*Journal of Economic Perspectives—Volume 36, Number 2—Spring 2022—Pages 3–28*

# A Social Insurance Perspective on Pandemic Fiscal Policy: Implications for Unemployment Insurance and Hazard Pay

Christina D. Romer and David H. Romer

COVID-19 is a worldwide public health crisis unlike anything seen in the post-World War II era. The fiscal response has been similarly extraordinary. The United States has spent $5.2 trillion on a wide range of recovery and support initiatives, and other countries have also spent unprecedented sums. The pros and cons of various measures have been discussed extensively. But, what has been largely missing from the fiscal policy discussion is an overarching analytical framework that takes into account the unique nature of a pandemic recession. This paper seeks to fill this gap.

We argue that a social insurance perspective is the appropriate way to understand and evaluate fiscal policy in a pandemic. Social insurance analysis shows how the government can use taxes and transfers to provide people with insurance that they would like to have, but that doesn't exist or that no one had contemplated needing. During a pandemic, workers in certain sectors face prolonged unemployment because their industries can't operate safely, while workers in other sectors remain relatively unscathed. Had workers foreseen this possibility, they would have liked to purchase insurance against the risk that their sector would be closed. The social insurance framework can show which types of government fiscal actions best approximate what a well-functioning insurance market would provide.

A social insurance perspective is more appropriate for designing and evaluating pandemic fiscal policy than simple aggregate-demand-based models. Conventional

■ *Christina D. Romer is Class of 1957-Garff B. Wilson Professor of Economics and David H. Romer is Herman Royer Professor in Political Economy, both at the University of California, Berkeley, Berkeley, California. Their email addresses are cromer@berkeley.edu and dromer@berkeley.edu.*

For supplementary materials such as appendices, datasets, and author disclosure statements, see the article page at https://doi.org/10.1257/jep.36.2.3.

Keynesian models of fiscal policy suggest that the way to deal with a recession is to increase aggregate demand quickly, and by enough to return output to its normal or potential level. And in this framework, it is not necessary for fiscal policy to closely target the workers or industries most affected by the recession. Raising aggregate demand anywhere will raise incomes and spending throughout the economy, and so help will eventually flow to those most affected.

These models and policy prescriptions don't hold in a pandemic recession. Because the virus thrives on human interaction (and hence on some types of economic activity), fiscal policy should not be aimed at quickly raising aggregate demand and attempting to return the economy to full employment. Doing so would make the pandemic worse and increase illness and deaths. Similarly, in a pandemic, some types of economic activity—such as in-restaurant dining and cruise travel—simply can't take place safely. As a result, broad stimulus measures like one-time payments or tax cuts can do little to put workers in those industries back to work. In essence, pandemic-related shutdowns of certain sectors short-circuit the usual Keynesian multiplier effect.

We begin our analysis by developing the social insurance framework. We describe a simple model with one sector that is affected by the pandemic and one that isn't. We show that optimal policy involves the government taxing those in the unaffected sector and providing income support for those in the sector that is shut. We then discuss several enhancements of the framework that yield richer understanding and more nuanced policy prescriptions. For example, adding a third sector where essential workers remain employed, but face greater health risks because of the nature of their jobs, suggests that government-provided hazard pay is appropriate. Or, incorporating notions of fairness or difficulty in identifying which workers remain able to work implies that optimal policy includes a role for general stimulus.

Armed with the framework, we examine two types of pandemic fiscal policy in detail: one that has been used extensively—unemployment insurance—and one that's hardly been used at all—hazard pay. We discuss in more depth the implications of a social insurance perspective for the usefulness of such policies and how they should be structured. We also discuss some of the practical issues around designing these fiscal actions for use in a pandemic, and examine how the implications of a social insurance perspective compare with what was actually enacted or proposed during the pandemic.

Finally, in the conclusion we consider the broader applicability of the social insurance perspective on fiscal policy. We argue that the insights likely carry over to a wide range of situations other than the current pandemic.

Some previous authors have also suggested a social insurance perspective on the appropriate policy response to the pandemic, and the baseline case of the next section draws heavily on that work.[1] Our contributions are in the ways we go beyond

[1] In a contribution early in the pandemic, Milne (2020) argues that the idea of "retrospective insurance" provides a valuable way of thinking about important aspects of the appropriate policy response. Similarly,

the baseline case and in evaluating actual and proposed policies from a social insurance perspective.

## A Social Insurance Perspective

The basic logic of a social insurance perspective on the fiscal policy response to a pandemic is straightforward. We therefore present a verbal description here, and leave the more formal presentation to the online Appendix available with this article at the *JEP* website.

### A Baseline Case

To see many of the key implications of the social insurance perspective, we start with a very stylized case that builds on Guerrieri et al. (2020) and Woodford (2020). We then consider the implications of relaxing some of its assumptions to address additional issues.

Think of a competitive, one-period economy with many identical individuals. There are two sectors, *A* and *B*. Other than producing different outputs, the two sectors are identical. Each individual obtains utility from their consumption of both sectors' outputs. Consumption of one sector's output doesn't affect utility from consuming the other sector's (that is, utility is "additively separable" over consumption of the two outputs). Although this assumption of course isn't exactly correct, the idea that, for example, whether one is able to go the dentist or take an airplane flight doesn't affect the marginal utility of groceries or clothes is arguably a reasonable approximation. We also assume that individuals get disutility if they work. For simplicity, work is a 0–1 variable—an individual is either working or they aren't.

We think of a pandemic as an event that makes production in one sector impossible; this could be either because producing the sector's output is unsafe or because consuming it is. To preserve the symmetry between the sectors, we assume they have the same probability of being shut down by a pandemic.

Finally, individuals must decide which sector they want to work in before they learn whether a pandemic will occur. Allowing for some mobility after the pandemic arises mitigates the fall in output in a pandemic, but otherwise has little impact on the messages of the baseline case.

---

in an informal early contribution, Saez and Zucman (2020) propose full government replacement of lost income for workers and businesses as a form of social insurance. Our framework builds most closely on Woodford (2020) and, especially, Guerrieri et al. (2020). Both papers consider multi-sector models where one sector is forced to shut down because of a pandemic, and both consider social insurance policies. And like us, Woodford uses the hypothetical case where there are perfectly functioning markets for "pandemic insurance" as a benchmark. These authors' main interests, however, are different from ours: the focus of Guerrieri et al. is on the conditions under which a pandemic—which is fundamentally a shock to aggregate supply—can lead to an aggregate demand shortfall (an issue we discuss below), while Woodford's focus is on the consequences of the structure of linkages among sectors.

