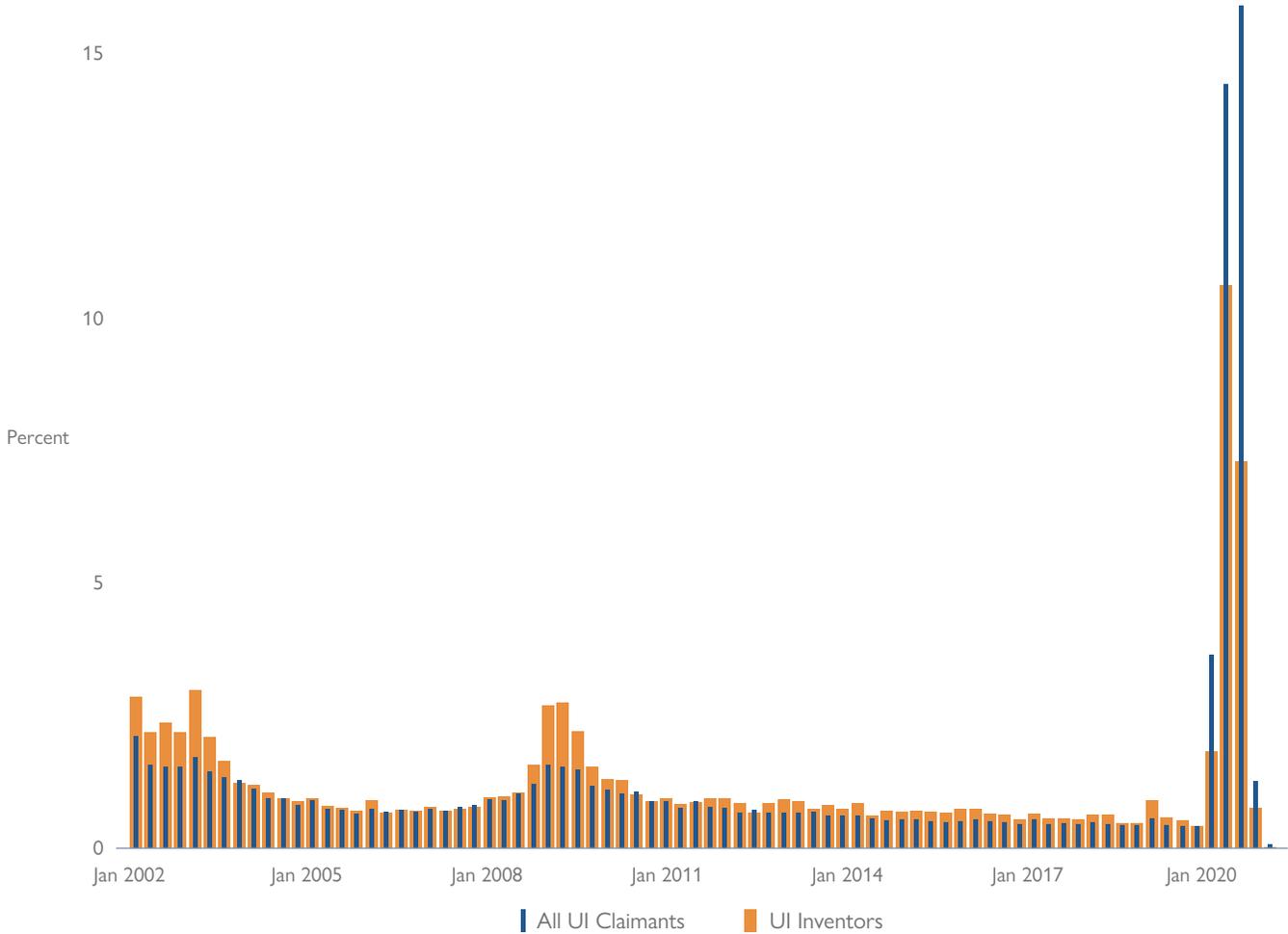
4. We can only identify inventors who have an SSN in Infutor data which introduces the possibility that the summary statistics for the matched subsample may have selection bias.

5. Specifically, we reweight the UI claimant sample to match inventors on pre-displacement income, 2-digit North American Industry Classification System (NAICS) industry, and UI claim start quarter.

III. Inventor’s Exposure to Job Loss and UI

A meaningful number of inventors access unemployment insurance in California. Between 2002 and 2021Q1, among the 305,193 people we observe employed in California at some point, 50,300 claimants (0.6% of all claimants and 16% of all employed inventors) had a patent before claiming UI. This is likely a conservative estimate, as missing Social Security Numbers in the Infutor dataset limit the completeness of the linkage. Since UI is available only to workers who are laid off, this figure suggests that a substantial share of inventors experience involuntary job loss. And because not all eligible workers apply for or receive UI, the true extent of inventor layoffs is likely even higher.⁶

FIGURE 2: The distribution of UI claims over time



Notes: Each bar represents the share of initial claims from 2002–2021 that took place during that month. The orange and blue bars will both separately add up to 100%.

6 Among job losers who are eligible for UI, the take-up of UI is between 25–50% (Anderson & Meyer, 1997; Kuka & Stuart, 2021; Lachowska et al., 2022).

Figure 2 shows that inventor UI claims rise sharply during economic downturns, mirroring broader labor market trends. Claim volumes increased during the early 2000 recession, the Great Recession (2008), and the COVID-19 recession (2020). Inventors appear more sensitive to the business cycle than the average claimant, highlighting that technical expertise does not shield workers from displacement during recessions. This pattern aligns with recent research documenting the pro-cyclical nature of R&D investment, which tends to contract during economic downturns (Massari & Shadmani, 2025).

An exception to this trend emerged during the COVID-19 pandemic. While roughly 45% of California's workforce filed for UI (Bell et al., 2020), inventor claims rose less sharply than in prior recessions. A possible explanation could be the different nature of the COVID-19 pandemic. The hardest hit industries, such as Accommodation and Food Services and Retail Trade, employ a relatively smaller number of inventors (**Figure 3**).⁷ Moreover, unlike earlier recessions, the COVID-19 shock produced uneven sectoral impacts, with some industries experiencing growth. These expanding sectors may have absorbed displaced inventors from more adversely affected areas, dampening the overall rise in inventor UI claims (Nicola & Hector, 2021).

