Should the U.S. government implement targeted wage subsidies for high-income-volatility essential occupations that are systematically undercompensated for career risk?

1. Background

Career risk has become a central feature of the modern U.S. labor market. In contrast to traditional stable occupations with predictable earnings and long-term employment security, many contemporary jobs now involve substantial income volatility, job insecurity, burnout, and the possibility that specialized skills become obsolete over time. **"Career risk" in this context refers to the uncertainty workers face about their future earnings paths, employment stability, and long-run career viability.** High income volatility occupations, including those in tech, consulting, finance, entrepreneurship, the gig economy, and other project-based sectors, expose workers to substantial fluctuations in pay and employment intensity across months or years.

This stands in sharp contrast to occupations with relatively stable income profiles. Tenured public-sector roles, civil service positions, K–12 education, and many healthcare or unionized jobs offer workers consistent earnings and predictable employment conditions. The rise of high-risk, high-reward occupations reflects broader structural changes in the U.S. economy since the early 2000s: increasing income inequality, "winner-take-all" compensation structures, rapid technological change, and the expansion of short-term or contract-based work arrangements. These developments have intensified the role of personal risk preferences in workers' career choices.

Data from the Bureau of Labor Statistics (BLS), IRS panel data, and Federal Reserve research highlight striking variation in income volatility across occupations. **While some workers experience only modest year-to-year changes in earnings, others face extreme volatility similar in magnitude to entrepreneurial returns or financial-sector compensation.** Despite this wide dispersion, **the U.S. labor market currently lacks formal mechanisms to compensate workers for career risk**. Unlike physical hazard pay or unemployment insurance for standard employees, there are few institutional supports for income volatility arising from market fluctuations, industry instability, or skills obsolescence. Self-employed workers and gig workers often fall outside social insurance systems entirely, and portable benefits remain limited.

Understanding career risk matters because **income volatility can distort labor market allocation**. Risk-averse yet highly skilled individuals may avoid entering volatile but economically productive sectors such as agriculture, early-stage entrepreneurship, renewable energy technology, or certain types of manufacturing, even when their abilities would contribute more to social welfare in those sectors, since they are not being compensated for the income risk they are taking up in those sectors. If market wages do not fully compensate for career risk, the result may be **inefficient sorting, underinvestment in innovative or essential industries, and persistent shortages of workers** in high-volatility occupations that provide critical economic value.

2. Costs & Benefits of Policy Intervention

Benefits:

- **Expands labor supply into essential but volatile sectors:** Agriculture, fisheries, energy, environmental work, early-stage entrepreneurship, and other high-volatility sectors often suffer labor shortages. Increasing expected wages makes these sectors more attractive to talented but risk-averse workers, improving economic productivity and sectoral performance.
- **Improves labor market equity:** Income volatility disproportionately affects hourly workers, gig workers, service workers, and immigrant or minority-heavy occupations. Risk-averse workers, especially low-wealth or liquidity-constrained individuals, will avoid sectors where volatility is not compensated. This pushes them into "safer" but not necessarily socially optimal occupations. Subsidies reduce inequitable exposure to earnings risk and help level the playing field.
- **Encourages innovation and entrepreneurship:** Startups and creative sectors carry high volatility but high social spillovers. Subsidizing wages in these sectors lowers entry barriers and supports long-run innovation and growth.

Costs:

- **Targeting error:** Government might mismeasure volatility, misidentify the affected occupations, overcompensate or undercompensate sectors, or ignore sub-occupation heterogeneity. If subsidies go to the wrong places, they worsen misallocation rather than fixing it.
- **Overcompensation due to unobserved amenities:** Some jobs have high volatility but also strong positive amenities, such as autonomy, flexible schedules, creative satisfaction, and prestige. For example, Yoga instructors/creative freelancers have high income variance but high job satisfaction and non-wage perks; they may be "rightfully" paid less for their volatility. A subsidy could distort this natural tradeoff.
- **Incidence problems due to firms absorbing the subsidy:** If labor supply to an occupation is inelastic, firms could absorb the subsidy via slower wage growth, adjusted hours, or even reduced private benefits. Workers then receive less than intended, and society pays more for the same labor market outcome. Hence, the effect of the subsidy is null since the firm absorbs it all.
- **Political capture and expansion risk:** The program may be vulnerable to lobbying and political capture, with industries exaggerating volatility and rallying to broaden subsidy eligibility beyond sectors where undercompensation is most severe. This inflates costs and dilutes policy focus, letting taxpayer money go to waste in the wrong sectors.