The equilibrium of this stylized economy isn't hard to describe. Consider first what happens when individuals cannot insure against a pandemic. This could occur because people simply hadn't contemplated the possibility of a pandemic, or because in practice the difficulty of spelling out exactly what constitutes a pandemic makes the cost of writing insurance contracts prohibitive. The symmetry of the model implies that half of individuals are in each sector. In the absence of a pandemic, everyone earns the same amount, each sector produces the same amount, and each individual consumes the same amount of each sector's output. If a pandemic shuts one sector, the individuals who were working there earn no income, and so have no consumption (recall that the economy lasts for only one period and workers can't switch sectors in a pandemic). The individuals in the sector that stays open continue to work, but they now spend all their income on that sector's output rather than splitting it between the two sectors.

In normal times, because everyone's consumption is the same, everyone's marginal utility of consumption is the same. But in a pandemic, the marginal utility of consumption (of the output of the sector that remains open) of those who remain employed is lower than normal, while the marginal utility of those who become unemployed is higher than normal (probably greatly so, because their consumption falls to zero). Thus, the marginal utility of sector-*A* workers is higher than that of sector-*B* workers if there's a sector-*A* pandemic, but lower if there's a sector-*B* pandemic. This variation in relative marginal utilities implies that from an ex ante perspective—that is, before it's known whether there will be a pandemic—the outcome is Pareto inefficient. Measures that would shift resources from low-marginal-utility individuals to high-marginal-utility individuals in a pandemic would raise everyone's ex ante expected utility.

The efficient allocation can be achieved without any government action if there are not only competitive markets for output and labor in each sector after it is known whether there will be a pandemic, but also competitive markets for "pandemic insurance" before it's known whether there will be a pandemic. With these markets in place, the outcome in the absence of a pandemic is the same as before. But now individuals in each sector purchase insurance against the possibility of a pandemic hitting their sector (with the market clearing because the individuals in the other sector are willing to sell such insurance). In the event of a pandemic, every individual consumes the same amount of the output of the sector that stays open as they do in the absence of a pandemic. Marginal utility is always equal across all individuals, and so the allocation is efficient.[2]

The final step is to return to the case where there is no insurance and consider how the government can implement the efficient allocation—that is, the one that

[2] Another market-based way of achieving the efficient allocation is through trade in competitive markets in the full set of "state-contingent" (or "Arrow-Debreu") commodities (output and labor in each sector in each state of the world—no pandemic, a sector-*A* pandemic, and a sector-*B* pandemic) before it's known whether there will be a pandemic. This produces the same outcomes as with competitive markets for pandemic insurance. Although this set-up is obviously more abstract and even less realistic than the possibility of pandemic insurance, it can be useful for clarifying outcomes and their welfare properties.

would occur with perfectly functioning insurance markets. In this case, the public sector is providing the insurance individuals would obtain for themselves if markets functioned perfectly, so it's natural to describe the policy as social insurance.

The policy that reproduces the efficient outcome is simple. In the absence of a pandemic, the government takes no action. But if there is a pandemic, it taxes the individuals in the sector that is still open half their income and transfers the proceeds to the individuals in the sector that is shut. The result is that each individual's after-tax-and-transfer income is half their usual income, and everyone's consumption of the output of the sector that stays open is the same as in normal times.

Thus, the policy that replicates what would happen with perfect insurance markets is one of targeted transfers: the government makes transfers to individuals who can't work because of the pandemic. Moreover, there is no "stimulus" in the optimal policy: what the government pays out in transfers equals what it takes in from taxes, and output and employment are the same as they would be without insurance markets or government intervention (as also observed by Woodford 2020). In addition, although individuals who can't work because of the pandemic obtain the same after-tax-and-transfer income (and the same consumption) as those who stay employed, they don't attain their usual income. Instead, they only get what they normally spend on the output of the non-pandemic sector. In that sense, insurance is less than complete.

Finally, a simple way of thinking about the government's policy is that it taxes the individuals in the non-pandemic sector what they would normally spend on the pandemic sector's output and gives the proceeds to the individuals in the pandemic sector. This allows them to maintain their normal spending on the output of the non-pandemic sector.

Although this baseline case shows some key messages of the social insurance perspective, it omits some important issues. We therefore turn to extensions. Table 1 summarizes their key features and implications.

**Incentives and Fairness**

In the efficient allocation of the baseline case, the individuals who were working in the sector that shuts down are actually better off than those in the sector that stays open: everyone has the same consumption, but only the individuals in the sector that's open have the disutility of working. There are two reasons that implementing that allocation through government social insurance might not be workable. The first involves incentives. In the model, it's evident who should continue working in the pandemic—everyone working in the sector that isn't shut by the pandemic. In practice, however, the situation is more complicated. Individuals differ in their nonwork situations (such as their childcare needs and preexisting health conditions), in their attitudes toward health risks, and in how easily they can change sectors in a pandemic. Similarly, it often isn't obvious which firms (or which parts of a firm) should continue operating in a pandemic. As a result, for many workers it is not possible to tell whether the optimal outcome involves their continuing to

*Table 1*
**Variations on the Baseline Case**

| | *Variant* | *Key implication* |
|---|---|---|
| 1. | Incentive or fairness considerations | Unemployed workers have lower consumption than the employed |
| 2. | A high-risk essential sector (plus incentive or fairness considerations) | Hazard pay for high-risk essential workers |
| 3. | Heterogeneous incomes, possibilities for self-insurance, and costs of social insurance | Higher replacement rates of lost income for lower-income workers |
| 4. | Multiple periods, barriers to borrowing, and a force causing the unemployed to have lower consumption than the employed | Aggregate demand falls by more than aggregate supply, implying a role for aggregate demand stimulus |

work. Second, public perceptions of fairness don't align perfectly with allocations that would prevail under complete markets (see, for example, Weinzierl 2014), and so an allocation that makes the unemployed better off than the employed may not be politically feasible or may be viewed as undesirable.