7. See Table 4 in (Bell et al., 2020) for list of industries that had the largest number of UI claims during COVID-19.

IV. Pre-UI Characteristics

Table 1 compares the demographic and employment characteristics of inventor-claimants to the broader population of UI claimants and shows that their profiles differ significantly. While 48% of all UI claimants are female, only 15% of inventor-claimants are women — highlighting a substantial gender disparity among inventors. Inventor-claimants are also more likely to identify as White or Asian, tend to be older, and possess significantly higher levels of educational attainment. Notably, 71% of inventor-claimants hold a college degree, compared to 23% among typical UI claimants. These educational differences are reflected in earnings: inventor-claimants report the highest-quarter earnings of \$54,533 — more than four times the \$13,172 earned by the average UI claimant. Their average earnings in the four quarters prior to claiming UI are similarly elevated at \$144,483, compared to \$39,160 for the broader claimant population.

Inventor-claimants also differ from typical UI claimants in the types of companies they worked for prior to unemployment. On average, firms employing inventor-claimants have 2,494 workers — smaller than the 3,675-worker average among firms employing the broader UI claimant population. Despite their smaller size, these firms offer significantly higher compensation: average quarterly earnings per worker total \$22,381, more than double the \$10,015 observed in firms associated with typical UI claimants. Inventor-claimants also tend to stay longer at these firms, with an average tenure of 23 quarters or about 5.75 years — about 50% longer than the average UI claimant (15 quarters or about 3.75 years). These patterns suggest that inventor-claimants are more likely to be employed in smaller, higher-paying firms where they maintain more sustained employment before UI receipt.

Column 3 shows the characteristics of all UI claimants after reweighting them to resemble inventor-claimants. This reweighting balances observable characteristics between inventors and comparable non-inventors, enabling a more meaningful comparison of their subsequent outcomes.⁸ As intended, the characteristics of the reweighted sample are more similar to inventor-claimants than to all claimants.

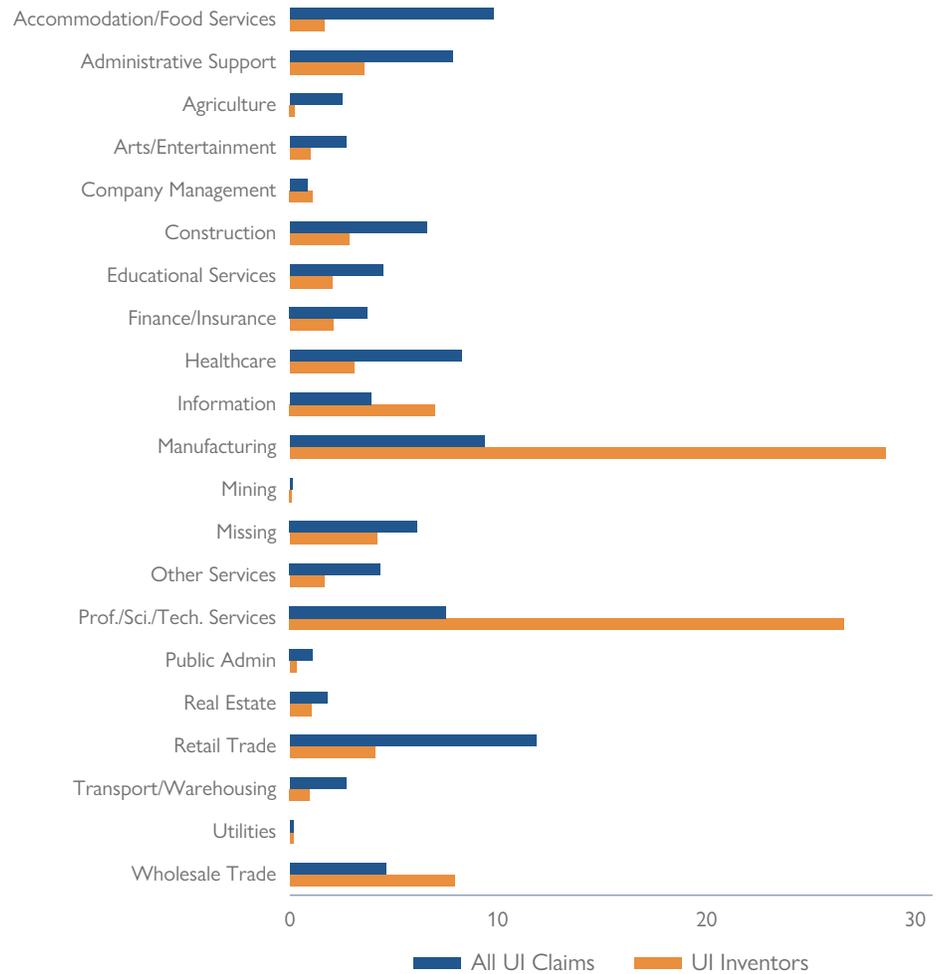
8. **Appendix B** describes the weighing procedure.