3. Economic Model

(3.1) Initial Setup:

Workers choose among occupations $o \in \{1 \ldots j\}$. Each occupation delivers a random labor income w_o with a mean income $\mu_o = E[w_o]$ and income variance $\sigma_o^2 = Var(w_o)$. Workers are risk-averse and care about the distribution of income, not just the mean. Let utility over income be $U(w)$, with $U'(w) > 0$ and $U''(w) < 0$. Hence, $U(w)$ is a **marginally diminishing utility function**. Workers observe (μ_o, σ_o^2) and **choose the occupation that maximizes expected utility** $E[U(w_o)]$.

(3.2) From general utility to mean–variance form (Taylor Approximation):

We want a tractable expression linking expected utility to the mean and variance of income. To do this, let's take a second-order Taylor expansion of $U(w_o)$ around μ_o:

$$U(w_o) \approx U(\mu_o) + U'(\mu_o)(w_o - \mu_o) + \frac{1}{2}U''(\mu_o)(w_o - \mu_o)^2$$

Take expectation on both sides:

$$E[U(w_o)] \approx U(\mu_o) + U'(\mu_o)E[(w_o - \mu_o)] + \frac{1}{2}U''(\mu_o)E[(w_o - \mu_o)^2]$$

The middle term vanishes, since $E[(w_o - \mu_o)] = 0$. So:

$$E[U(w_o)] \approx U(\mu_o) + \frac{1}{2}U''(\mu_o)\sigma_o^2$$

Now use the **Arrow–Pratt measure of absolute risk aversion** ρ:

$$\rho(\mu_o) = \frac{-U''(\mu_o)}{U'(\mu_0)} \Rightarrow U''(\mu_o) = \frac{-\rho(\mu_o)}{U'(\mu_0)}$$

Plug in:

$$E[U(w_o)] \approx U(\mu_o) - \frac{1}{2}\rho(\mu_o)U'(\mu_o)\sigma_o^2$$

Normalize units so that at relevant income levels $U'(\mu_o) \approx 1$. Then:

$$\boxed{E[U(w_o)] \approx \mu_o - \frac{1}{2}\rho\sigma_o^2}$$

This gives the familiar mean–variance utility: **"Expected utility is approximately mean income minus a risk penalty, where the penalty strength is governed by risk aversion."** We assume that a worker in the labor market self-selects a job based on maximizing this expected wage-utility function.

(3.3) Compensating differentials for career risk:

Consider two occupations, safe 's' and risky 'r'. For a given worker with risk aversion constant = ρ, the worker is indifferent if the utility from both occupations is the same:

$$E[U(w_s)] = E[U(w_r)]$$

$$\mu_s - \frac{1}{2}\rho\sigma_s^2 = \mu_r - \frac{1}{2}\rho\sigma_r^2$$

$$\boxed{\mu_r - \mu_s = \frac{1}{2}\rho(\sigma_r^2 - \sigma_s^2)}$$

From this equation, we can interpret that each marginal worker will need a higher mean income to offset the higher variance in risky occupations to make them indifferent between choosing one of two occupations 's' and 'r'. This relationship **hints at the existence of compensating differentials for career risk**.

This relationship can then be generalized to make decisions across all occupations in a market, not just a choice between two occupations. And if the labor market is efficient, competitive, and sorting is frictionless, this relationship across occupations at the individual worker level can be generalized to **the**

entire labor market as well: **every marginal worker would be guided by this wage-risk relationship and self-select to reflect roughly the same relationship at the market level**.

(3.4) Estimating the market risk premium for career risk:

We test our claim of "individual-level to market-level generalization of the wage-risk relationship" using a linear regression model**.** This model will help us check if **the individual-level wage-risk relationship is significant at the market level** and give us the **market-wide career risk premia through the fitted model's parameters,** which will help us decide which occupations are being systematically undercompensated for risk. More specifically, the estimable regression would be of the form:

$$\mu_o = \widehat{\alpha} + \widehat{\beta}\sigma_o^{\,2} + \widehat{\varepsilon_o}$$

where:

- μ_o: average income in occupation 'o'
- $\sigma_o^{\,2}$: income variance in occupation 'o'
- $\widehat{\beta}$: market-wide premium for career risk (labor market's compensation per unit of income risk)
- $\widehat{\varepsilon_o}$: actual deviation of occupation 'o' from the predicted wage-risk frontier

To infer the OLS estimator $\widehat{\beta}$, we use Current Population Survey (CPS) data collated and cleaned by the Economic Policy Institute (EPI). **The model's goodness-of-fit comes out to be R^2 = 74.2%** which is considered to be **very significant** for economic and wage data. **This model validates our claim that the individual-level wage-risk relationship also holds at the market level,** thereby **validating our proposed expected utility model for the marginal worker.**

(3.5) **Interpreting residuals**:

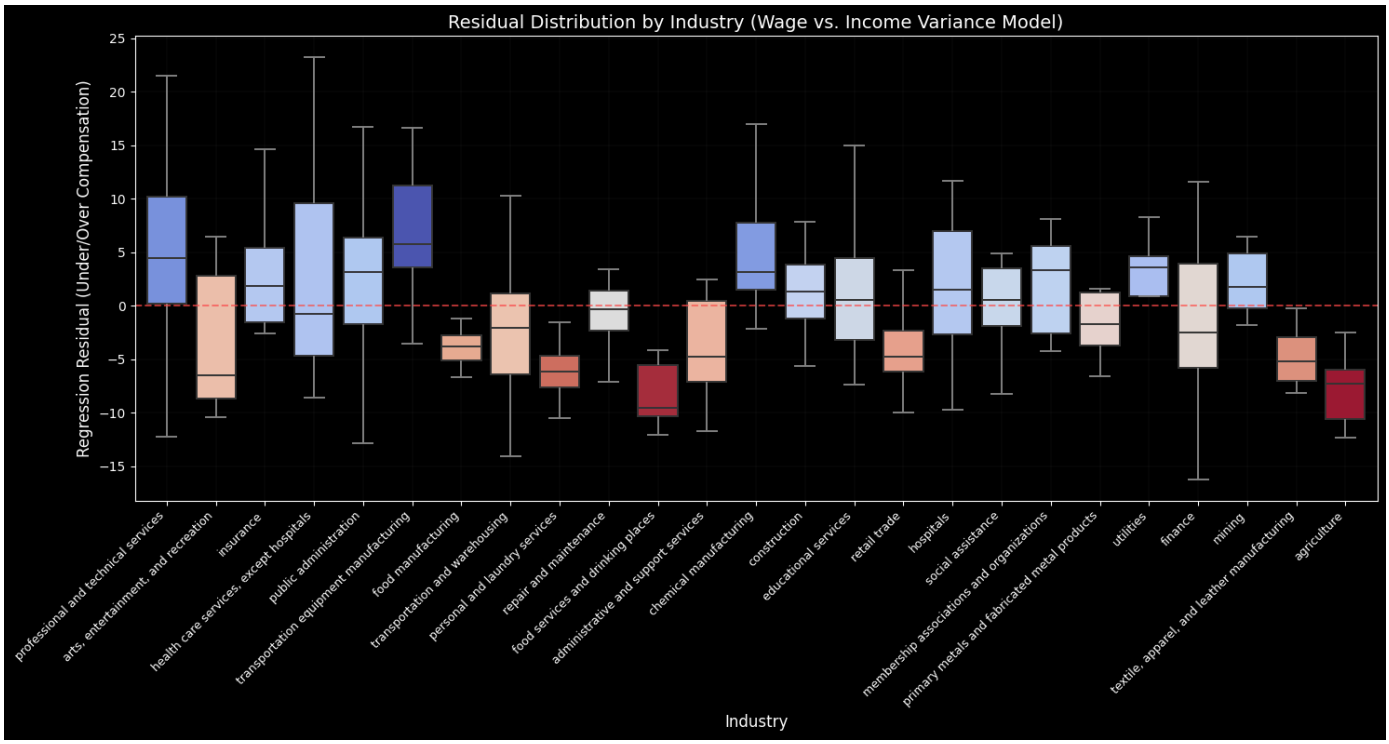
For each occupation:

$$\widehat{\varepsilon_o} = \mu_o - (\widehat{\alpha} + \widehat{\beta}\sigma_o^2)$$

We've already proved that this relationship holds at the market level with high significance. We can now interpret the regression's residuals as follows:

- **If $\widehat{\varepsilon_o} < 0$:** Occupation 'o' pays less than what the market's average risk pricing would justify given its income variance. It is **relatively undercompensated for career risk** and is therefore a candidate for wage subsidies.
- **If $\widehat{\varepsilon_o} > 0$:** Occupation 'o' pays more than implied by the average risk premium. It is **relatively overcompensated for career risk**. This occupation wouldn't need a subsidy, but we won't be issuing additional income taxes on it to finance our subsidies either, since it probably is being overcompensated due to uncaptured compensating differentials such as health risk/hazard pay).

These residuals provide a data-driven basis for identifying where policy interventions could correct relatively mispriced career risk, independent of any individual worker's ρ value. Relatively underpriced sectors should receive a wage subsidy to get a boost to their mean income, making them attractive options for labor supply to now self-select into. This redistributes the labor market resources more efficiently and hence increases GDP through an efficiency boost. Note that **this regression cannot tell us whether the market misprices career risk as a whole (in absolute terms)**: 'β' could be aggregately underpricing the career risk for all occupations in the market.