We capture these considerations by assuming the government has no information about who should optimally be working in a pandemic and who shouldn't. As a result, the individuals who continue working must be at least as well off as those who don't; otherwise, no one would work. Since working involves disutility, it follows that the employed must have greater consumption than the unemployed. Total output (and hence total consumption) is the same as without this constraint. Thus the employed consume more than they do without the constraint, and the unemployed consume less. The "replacement rate" from social insurance is therefore lower than in the baseline case. The other key implications of the baseline case continue to hold: the optimal policy is targeted transfers, and there's no need for stimulus.[3]

**High-Risk Essential Workers and Hazard Pay**

During a pandemic, there are some jobs—notably in healthcare—where it's socially desirable for workers to continue working even though it involves an elevated risk of illness. To capture this, suppose there are three sectors rather than two. When there's a pandemic, as before one sector shuts down and one is unaffected. But now

[3]The online Appendix also discusses the cases where the government has some but less than full information about who should be working in a pandemic, and where some individuals can switch sectors in a pandemic but the government has limited information about who can switch easily. For the most part, these extensions don't change our main messages. However, we find that labor mobility with limited government information not only leads to a smaller fall in output in a pandemic than in the baseline case, but also provides a reason the government might want to provide a "moving bonus" to workers who switch sectors in a pandemic (somewhat analogous to the possibility of hazard pay discussed below).

a third sector is essential and high-risk: the workers are particularly valuable during a pandemic but must interact with others, and so face greater chances of illness. As a result, both the utility of consuming the sector's output and the disutility of working in this sector are higher than normal. We continue to assume that workers must decide which sector to be in before knowing whether there will be a pandemic. Finally, to maintain the symmetry across sectors (which makes the implications particularly clear), we assume that in a pandemic each sector is equally likely to be the one that shuts and each is equally likely to be the essential high-risk one.

In the absence of incentive or fairness considerations, the efficient policy with a high-risk sector is very similar to that of the baseline case. Workers are equally divided among the sectors. In a pandemic, each individual's consumption of the outputs of the two sectors that stay open is unchanged (while their consumption of the output of the sector that shuts of course falls to zero). As before, the efficient allocation can be obtained by a social insurance program of targeted transfers to the unemployed.

With this policy, however, workers in the high-risk sector are the worst off, individuals who had been working in the sector that shuts are the best off, and workers in the sector that stays open but is not high-risk are in between. As a result, the presence of an essential high-risk sector has more interesting implications if allocations that make the employed worse off than the unemployed aren't possible. With this constraint, as before, workers in the sector that stays open but is not hazardous must have higher consumption than the unemployed. More importantly, because working in the high-risk sector involves greater disutility than working in the other open sector, the consumption of workers in the high-risk sector needs to be even greater than that of workers in the other open sector.

This allocation can't be implemented just by targeted transfers to the unemployed; there must also be transfers to workers in the high-risk sector. This implication corresponds to the idea of "hazard pay": workers in the sector that is essential but hazardous are compensated for the additional risks they face by continuing to work.

**Heterogeneous Incomes and Self-Insurance**

In the baseline case, individuals in the sector that shuts down are fully compensated for the loss of the income they would use to purchase the output of the other sector. It follows that if earnings are heterogeneous, individuals with much higher non-pandemic earnings who lose their jobs receive much larger social insurance payments than lower-earning individuals. And although the situation with incentive or fairness considerations is somewhat more complicated, the result that optimal social insurance payments rise strongly with non-pandemic earnings carries over to that case.

This implication of our framework doesn't correspond well with intuition or with what is done in almost all social insurance programs. For example, although unemployment insurance payments are an increasing function of prior earnings, they're normally capped at a relatively low level, and that policy continued during the pandemic. Similarly, the various rounds of direct payments to individuals

excluded those with high incomes, and there were limits on the amount of an individual's earnings that could be paid using funds from the Paycheck Protection Program (where the government made forgivable loans to small businesses hurt by the pandemic).

This gap between our framework's implications and actual policy reflects, at least in part, the framework's omission of two important factors. One is that insurance (whether provided privately or through the government) involves administrative and related costs, which reduces the optimal amount of insurance. The other is that individuals make decisions over multiple periods. As a result, they have some ability to self-insure through their saving and borrowing, and this ability is almost certainly greater for individuals with higher incomes.

The availability of self-insurance reduces the amount of insurance the government should provide when that insurance is costly, and the reduction is greater when an individual's ability to self-insure is greater. Specifically, suppose (realistically) that higher-income individuals are more able to self-insure, in the sense that their consumption falls by a smaller proportion if they become unemployed in a pandemic and there's no social insurance. Then, as we show in the online Appendix, under reasonable assumptions pandemic social insurance payments rise less than proportionately with individuals' normal incomes. Indeed, if self-insurance is sufficiently strong at high enough incomes, optimal pandemic social insurance doesn't provide very high-income individuals with any payments at all.

**The Possibility of an Aggregate Demand Shortfall and a Need for Stimulus**

A pandemic is a disruption to the economy's ability to produce, so it's natural to describe it as a shock to aggregate supply. However, as argued informally by Rowe (2020) early in the pandemic and formalized soon after by Guerrieri et al. (2020), a pandemic that disproportionately affects some sectors can lead endogenously to a fall in aggregate demand larger than the fall in aggregate supply. This result holds in a natural multi-period version of our framework.

Following Guerrieri et al. (2020), we say aggregate demand falls by more than aggregate supply in a pandemic if with the previous real interest rate and the optimal social insurance policy, demand for output is less than the efficient level of output (which is, of course, less than normal output because of the need to shut down some of the economy). If this occurs, obtaining the efficient level of output requires some source of additional aggregate demand, which could come either from a reduction in the real interest rate or from fiscal stimulus.

Whether a pandemic reduces demand by more than supply isn't immediately clear. On the one hand, everyone's consumption falls in a pandemic. In a multi-period setting, this effect tends to make individuals want to borrow against their future income to smooth their consumption. This acts to raise demand relative to supply, and so works in the direction of raising the equilibrium real interest rate. On the other hand, the range of outputs that are available to consume falls in a pandemic because of the shutdowns. This makes consumption less attractive than usual, which works in the other direction.

It turns out that in the most natural multi-period extension of our baseline case, these two effects exactly balance. With optimal social insurance in the baseline case, each individual's consumption of the output of the sector that stays open is the same as in normal times. Together with the assumption that consumption of one sector's output doesn't affect utility from consuming the other sector's, this implies that each individual's marginal utility is the same as normal. As a result, in a multi-period setting, the same real interest rate that makes individuals want to buy the usual level of output in normal times makes them want to buy the efficient level of output in a pandemic. Thus, there is no force causing the equilibrium real interest rate to either rise or fall in a pandemic.