TABLE 1: Demographic and employment characteristics of all UI claimants and inventor-claimants

	ALL UI CLAIMANTS FIRST CLAIM	UI INVENTORS FIRST CLAIM	ALL UI CLAIMANTS (REWEIGHTED)
Female	0.48	0.15	0.27
Age			
18 to 30	0.41	0.047	0.15
31 to 40	0.20	0.19	0.23
41 to 50	0.18	0.33	0.29
51 to 60	0.14	0.29	0.23
60+	0.064	0.13	0.086
Race			
White	0.38	0.57	0.54
Black	0.062	0.021	.03
Asian	0.14	0.25	0.20
Hispanic	0.33	0.047	0.12
Education			
HS Grad or Less	0.45	0.12	0.20
Some College/Associate's	0.31	0.17	0.22
College Graduate or More	0.23	0.71	0.58
Pre-UI Earnings			
High Quarter Wage (\$)	13,172	54,533	58,542
Earnings in past four Quarters (\$)	39,160	144,483	143,118
Pre-UI Firm			
Avg Firm Size	3,675	2,494	2,617
Avg Firm Pay	10,015	22,381	20,033
Number of quarters employed	15	23	19
N	8,464,082	50,300	8,464,082

Notes: Includes all UI claimants (unweighted in Column 1 and weighted in Column 3) and a subset of inventor-claimants (Column 2), who initiated a claim between 2002 and 2021. This reweighting is done such that the characteristics of all claimants sample resembles inventor-claimants. The fractions within groups (age, race, and education) do not add up to 1 because there is a small share of claimants with missing values.

FIGURE 3: Industry distribution of all UI claimants and inventor-claimants



Notes: The figure shows the industry of the separating firm for all first UI claims initiated between 2002 and 2021: 8,464,082 by all claimants, and 50,300 by inventors.

Figure 3 illustrates the substantial differences in the industry distributions prior to unemployment between inventor-claimants and the broader UI population. The industry distribution of inventor-claimants is more concentrated: approximately 45% were employed in just two sectors — Professional, Scientific, and Technical Services, and Manufacturing. In contrast to the average UI claimant, inventor-claimants are underrepresented in industries such as Healthcare and Social Assistance, Construction, Administrative and Support Services, and Retail Trade.

V. UI Experience

TABLE 2: UI claim characteristics of all UI claimants and inventor-claimants

	ALL UI CLAIMANTS FIRST CLAIM	UI INVENTORS FIRST CLAIM	ALL UI CLAIMANTS (REWEIGHTED)
Claim Variables			
Weekly Benefit Amount (\$)	304	405	381
Max Benefit Amount (\$)	7,672	10,459	9,808
Potential Benefit Duration (weeks)	25	26	26
Replacement Rate	0.43	0.22	0.26
Claim Outcomes			
Total Benefit Amount (\$)	5,142	6,687	6,347
Total UI duration (weeks)	18.3	17.9	17.9
N	8,464,082	50,300	8,464,082

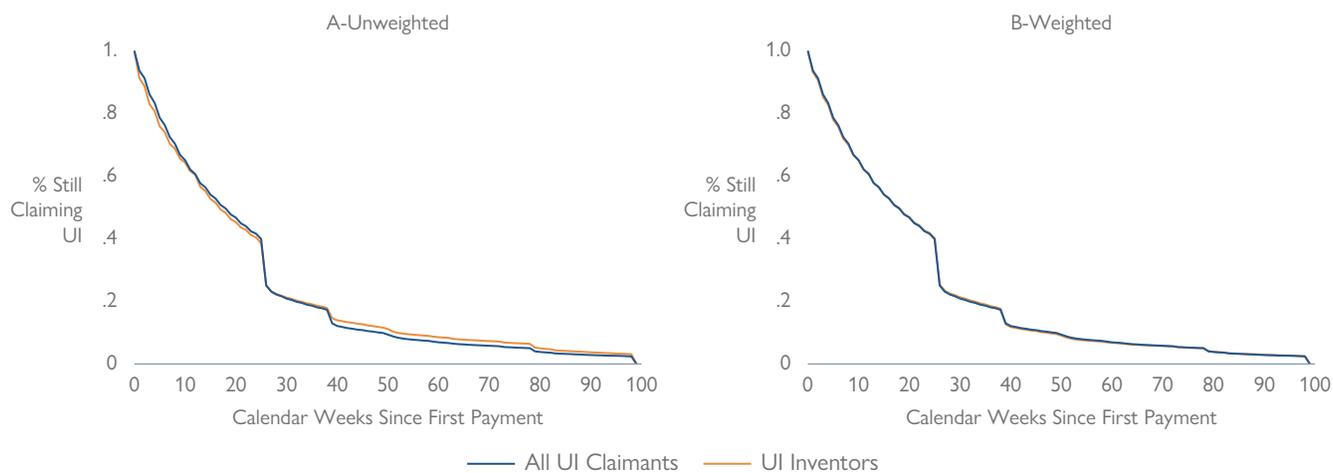
Notes: Includes all UI claimants (unweighted in Column 1 and weighted in Column 3) and a subset of inventor-claimants (Column 2), who initiated a claim between 2002 and 2021. Replacement rate is the ratio of the claimant's weekly benefit amount to their average weekly wage before entering UI. Maximum Benefit Amount is the maximum UI benefits the claimant is eligible for over the claim duration. Total Benefit Amount is the actual UI benefits the claimant is paid over the claim duration.

Given the large differences in the characteristics of inventor-claimants and regular claimants, are their experiences with the UI system also different?

Table 2 compares the UI experiences of these groups. It shows that inventor-claimants qualify for higher UI benefits than the average claimant. The average weekly benefit for inventor-claimants is \$405, with a maximum benefit amount of \$10,459 and a potential benefit duration of 26 weeks — compared to \$304; \$7,672; and 25 weeks respectively, for all claimants. These results are consistent with the elevated pre-claim earnings of inventor-claimants and the earnings-based formula used to calculate UI benefits.

However, California's cap on weekly UI benefits (\$450) limits the extent to which earnings are replaced for higher-income workers. As a result, inventor-claimants experience a steeper income drop upon entering UI. Their average replacement rate — the ratio of weekly UI benefits to prior weekly earnings — is just 22%, compared to 43% for the broader claimant population. In other words, while inventor-claimants qualify for higher benefit amounts, UI replaces a much smaller share of their prior income. While in the UI system, inventor-claimants receive more benefits in total (\$6,687 vs \$5,142), reflecting their higher weekly benefit amount, but receive benefits for slightly shorter durations (17.9 weeks vs. 18.3 weeks).