The residual boxplots show a clear divide between industries that are already rewarded for their risk and those where income volatility is systematically undercompensated. High-wage professional sectors such as finance, healthcare, professional and technical services, and parts of manufacturing exhibit positive

residuals, reflecting **skill premia** and other non-career-risk-based rewards like **health risk premia** that push their wages above what the compensating-differentials model predicts. In contrast, several essential but low-wage and highly volatile industries, including **agriculture, food services, administrative and support services, personal and laundry services, and social assistance**, consistently fall below the compensating frontier. The result is structural underpricing of career risk in precisely the sectors that underpin daily economic functioning, reinforcing labor shortages and discouraging risk-averse workers from entering socially valuable occupations. These residuals show a clear **labor-market failure** for career-risk compensation and show that our **factors of production are not being used to their highest potential**. These essential high-volatility industries need targeted wage subsidies the most to move them back up to the compensating frontier.

4. Empirical Evidence

Compensating differential theory, originating with Adam Smith and formalized by Rosen (1986), predicts that **workers must receive higher wages for accepting undesirable job attributes**, including uncertainty, instability, and income volatility. These "equalizing differences" ensure that workers are indifferent across occupations in equilibrium. However, a growing empirical literature shows that labor markets rarely deliver the required compensation for risk. Fugiel (2022) documents that workers facing unstable or unpredictable schedules receive no wage premium despite clear disamenities, while Wilson (2019) and Hamermesh (1999) similarly find weak or inconsistent wage adjustments for non-wage job risks. Recent research on income volatility reinforces this pattern. High-frequency administrative data from the Becker Friedman Institute (2025) indicate that large month-to-month earnings swings are widespread, persistent, and detrimental: volatility increases consumption instability and job separations, and many workers express a willingness to pay for greater stability, yet wages do not adjust accordingly. Juhn, McCue, Monti, and Pierce (2017) find only limited evidence of firms smoothing earnings; most workers experience volatility that is only partially offset, if at all. These findings support the view that **income volatility is a labor-market disamenity that is systematically undercompensated**.

Given this undercompensation, empirical literature proposes several policy interventions to mitigate the welfare losses associated with earnings instability. One leading approach is **wage insurance**, as outlined in the Aspen Institute's EPIC report (2017), which recommends income-smoothing mechanisms, shortfall savings accounts, and partial wage replacement after income drops. **Wage insurance aligns directly with the idea of compensating for volatility by lowering workers' exposure to risk**. However, while insurance reduces variance, it may not generate the intended labor-supply response: behavioral evidence suggests that **workers often undervalue or misunderstand insurance mechanisms, leading to low take-up rates and muted labor-supply responses**. Additionally, wage insurance schemes require complex administrative systems, actuarial monitoring, and continuous adjustment to accurately measure volatility across occupations.

By contrast, targeted wage subsidies directly raise mean wages in undercompensated high-volatility occupations, producing a clear and immediate increase in expected utility. Because subsidies shift occupations upward toward the compensating-differential frontier in the wage–variance space, rather than reducing variance itself, they may be more salient, easier to administer, and more effective at attracting labor into essential but volatile sectors where mispricing is most severe. Unlike insurance, where workers often fail to perceive the value of risk reduction, a subsidy shows up directly in paychecks. This creates stronger, more predictable labor-supply responses. For these reasons, **although wage insurance is widely discussed in the literature, targeted wage subsidies offer a more direct and operationally efficient method of correcting the undercompensation of career risk** documented across empirical studies.

5. Conclusion

Taken together, the theoretical model, the regression evidence, and the empirical literature all point to the same conclusion: **the U.S. labor market does not consistently compensate workers for career risk, and this underpricing is concentrated in a small set of high-volatility, low-wage essential industries**. The compensating-differentials model predicts that higher income volatility should be matched with higher mean wages to equalize expected utility across occupations. Yet the residual analysis shows persistent undercompensation in sectors such as **agriculture, food services, personal and laundry services, administrative and support services, social assistance, and parts of retail and transportation**. These are precisely the industries the economy depends on, but that struggle to attract and retain workers because wages fail to offset income instability.

The main benefits of a targeted wage subsidy are therefore substantial: **correcting a documented market failure, improving labor allocation into essential volatile sectors**, and **increasing welfare/equity for risk-averse workers who currently avoid these occupations**. The costs: fiscal burden, imperfect measurement of risk, and the possibility of subsidizing jobs that are "low-risk" for unobserved reasons, are real but appear manageable relative to the scale of undercompensation documented in both our data and the broader research literature. Overall, the evidence tilts **in favor of intervention**, though not decisively. To draw a fully confident conclusion, additional evidence is needed on the **magnitude of workers' risk preferences** across occupations, **how strongly labor supply responds to risk-correcting wage increases**, and whether **unobserved job amenities explain part of the negative residuals** in essential sectors. In the absence of that information, a targeted, data-driven wage subsidy focused narrowly on undercompensated volatile essential industries appears justified and welfare-enhancing.

6. References

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