Crucially, however, this result fails if social insurance doesn't equalize consumption across individuals in a pandemic (as occurs with incentive or fairness considerations or with costly insurance). In this case, since total output of the sector that stays open is the same as normal, in the optimal allocation some individuals consume more of the sector's output than normal and some consume less. Those consuming more want to save, which reduces demand, while those consuming less want to borrow, which raises demand. If there are smaller barriers to saving than to borrowing, which is surely realistic, the saving effect dominates the borrowing effect, and so there's an aggregate demand shortfall. Thus, a pandemic is likely to lead to a need for aggregate demand stimulus.

Guerrieri et al. (2020) explore these issues in much more depth. For our purposes, the key message is that a need for stimulus in a pandemic isn't just possible but plausible despite the fall in the economy's safe capacity. One implication is that in thinking about possible social insurance policies in a pandemic, it's appropriate to be concerned about whether they raise aggregate demand in addition to providing insurance.[4]

## Implications for Unemployment Insurance in the Pandemic

A key implication of the social insurance framework is that benefits should be targeted to those who suffer direct economic harms from the pandemic. Because being unable to work is a powerful indicator of being harmed economically, it follows that unemployment insurance should be a central component of pandemic fiscal policy. We therefore turn to what the social insurance perspective implies about how unemployment insurance should be structured in a pandemic, and compare those prescriptions with what was actually done in the United States.

[4]The online Appendix discusses two issues concerning pandemic fiscal policy that fit in the social insurance framework but that we don't consider in the text: "forgiveness" (that is, policies that eliminate either payment obligations, such as student loan payments, or outstanding debts, such as student loan balances) and aid to state and local governments. It also describes some extensions that have little effect on the main messages of our analysis.

**Coverage**

A first issue is who should be eligible for unemployment insurance. In practice, eligibility in normal times is restricted in various ways. Among the most important are that workers must have earned at least a certain amount over some length of time before becoming unemployed (with earnings from self-employment not counting toward this requirement); they must not have left their previous job voluntarily; and they must be either actively seeking work or awaiting recall to their previous job. Yet if individuals could purchase pandemic insurance, they would want to insure themselves against being unable to work in a pandemic regardless of whether they satisfied these criteria. Thus, the social insurance framework implies that unemployment insurance should be broadly available to individuals who aren't working because of a pandemic.

Actual policy in the United States largely followed this implication of our framework. In response to the pandemic, policymakers increased the length of time individuals could receive benefits and relaxed search requirements, waiting periods, and some eligibility rules for regular unemployment insurance. They also enacted the Pandemic Unemployment Assistance program, which extended coverage to many previously uncovered workers, including the self-employed, gig workers, and workers who quit their jobs because of childcare needs resulting from the pandemic (Cajner et al. 2020). Finally, as discussed in more detail below, they added a fixed weekly amount to benefits (including those through Pandemic Unemployment Assistance) for much of the pandemic.

As Cajner et al. (2020) stress, a host of factors—ranging from fraudulent claims to idiosyncratic biweekly reporting in some large states—make it very challenging to determine the number of individuals receiving benefits during the pandemic. Nonetheless, it's clear that coverage rose broadly in line with job losses. Employment (as measured by the household survey, and so including the self-employed) fell by 24.7 million from February to April 2020.[5] Cajner et al.'s preferred measure of continued regular unemployment insurance claims rose by 19.7 million from its pre-pandemic level to its peak. Determining the number legitimately receiving Pandemic Unemployment Assistance benefits is even harder, but Cajner et al.'s results indicate it was at least several million.

At the same time, unemployment insurance coverage wasn't complete. Some of the pandemic unemployed, such as most new entrants to the labor force who could not find a job immediately, were not eligible for any unemployment insurance. In addition, the conjunction of the enormous crush of claims, limited processing resources, and antiquated administrative systems in many states led to long delays in processing claims (Bitler, Hoynes, and Schanzenbach 2020; Cajner et al. 2020). Nonetheless, there was unusually broad coverage of the unemployed in the pandemic.

[5] Because the impact of the pandemic swamped the effects of normal seasonal variation, the numbers in this paragraph are not seasonally adjusted.

**Duration**

A second issue that is not directly addressed by the one-period framework is how long pandemic-related unemployment insurance should last. Again, however, the logic of the social insurance perspective is clear. If individuals could purchase pandemic insurance, they would want to be insured for the duration of the pandemic. Thus pandemic-related unemployment insurance should be available for however long the pandemic lasts.

Actual US policy departed considerably from this implication of the social insurance framework. Policymakers did increase the number of weeks that individuals could receive benefits. However, throughout the pandemic, the various extensions of duration, expansions of coverage, and increases in benefits were tied to calendar time rather than to metrics of the course of the pandemic or the state of the economy. Moreover, there was often great uncertainty about whether the emergency measures would be extended or allowed to lapse, which is not what beneficiaries would desire from a social insurance program.

Consider, for example, the Pandemic Unemployment Assistance program. The original Coronavirus Aid, Relief, and Economic Security (CARES) Act, enacted on March 27, 2020, provided 39 weeks of benefits under the program and set its end data as December 31, 2020. The program was continued at the last minute through mid-March 2021 by the Consolidated Appropriations Act, 2021, enacted December 27, 2020, which also provided an additional eleven weeks of benefits. The program was extended again (through September 6, 2021) by the American Rescue Plan Act of 2021, enacted on March 11, 2021—just a few days before the program was to end.

Similarly, the additions to benefits fluctuated greatly in ways largely unrelated to the severity of the pandemic. The CARES Act provided an extra $600 per week of unemployment insurance benefits through July 31, 2020, at which point the supplement was allowed to lapse. The Lost Wages Assistance Program through the Federal Emergency Management Agency then provided $300 per week of additional benefits (or, in a few states, $400 per week) for roughly six weeks for many workers, though workers receiving low benefits were excluded. Additional benefits then lapsed entirely through the end of 2020. The Consolidated Appropriations Act, 2021 provided $300 per week in additional benefits from January 1, 2021, through March 14, 2021. Finally, the American Rescue Plan Act of 2021 extended the $300 per week through September 6, 2021.

**Replacement Rates**

An issue for which it's much harder to determine the exact implications of the social insurance framework is how generous unemployment benefits in a pandemic should be and how that generosity should vary with prior income. In our baseline case, individuals who remain employed are taxed to finance transfers to the unemployed, and insurance payments to the unemployed are less than their prior incomes. In practice, however, additional unemployment insurance in the pandemic has been financed in the short term by government borrowing. In this case, as we describe in the online Appendix, the natural modification of our

baseline case implies that optimal social insurance fully replaces the incomes of individuals who can't work because of the pandemic.