FIGURE 4: UI Survival curve of all UI claimants and inventor-claimants



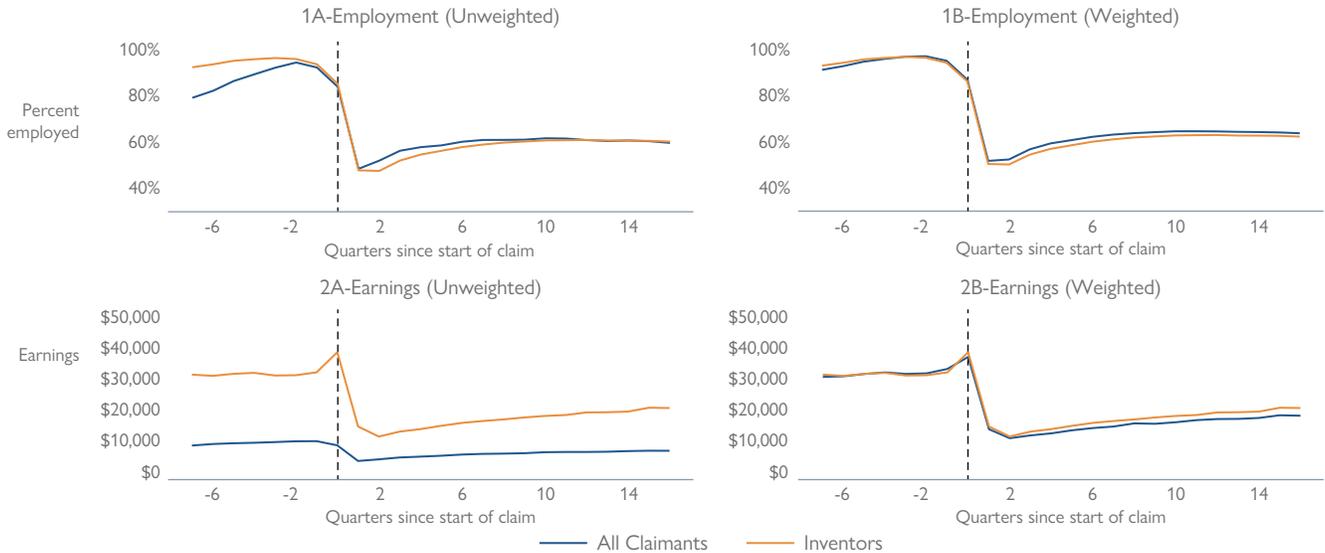
Notes: Includes all first UI claims initiated between 2002 and 2015: 5,372,761 by all claimants, and 38,239 by inventor-claimants.

Figure 4 presents the UI survival curve, which shows the share of claimants continuing to receive UI benefits over time after their first benefit payment. The horizontal axis measures the weeks since initial payment, while the vertical axis reflects the proportion of claimants still actively receiving benefits. Panel A shows that inventor-claimants and the broader UI claimant population follow similar exit patterns, with comparable weekly retention rates.⁹ Panel B shows the survival curves after we reweight the all UI claimant sample to match inventors on pre-displacement income, 2-digit North American Industry Classification System (NAICS) industry, and UI claim start quarter, and see that the UI exit patterns are still similar for both groups. This indicates that the timing of UI exits is broadly consistent across both groups.

9. The steep decline in claiming UI at 26 weeks corresponds to the maximum duration of UI benefits in California. Claimants who receive partial benefits due to part-time work while they are also receiving UI benefits can receive benefits for longer than 26 weeks.

VI. Experiences Post UI

FIGURE 5: Employment and earnings of all UI claimants and inventor-claimants



Notes: Includes all first UI claims initiated between 2002 and 2015: 5,372,761 by all claimants, and 38,239 by inventor-claimants.

The survival curves show that inventor-claimants exit UI at similar rates as all claimants. Exiting UI doesn't always mean immediate reemployment. Some claimants leave the system without securing a job, entering a period of non-employment. Figure 5 shows the employment rates and earnings before and after UI entry for inventor-claimants and all claimants. Panel 1A shows that inventor-claimants have higher pre-UI employment rates, dip below others in the first eight quarters after filing a claim, and then converge. Panel 1B reveals that, after adjusting for observable characteristics, inventor-claimants maintain lower employment rates for up to 16 quarters after they start receiving UI.

Panels 2A and 2B show earnings trajectories for inventor-claimants relative to the broader UI claimant population, both before and after UI entry.¹⁰ Panel 2A highlights that inventor-claimants earn substantially more prior to UI, with a spike in earnings during the claim quarter followed by a sharper decline. Earnings then gradually recover over time. Panel 2B adjusts for observable differences — earnings, industry, and claim file date — by reweighting the general claimant sample to match inventor-claimants. While earnings gaps persist, the magnitudes are smaller, suggesting that part of the disparity reflects compositional differences rather than inventor-specific dynamics.¹¹

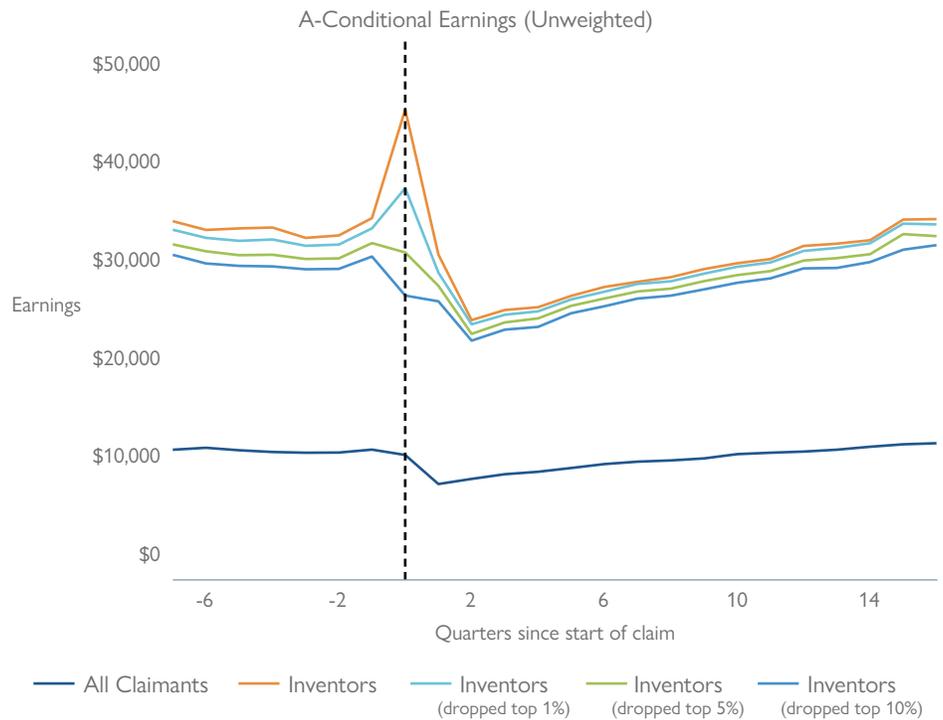
10. These earnings are not conditional on employment. The earnings conditional on employment and log earnings are shown in the Appendix C.