The various extensions of our baseline case discussed in the previous section, however, suggest two reasons for less than 100 percent replacement. First, there may be incentive or fairness considerations that imply the unemployed shouldn't be better off than the employed. Because the unemployed don't have the disutility of working, in a one-period setting this requires that they have lower incomes than the employed. As various authors have pointed out, however, things are more complicated in a dynamic setting. Someone who is unemployed may face a long and challenging job search when the pandemic ends. Thus it's not clear that replacement rates need to be much (or even at all) below 100 percent during the pandemic to prevent individuals preferring unemployment to employment (for example, Ganong, Noel, and Vavra 2020).

Second, and more importantly, providing social insurance involves costs beyond the insurance payments. Those costs include administrative expenses, the distortions caused by the incentive effects of the insurance, and the distortions from raising the additional revenues at some point to satisfy the government's intertemporal budget constraint. These costs imply that even in the absence of incentive or fairness issues, optimal social insurance should leave the consumption of the unemployed somewhat below that of the employed. In the online Appendix, we argue that 10 to 15 percent is a plausible ballpark figure for the size of the shortfall.

How much social insurance is needed to achieve this level of consumption for unemployed workers depends crucially on the possibility and cost of self-insurance. In particular, to make more precise statements about optimal replacement rates and how they should vary with prior income, we would want two types of information. The first is a comparison of the consumption of unemployed and otherwise similar employed individuals in the absence of unemployment insurance, as a function of their income. This would be informative about the extent of self-insurance. The second is evidence about how the unemployed finance their consumption in the absence of unemployment insurance. This would be informative about the cost of self-insurance. To the extent individuals use types of self-insurance that are more costly than government-provided social insurance (as might be true of borrowing at very high interest rates or selling highly illiquid possessions), it's optimal for the government to provide the insurance. On the other hand, if sufficiently high-income individuals can do enough self-insurance at a cost less than that of the government to keep their consumption from falling very much if they become unemployed, optimal social insurance doesn't provide them with any social insurance payments.

Ganong and Noel (2019) examine the consumption behavior of unemployment insurance recipients before the pandemic. In a sample where recipients are probably financially healthier than typical beneficiaries, they find that after recipients exhaust their benefits, their consumption is on average 20 to 30 percent below what it was when they were employed. They also find that the falls average 30 to 40 percent among those in the highest third of the ratio of benefits to prior income and in the lowest third of assets relative to prior spending (both which tend to be

associated with lower incomes). Farrell et al. (2020) and Ganong et al. (2021) find that delays in benefits early in the pandemic also resulted in large reductions in consumption for the unemployed.

Another type of evidence about these issues comes from short-run marginal propensities to consume (MPCs) out of stimulus payments during the pandemic. A high MPC is suggestive of current marginal utility being high relative to future marginal utility, and thus of short-run financial distress. Karger and Rajan (2021) and Baker et al. (2021) find large MPCs from the stimulus payments. More importantly for our purposes, they find that it varied substantially with income. For example, Baker et al.'s point estimates (from their Table 5, Column 1) imply an MPC over three months of 0.66 at a monthly income (net of withholding) of $500 and just 0.15 at a monthly income of $5000. This evidence points to greater economic stress during the pandemic among low-income individuals.

Taken together, these studies indicate that unemployed workers may have limited ability to self-insure, and that this ability may be substantially smaller among lower-income workers. This suggests that the replacement rate for unemployment benefits may need to be fairly substantial, though clearly less than 100 percent, to result in a loss of consumption in the 10 to 15 percent range. It also suggests that replacement rates should decline as prior income rises. However, the existing evidence is not enough to pin down optimal replacement rates precisely.

Even though we are unable to say what exactly replacement rates from unemployment insurance during a pandemic should be, it is clear that actual replacement rates have differed sharply from the prescriptions of a social insurance perspective. Ganong, Noel, and Vavra (2020) show that the flat $600 per week of additional benefits raised replacement rates to well over 100 percent for most workers.

There appear to have been two forces behind the policies involving greater than 100 percent replacement. One is the pursuit of other objectives, especially redistribution toward lower-wage workers and aggregate demand stimulus. The other is idiosyncratic factors: Ganong, Noel, and Vavra (2020) report that an overestimate of the average wage of workers who would lose their jobs led policymakers to underestimate the impact of the $600 weekly adjustment on replacement rates, and that the very limited capacities of state unemployment insurance systems led policymakers to adopt the fixed supplement rather than more complicated additions to benefits.

The later iterations of benefit increases, which were in the range of $300 per week, likely reduced replacement rate to below 100 percent for many workers, and so are more consistent with the social insurance perspective. Also, regular unemployment benefits continued to phase out at high incomes, which is consistent with the social insurance framework given the evidence that self-insurance is easier for high-income unemployed workers.

**Unemployment Insurance Payments as Demand Stimulus**

As we have discussed, even with optimal social insurance, a pandemic can lead to a shortfall of aggregate demand from what is needed to yield the desirable level of output. Thus, even though the central motivation for broad unemployment

insurance in a pandemic is social insurance, it is valuable to know whether unemployment insurance is also an effective source of aggregate demand stimulus.

Three types of evidence suggest that it is. First, the social insurance framework implies that unemployment insurance should be targeted to individuals whose marginal utility from consumption would otherwise be temporarily high. Such individuals would be expected to devote a large fraction of a marginal increase in resources to current consumption.

Second, the evidence from before the pandemic points to a high marginal propensity to consume out of unemployment insurance benefits, and thus to it being effective stimulus. Ganong and Noel (2019) report a very conservative lower bound for the MPC out of unemployment insurance benefits of 0.27, an upper bound of 0.83, and a point estimate under reasonable assumptions of 0.77. In a survey of work in this area, Chodorow-Reich and Coglianese (2019) suggest an MPC of about 0.35 over one month and 0.55 over a year.

Third, the evidence from the pandemic also points to high marginal propensities to consume out of unemployment insurance benefits. Most notably, Ganong et al. (2021) estimate an MPC out of benefits (both regular and the $600 supplement) between 0.29 and 0.43 over one month, and between 0.62 and 0.69 over six months.