11. In Appendix C, we divide the claimant population into three earnings percentiles: 1–50, 51–90, and 91–100. The inventor claimants earnings trajectories are similar to the claimants in 91–100 percentile.

A distinctive feature of inventor-claimants is the spike in earnings observed at the time of UI entry, which likely reflects severance pay, bonus disbursements, or delayed compensation. This temporary income cushion may afford inventor-claimants greater flexibility in their job search, contributing to lower employment rates relative to the broader claimant population during the initial quarters following UI entry.

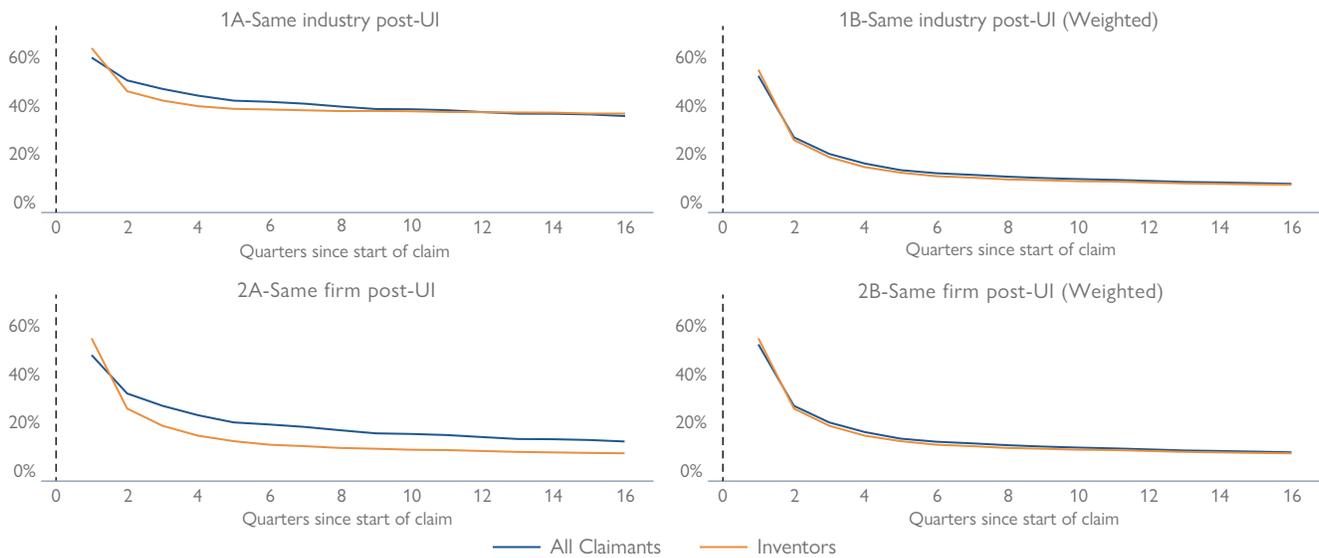
In **Figure 6**, we show much of the inventor-claimants earnings spike is contributed by high-earning inventor-claimants, by plotting the earnings trajectories after excluding the top 1%, 2%, and 5% of inventor-claimants by earnings. The earnings spike is no longer observed after dropping the top 5% of inventor-claimants, suggesting that the spike is driven by higher earners among inventor-claimants.

FIGURE 6: Earnings of all UI claimants and inventor-claimants after excluding high-earning inventor-claimants



Notes: Includes all first UI claims initiated between 2002 and 2015: 5,372,761 by all claimants, 38,239 by all inventors, 37,882 after excluding the top 1% of inventors, 37,503 after excluding the top 2%, and 36,353 after excluding the top 5%.

Figure 7: Post-UI employment industry and firm of all UI claimants and inventor-claimants



Notes: Includes all first UI claims initiated between 2002 and 2015: 5,372,761 by all claimants, and 38,239 by inventors.

Figure 7 examines post-UI firm-level employment outcomes for inventor-claimants. Panel 1A shows that relative to the broader claimant population, inventor-claimants are less likely to return to their pre-separation industry in the first 10 quarters since the start of their UI claim. This gap disappears after adjusting for demographic characteristics (Panel 1B), suggesting that industry reallocation is largely explained by differences in demographic characteristics. Given their industry concentration, it is reasonable to expect that they have industry-specific skills and so are more likely to look for jobs in the same industry. The fact that they are equally likely as the broader claimant population to be employed in the same industry suggests their skills are transferable to other industries. Panels 2A and 2B reveal similar patterns by employer: inventor-claimants are less likely to be reemployed by their prior employer, but this difference also appears to be driven by demographic composition rather than inventor-specific dynamics.

FIGURE 8: Post-UI employment firm size and earnings of all UI claimants and inventor-claimants



Notes: Includes all first UI claims initiated between 2002 and 2015: 5,372,761 by all claimants, and 38,239 by inventors.