One wouldn't expect the large marginal propensities to consume to apply regardless of the level of benefits, however. If benefits are sufficiently high that the marginal utility of current consumption for the unemployed is driven down to its normal level, a large fraction of any additional benefits is likely to be saved. The evidence doesn't clearly support this prediction, however. Ganong et al. (2021) find that because of the high replacement rates, the unemployed had both unusually high consumption and large increases in their stock of savings during the period when benefits included the $600 supplement. Furthermore, despite the higher saving, they estimate an MPC out of the subsequent $300 supplement that is very similar to the MPC out of the initial benefits. Thus, the issue of under what circumstances MPCs are high remains open.

## Implications for Hazard Pay in the Pandemic

As discussed in the first section, a novel implication of the social insurance perspective is that in some cases, the government should provide hazard pay to high-risk essential workers during a pandemic. This implication results from extending the baseline model to include a third sector where workers doing very socially valuable jobs face greater risk of illness, and hence have greater disutility of work during a pandemic. The inclusion of this third sector, combined with either notions of fairness or difficulty in determining who should be working, leads to paying such at-risk workers a bonus. Intuitively, the need for hazard pay comes from seeking to make sure workers employed in the riskier sector aren't worse off than workers whose sector had to shut down. This section investigates this implication of the

social insurance perspective on fiscal policy in more detail. It also considers some of the many practical issues involved in the design and implementation of an actual program.

Government-funded hazard pay was considered during the pandemic and actually implemented on a very limited basis. These programs provide a useful baseline for discussion. The 2020 HEROES Act, which passed by the House of Representatives in May 2020, contained a $200 billion hazard pay program (US Congress 2020). The proposed program, which did not make it into final legislation, would have paid an extra $13 per hour for the period from January 27, 2020 (the first day of the declared public health emergency) until 60 days after the last day of the emergency. The definition of who was potentially eligible was very broad. Qualifying work was defined as work "not performed while teleworking from a residence" and involving "regular in-person interactions with . . . patients; . . . the public; . . . or coworkers" in a number of specific areas (US Congress 2020). Actual eligibility determination required an application by the employer to the Treasury Department. If the application was approved, the employer would then receive a grant and be responsible for providing the premium pay to workers.

An example of a hazard pay program that was actually implemented is the COVID-19 Pennsylvania Hazard Pay Grant (Pennsylvania Department of Community and Economic Development 2020), enacted in May 2020. The employees receiving the hazard pay needed to interact with others and couldn't be teleworking from home. The list of eligible industries was decidedly shorter than the HEROES Act program. The amount of hazard pay was $3 per hour, up to a total of $1200. Like the HEROES Act, the Pennsylvania program required employers to apply for the grants. Employers could only apply for grants covering up to 500 full-time-equivalent employees per location. The budget for the program was $50 million.

**Who Should Receive Hazard Pay?**

Whether some workers should receive hazard pay depends crucially on differences in risk across occupations during the pandemic. A number of studies have tried to investigate this issue. Their findings are summarized in Table 2.

One of the most detailed studies combines comprehensive health records and occupation data to form a complete individual-level national database for Norway (Magnusson et al. 2021). The study then identified occupations with direct contact with children, students, patients, and customers, and compared COVID-19 infection rates for these occupations with those of all other working-age adults. The study found that after controlling for age and sex, healthcare workers and transit workers had approximately three times the risk of contracting COVID-19 during the first wave of infection (February 26–July 17, 2020) (Magnusson et al. 2021, Figure 3). Interestingly, in the second wave (July 18–December 18, 2020), healthcare workers no longer had significantly elevated COVID-19 risk. Instead, the occupations with the highest odds ratios of infection were food service workers (food counter attendants, bartenders, and waiters), transit workers, and cleaners (p. 8).

*Table 2*
**Summary of Studies of Occupational Risk of COVID-19**

| *Study* | *Sample* | *Riskiest occupations* | *Degree of elevated risk* |
|---|---|---|---|
| | | ***Outcome Variable: COVID-19 Infection*** | |
| 1. Magnusson et al. (2021) | All working-age Norwegians | 1st wave: healthcare, public transit workers<br>2nd wave: food service, public transit workers, cleaners | Approximately 3 times all other working-age adults<br>Approximately 1.5–2 times all other working-age adults |
| 2. Mutambudzi et al. (2021) | 120,075 UK Biobank participants | Healthcare workers<br>Social care workers | 7.43-fold increase in risk<br>2.46-fold increase in risk |
| 3. Song et al. (2021) | 400,000 primary policy holders of a major insurer in PA | Essential workers as revealed by whether their industry was shut down | 53% increase in risk relative to non-essential workers |
| | | ***Outcome Variable: COVID-19 Death*** | |
| 4. Billingsley et al. (2020) | All deaths in Sweden 3/5 to 5/7/2020 | Taxi and bus drivers<br>Service sector | 3.7 times the risk of IT techs.<br>2.2 times the risk of IT techs. (not statistically significant) |
| 5. Chen et al. (2021) | Deaths in CA from 1/2016 to 11/2020 of people 18–65 | Food or agriculture<br>Transportation or logistics<br>Manufacturing<br>Facilities | 1.39 times expected deaths<br>1.31 times expected deaths<br>1.24 times expected deaths<br>1.23 times expected deaths |

A study of 120,000 people in the United Kingdom compared the risk of COVID-19 (severe enough to be diagnosed in a hospital or emergency room) between workers in eight essential occupations and nonessential workers (Mutambudzi et al. 2021). The highest relative risk was for healthcare professionals, medical support staff, health associate professionals, and social care workers. Healthcare workers had more than a seven-fold increase in COVID-19 risk. A strong point of this study is that it was able to control for a wide range of health and demographic covariates.

Song et al. (2021) used detailed private insurance data from Pennsylvania to compare COVID-19 inflection rates for essential and nonessential workers. Essential workers were defined as those employed by firms designated by the governor as life-sustaining businesses and permitted to continue physical operations during a statewide shutdown. Because this definition required physical operation, many of the workers involved were likely to have contact with others. The authors use a difference-in-differences specification to see if essential workers had higher infection rates following the shutdown order. They find that for a sample of policyholders younger than 65, "being an essential worker is associated with a 53% increase in likelihood of being Covid-positive" (p. 11). This increase was most notable in the health and social care sectors, but still present to a smaller extent for essential workers outside those sectors.

Two other studies use death records to assess the occupational mortality risk of COVID-19. A Swedish study found that taxi and bus drivers and service sector workers had a higher risk of dying from COVID-19 than other workers, but the elevated risk disappeared when demographic covariates were included (Billingsley et al. 2020). A California study estimated excess deaths for nine occupational sectors over the period March–November 2020 (Chen et al. 2021). The sectoral highs were in food or agriculture, transportation or logistics, manufacturing, and facilities. Healthcare workers faced only slightly elevated mortality risk. A weakness of this study is that the authors have little information on covariates, as well as imperfect data on occupation.

Based on this evidence, it appears that hazard pay would have made sense during the pandemic. There was indeed a portion of the economy that needed to remain open but that involved a greater risk of illness. At the same time, the evidence suggests that the fraction of essential workers at noticeably higher risk was relatively small. Both Magnusson et al. (2021) and Mutambudzi et al. (2021) identify healthcare workers as being the main workers at greater risk (at least early in the pandemic). Using occupational data from the May 2019 National Occupational Employment and Wage Estimates, healthcare workers (broadly defined) account for about 10 percent of all US workers (US Bureau of Labor Statistics 2019). Expanding the list to include food service workers, taxi drivers, and cleaners, the other noticeably higher risk occupations, adds another 8 percent of US workers.

Compared with this list, the HEROES Act had an excessively broad definition of who should receive hazard pay during the pandemic. The list of eligible occupations or industries in the bill went on for more than four pages and included not just the obvious ones of healthcare and public transportation, but child care, barge operations, longshoremen, laundry work, and restaurant work. The list of eligible industries in the Pennsylvania program was shorter, but still included many for which there is little evidence of higher risk, such as security services, freight trucking, and retail food stores. Both programs did limit the bonuses to frontline workers—that is, essential workers who were required to interact with others. Blau, Koebe, and Meyerhofer (2021) estimate that in March 2020, about 43 percent of all US workers met these criteria.

Both the HEROES Act and the Pennsylvania hazard pay program relied on firms to apply for hazard pay funds from the government. From a social insurance perspective, this feature is problematic. Relying on employer application risks identical workers being treated differently (or worse, workers facing less risk getting premium pay and workers facing more risk not). Whether workers receive the government-provided hazard pay could depend on employer motivation or simply on how quickly employers respond to the call for applications. These outcomes are not socially optimal.

Various alternatives are possible. A minor variation that would reduce the possible randomness would be for the government to invite firms in the relevant industries to say how many workers they have eligible for the hazard pay. The presumption would be that all such identified workers would receive it. Firms would

still have to make some effort for their workers to receive the bonus, but the burden would be less. A more extreme variation would be to require individual workers to apply, as they do for unemployment insurance. This proposal has the great disadvantage of being administratively complex. Not only would the government need to process a very large number of applications, but firms would likely still have to be involved because they are the sensible unit for dispensing the pay.

**How Large Should the Hazard Premium Be?**

The HEROES Act called for a hazard premium of $13 per hour for all eligible workers; the Pennsylvania program provided a boost of $3 per hour. Since risk is related to contact, and contact is time-dependent, it is appropriate for the hazard premium to be per hour worked rather than lump sum. A more difficult and fundamental question is just how much extra pay would be appropriate for high-risk workers.

A crude way to try to answer this question is to blend risk estimates with an estimate of the value of a statistical life. Table 3 presents such a calculation. The Centers for Disease Control and Prevention (2021a) provide an estimate of the number of COVID-19 infections for adults 18 to 64 in the United States over roughly the first year of the pandemic. We combine this with data on the working-age population in 2019 from the US Census Bureau (Rogers and Wilder 2020) to get an overall infection rate (row 1 of Table 3). Magnusson et al. (2021, Figure 3) find that healthcare and public transit workers in Norway had a risk of contracting COVID-19 that was approximately three times greater than other working-age adults (adjusting for age and sex) during the first wave of the pandemic. As discussed above, these workers comprise about 10 percent of employed workers in the United States, or 7 percent of the working-age population in 2019. From this, we can back out estimates of the risk of getting COVID-19 during the first year of the pandemic for both the high-risk group and other working-age adults (row 2). This calculation suggests that high-risk workers had a 59 percentage point higher risk of infection.[6] We then estimate the infection fatality rate for working-age adults by dividing confirmed working-age deaths (Centers for Disease Control 2021b) by estimated cases (row 3).[7] The Environmental Protection Agency and other government agencies use $10 million as their estimate of the value of a statistical life (row 4) (for example, US Environmental Protection Agency 2016).

Armed with these components, we can calculate the cost to high-risk workers of the extra risk of dying they incurred during the pandemic. Multiplying the excess risk times the infection fatality rate times $10 million yields $8,617 (row 5

[6]This difference is almost surely somewhat too large. It may reflect the fact that the Magnusson et al. (2021) estimates for relative risk come from early in the pandemic when overall infection rates in Norway were very low. It is worth reiterating, however, that Mutambudzi et al. (2021) also estimate very high risk for healthcare workers.

[7]Our resulting infection fatality rate of 0.146 percent matches quite closely the estimates from O'Driscoll et al. (2020) for the infection fatality rate for working-age adults based on a meta-analysis of studies for a number of countries.

*Table 3*
**Putting a Dollar Value on Increased COVID-19 Risk for High-Risk Workers**

| | |
|---|---|
| 1. | Share of working-age population who had COVID-19 during first year of the pandemic:<br>75,302,292/213,610,414 = 0.35 |
| 2. | Estimated risk of getting COVID-19 based on Magnusson et al. (2021):<br>Other working age population: 29%<br>Healthcare and transit workers: 88%<br>Difference: 59 percentage points |
| 3. | Estimated infection fatality rate for working-age population:<br>110,143/75,302,292 = 0.00146 |
| 4. | Value of a statistical life: $10 million |
| 5. | Dollar value of excess risk to healthcare and transit workers:<br>0.59 • 0.00146 • $10 million = $8,617 per year (or $4.13/hour) |
| 6. | Dollar value of excess risk to all frontline workers based on Magnusson et al.:<br>0.18 • 0.00146 • $10 million = $2,704 per year (or $1.30/hour) |
| 7. | Dollar value of excess risk to top two risk tiers based on Magnusson et al.:<br>*Healthcare and transit workers*:<br>0.59 • 0.00146 • $10 million = $8,617 per year (or $4.13/hour)<br>*Food service workers, taxi drivers, and cleaners*:<br>0.29 • 0.00146 • $10 million = $4,308 per year (or $2.06/hour) |

*Note:* Equations may not hold exactly because of rounding.

of Table 3). The pandemic had been going on for roughly a year as of the time of the data used in the calculation, so this estimate corresponds to the pay boost that would be needed for a year to compensate for the additional risk. This works out to $4.13 per hour for a typical 2,087-hour work year (US Office of Personnel Management 2021). This is roughly what the Pennsylvania hazard pay program provided, but substantially less than what the HEROES Act called for.