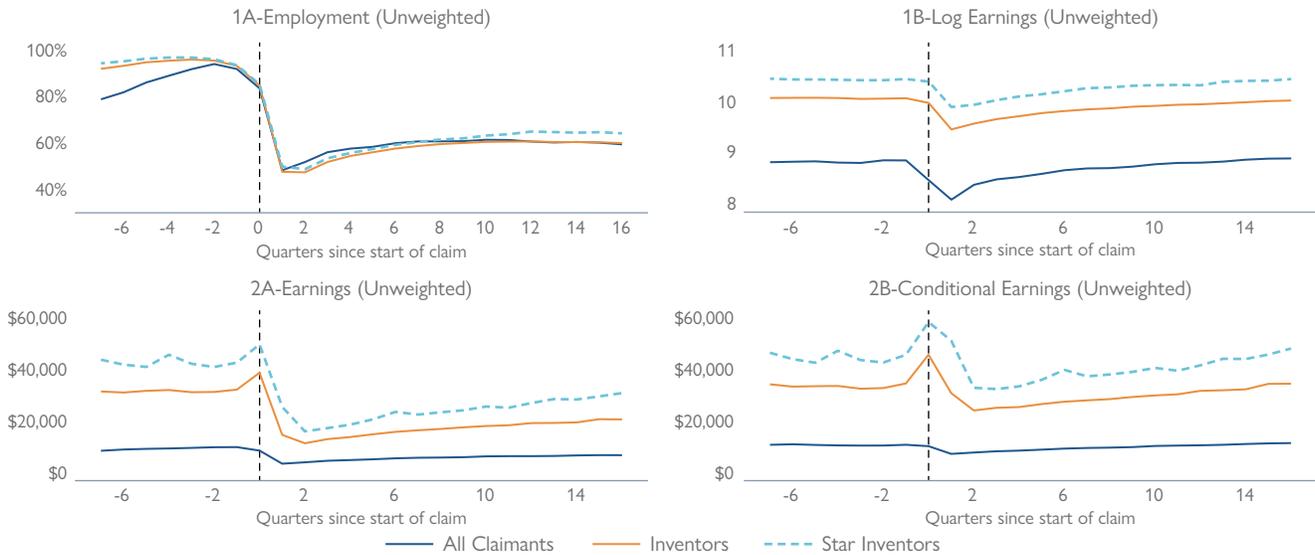
Figure 8 examines post-UI firm-level employment outcomes for inventor-claimants. Panels 1A and 1B show that inventor-claimants tend to be reemployed at smaller firms (measured by total employment) after starting a UI claim. Panels 2A and 2B indicate that these firms offer higher average wages — even after adjusting for demographic differences. This post-UI pattern mirrors the characteristics of their pre-UI employers, as documented in [Table 1](#).

In summary, inventor-claimants exit UI at rates comparable to the broader claimant population, but their employment recovery follows a distinct trajectory. After adjusting for demographic differences, their employment rates lag behind other claimants for up to 16 quarters after the start of their UI claim. A pronounced earnings spike in the claim quarter suggests the presence of severance pay, bonuses, or deferred compensation, which appears to be driven by a small group of high-earning inventor-claimants. Two mechanisms likely drive the employment patterns: (1) search frictions tied to specialized skill matching, which delay reemployment as inventors seek roles aligned with their expertise; and (2) liquidity effects from the earnings spike, which may reduce short-term urgency and enable longer search durations.

After exiting UI, inventor-claimants are equally likely to return to their prior employer or industry, after adjusting for demographics. They transition into firms with higher average wages and smaller firm size — consistent with their pre-UI employment characteristics. These findings point to selective reemployment into higher-quality matches, albeit with longer search durations and similar employer and industry continuity.

VII. Heterogeneity Analysis — Star Inventors

FIGURE 9: Employment and earnings of all UI claimants, inventor-claimants and star inventors



Notes: Includes all first UI claims initiated between 2002 and 2015: 5,372,761 by all claimants, 38,239 by inventors, and 1,849 by star inventors.

In [Figure 9](#), we show the employment and earnings outcomes for star inventors — those whose patents are highly cited — to inventor-claimants and the broader UI claimant population.¹² Relative to all inventor-claimants and all claimants, star inventors exhibit stronger labor market outcomes both before and after UI entry. Their pre-UI employment rates and earnings are higher, and they maintain relatively better post-UI employment trajectories, suggesting greater resilience and stronger reemployment prospects.

12. Star inventors are those who, in at least one year since 1970, held patents in the top 5% by citations in other patent applications among patents granted that year.

VIII. Conclusion and Policy Implications

Our findings point to two key implications for the design and targeting of unemployment insurance (UI) and reemployment programs.

First, UI may indirectly support innovation. Inventors engage with UI at substantial rates, consistent with the view that unemployment insurance can enable employment at higher-risk, innovation-intensive firms. Recognizing UI's indirect role in supporting innovation could inform broader workforce and innovation policy, among others, in contexts of displacement or reallocation of technical talent.

Second, post-UI patenting activity presents an opportunity for entrepreneurship support. Of the 71,180 California-based inventors who have ever claimed UI, roughly 20,880 (20%) filed a patent after applying for benefits. This suggests that programs like Self-Employment Assistance (SEA) initiative may be especially well-suited to inventor-claimants. The SEA program provides income support to eligible unemployed workers interested in starting their own businesses. SEA is a voluntary state program, and as of 2022 only eight states (Delaware, Mississippi, New Hampshire, New Jersey, New York, Oregon, Pennsylvania, and Rhode Island) operated it. Participants receive weekly allowances equal to their regular UI benefits and are exempt from standard work search requirements while they work on establishing a small business. SEA is available only to individuals who qualify for UI and are deemed likely to exhaust their benefits. In 2022, there were 1,404 SEA participants nationwide (Isaacs, 2023). Expanding SEA or developing inventor-specific reemployment pathways could better align post-displacement support with the skills and trajectories of this high-skill population.

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XI. Appendix

A. Identifying inventors in California

We want to identify inventors in the patent data among workers in the quarterly earnings and UI claims data. Since the patent data does not contain applicant's Social Security Number (SSN), we cannot directly match the two using SSN to identify inventors. Instead, we first merge the patent data with Infutor using an inventor's name, city, and state. This gives us the SSN of the patent applicants. We then merge this dataset with the quarterly earnings and UI claims data using the SSN. All linkage and analysis using identified data was conducted on secure CPL servers or within EDD's secure environment.

Matching patent data with Infutor

The matching of inventors from the patent data to individuals from Infutor is done using the first name, middle name, last name, city, and state, which are contained in both datasets. We use an algorithm similar to that used in Bell et al. (2019b).

Parsing names

Before beginning the match process, the names were standardized as follows. First, names were all made lowercase and given a match priority of 1. Any subsequent changes to a name resulted in a new observation with a match priority of match priority plus 1. Excess spaces in names were observed, and any spaces were removed. All non-Latin alphabet characters and punctuation were removed. We also removed extraneous information: "(Deceased)," "(Owner)," "(Esq)," "(Real Party in Interest)," "(patentee/owner)," "(3rd Party Rq)." Next, honorifics were removed, if "Phd", "Jd", "MBA", or "PE" came at the end of a name, they were removed. Next, any nicknames, signified by a name followed by a second name within parentheses, with an " aka, " or in parentheses in the middle name, were removed. Suffixes sometimes appear at the end of first, middle, or last name fields. If these fields end with a "JR," "SR," "1st,"—"5th," or a numeral I–V, the suffix is stripped out and stored separately from the name.

This order of edits (though not necessarily the same as the "match priority" variable if each round did not produce an edit):

1. As it appears (with names lowercase)
2. No spaces
3. Removed punctuation
4. No extraneous info like deceased, owner

5. No honorifics like PhD
6. For nicknames in ()'s we try to use the nickname in place of the first name
7. Then we try first name w/o the nickname (this is instead of #5 — a bit of a branching point)
8. Remove suffixes and store in a separate field

Matching Algorithm

1. Exact match on name and location:
 - Name: First name, middle initial, and last name
 - Location: The inventor's city and state must match at least one city and state associated with the name match at some point
 - An exact match would mean using just patent data's match priority 1
 - Disregard the matched inventors' records and the matched individual identifier (uuid) from Infutor
2. Exact match on aliases and location:
 - Name: First name, middle initial, and last name of inventors' match any of the aliases
 - Location: The inventor's city and state must match at least one city and state associated with the name match at some point
 - An exact match would mean using just the patent data's match priority 1
 - Disregard the matched inventors' records and the matched uuid from Infutor
3. Repeat 1 and 2, but allow all other match priorities from the expanded list:
 - When faced with duplicate matches, take the one with the best match priority (i.e., min (match priority))
4. Merge data with names and aliases. Here is the ranking:
 - Name matches priority 1
 - Alias matches priority 1
 - Name matches priority 2
 - Alias matches priority 2
5. For patent_source in range (1,10):
 - For infutor_source in (names, aliases):
 - i. Keep if it's a match, and exclude from subsequent stages

This merged data is then matched with UI claims data using SSNs.

TABLE A1: Sample sizes

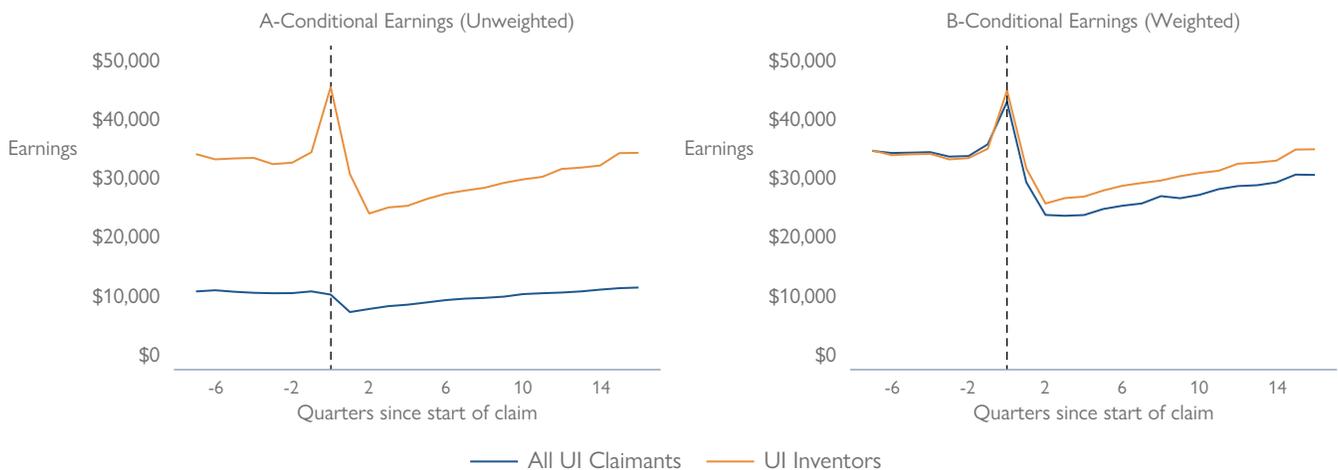
CATEGORY	ALL UI CLAIMS	EVER INVENTOR UI	INVENTOR UI AFTER PATENT	INVENTOR UI AFTER PATENT (2002–2015)
All UI Claims (total)	21,280,898	151,648	111,355	76,442
First UI Claims (total)	8,464,082	71,780	50,300	38,239

B. Weighting procedure

We employ the Inverse Propensity Score Weighting (IPW) procedure to adjust the comparison group of all UI claimants to resemble inventors more closely. Within each industry and quarter of UI entry, a model based on the last seven quarters of pre UI earnings estimates the likelihood that an individual is an inventor. These estimated probabilities are then used to construct weights, which give greater influence to non-inventors who closely match inventors and less to those who differ substantially. This reweighting balances observable characteristics between inventors and comparable non-inventors, enabling a more meaningful comparison of their subsequent outcomes.

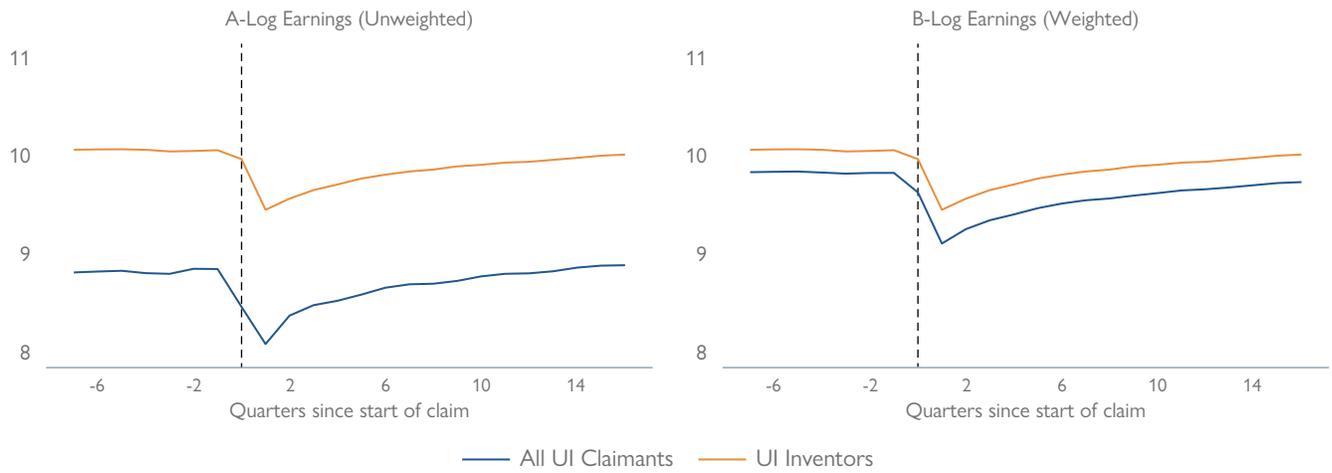
C. Conditional earnings, log earnings, and earnings percentile

FIGURE C1: Earnings conditional on employment of all UI claimants and inventor-claimants



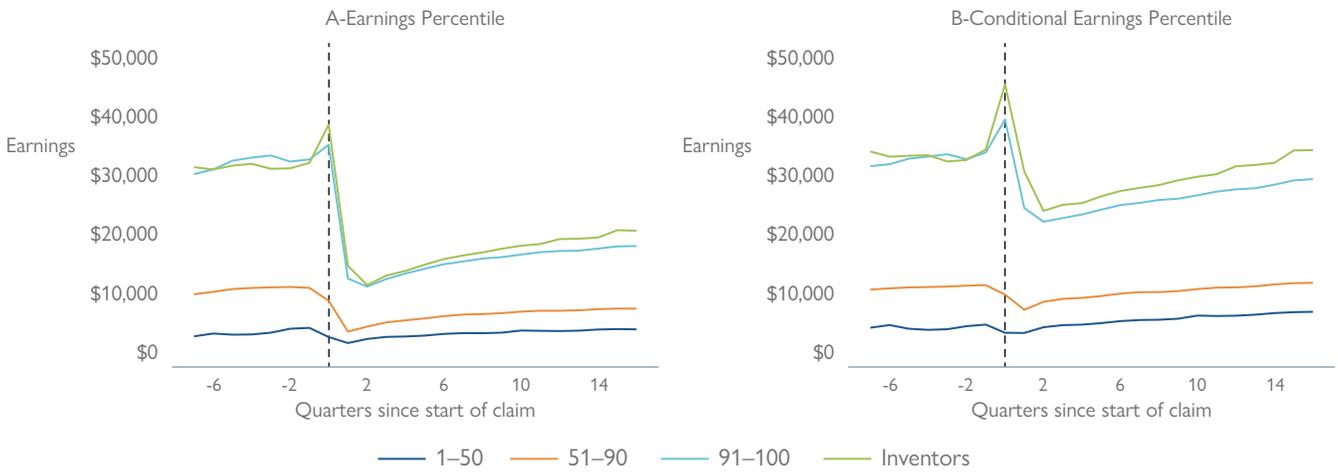
Notes: Includes all first UI claims initiated between 2002 and 2015: 5,372,761 by all claimants, and 38,239 by inventors.

FIGURE C2: Log earnings of all UI claimants and inventor-claimants



Notes: Includes all first UI claims initiated between 2002 and 2015: 5,372,761 by all claimants, and 38,239 by inventors.

FIGURE C3: Earnings percentile of all UI claimants and inventor-claimants



Notes: Includes all first UI claims initiated between 2002 and 2015: 5,372,761 by all claimants, and 38,239 by inventors.

D. Identifying start inventors

The patent data contains the number of times a patent is cited in another patent application.¹³ We focus on U.S. patents granted by USPTO in which the applicant has cited other U.S. patents. There are a total of 4,474,330 patents that are cited at least once between 1970 and 2021 in other patent applications. The mean of the number of times a patent is cited is 15.58, and the median is 4. Thus, the distribution is skewed to the right, which indicates outlier patents that are heavily cited.

TABLE D1: Number of times a patent is cited in another patent since 1970s

NUMBER OF TIMES CITED	NUMBER OF PATENTS	PERCENTAGE
1–5	2,725,710	60.9%
6–10	626,985	14.0%
11–20	478,643	10.7%
21–50	388,549	8.7%
50+	254,443	5.7%
	4,474,330	100%

The table D.1 shows the number of times a patent is cited in another patent since 1970. 2,725,710 patents (60.9%) are cited between 1–5 times, while about 254,443 patents (5.7%) are cited more than 50 times. Unsurprisingly, a majority of patents are cited less than 5 times. Mapping the patents to inventors, we identify 13,741 inventors as star inventors, who were in the top 5% of authors by citation in at least one year since 1970.

13. <https://patentsview.org/download/data-download-tables>