There are various ways that this estimate of the appropriate size of the hazard premium could be too low. Most obviously, it only includes the risk of dying from COVID-19. Studies suggest that at least 10 percent of COVID-19 survivors experience long-term effects (for example, Greenhalgh et al. 2020). Workers might put a substantial dollar value on that possibility as well. Second, hazard pay is motivated by a desire to ensure that high-risk workers remain willing to do socially valuable work. As a result, what matters is not necessarily their actual risk of infection and death, but their perceived risks. If high-risk workers systematically overestimate their risks, the hazard premium might need to be higher. For example, if the perceived infection fatality rate were twice as high as the estimate in Table 3, then the perceived cost of excess risk to high-risk healthcare and transit workers would be over $8 per hour—getting closer to the hazard premium called for in the HEROES Act. Third, the calculations in Table 3 use confirmed COVID-19 deaths to calculate the

infection fatality rate. Excess deaths (from all causes) are estimated to be approximately 30 percent higher than confirmed COVID-19 deaths in 2020 (Islam et al. 2021). Using this alternative estimate increases the hazard pay needed by 30 percent as well.

Importantly, the calculation above is only for the highest-risk workers. The HEROES Act proposed to provide hazard pay for most frontline workers. The high-contact workers analyzed by Magnusson et al. (2021) account for roughly 31 percent of all workers in the United States in 2019.[8] For this broader group, the overall weighted average of the added risk of infection (adjusted for age and sex) was a factor of 1.59 (which is very similar to the factor of 1.53 found by Song et al. 2021), which translates into an elevated infection risk of 18 percentage points. Line 6 of Table 3 shows that the resulting dollar value of the extra risk to frontline workers as a group is relatively low—precisely because most face little elevated risk (or in some cases lower risk than non-frontline workers). The calculation suggests that the dollar value of the added risk for this broad group is $2,704, or roughly $1.30 per hour.

Given the variation in risk among frontline workers, an appealing possibility would be to have some sort of tiered hazard pay system. While neither the evidence nor administrative capacity is likely to be adequate for a highly variable scale, it seems possible that having a few tiers could result in a program that more closely fits the social insurance ideal. For example, in the Magnusson et al. (2021) study, roughly 10 percent of workers have a threefold increase in risk, and another 8 percent have a twofold increase. As shown in line 7 of Table 3, these numbers imply a dollar value of the extra risk of $4.13 per hour for the highest-risk workers, and $2.06 for the second highest risk category.[9]

While these various calculations do not yield a firm number for the size of any hazard premium, they illustrate how policymakers might go about figuring out an appropriate premium in a pandemic. A crucial input, particularly for a tiered hazard pay scheme, is good evidence on the degree of elevated risk for different occupations and industries.

There are obviously other ways policymakers could try to ascertain the appropriate amount of hazard pay. For example, they could gather data on labor shortages in frontline industries. During the pandemic, there was a great deal of anecdotal evidence of labor shortages, particularly for nurses and home healthcare workers (for example, McLernon 2020; Nguyen 2020). Though it would be impractical to try to estimate a full labor supply function in real time, the degree of labor shortage in frontline industries could provide a rough guide for at least the appropriate ranking of the hazard premium across industries.

[8]We calculate this percentage by matching the categories of workers in the Magnusson et al. study with those from the US Bureau of Labor Statistics (2019).

[9]For the increased risk for food service workers, taxi drivers, and cleaners, we use the estimates from the second wave of infection, when the relevant sectors were more likely to be open (see Magnusson et al. 2021, Figure 4).

**Should Hazard Pay Phase out at High Incomes?**

Whether hazard pay should phase out above some income level depends on the relationship between the utility of income from working and the disutility of working itself for high-wage, high-risk workers. If the two were reasonably close before the pandemic, the rise in the disutility of work caused by the pandemic could cause many of these workers to stop working (even if they were not eligible for unemployment insurance). Because such workers are very valuable to society, in this case hazard pay should continue even at high incomes. On the other hand, if the utility provided by the income from working was substantially above the disutility of working for high-income workers in the high-risk sector before the pandemic, even a substantial rise in their disutility of work would not make them choose unemployment. In this case, it would make sense for hazard pay to phase out.

There are good reasons for thinking that the scenario where high-income workers in the risky sector choose to continue working despite increased risk is the more plausible one. Workers such as doctors and dentists have invested years in training and building a practice. The present value of the income loss they would face from leaving their jobs, even temporarily, is very large. More generally, it is likely that high human capital and high match quality create a substantial wedge between what high-skilled, high-risk workers earn and the disutility of work. Finally, there is also evidence that nonpecuniary job benefits are higher for well-educated workers (see Duncan 1977). This too creates a wedge between the wage and the disutility of labor that would encourage high-income, high-risk workers to continue working even if the disutility of work rises. Thus, it would likely be appropriate for hazard pay to phase out at high incomes.

Interestingly, the HEROES Act did not phase out hazard pay entirely for high-wage workers, though it did limit it. The act capped the amount of premium pay at $10,000 for eligible workers earning less than $200,000, and $5000 for eligible workers earning more than $200,000. The Pennsylvania program, on the other hand, only applied to workers earning less than $20 per hour (excluding benefits and overtime).

**Hazard Pay as Demand Stimulus**

The primary motivation for hazard pay during a pandemic from a social insurance perspective is to make sure essential workers in hazardous sectors are not worse off than workers who become unemployed because their sectors shut down. However, because there may be inadequate aggregate demand during a pandemic, an important practical consideration is whether hazard pay is likely to be useful as demand stimulus. From a logical standpoint, hazard pay wouldn't seem to have a particularly large bang for the buck. By definition, the workers receiving it remain employed. As a result, one might think that the recipients have a lower marginal propensity to consume than the unemployed workers discussed in the previous section.

One factor that militates against this presumption is that many frontline workers are relatively low-income. Blau, Koebe, and Meyerhofer (2021, p. 172) estimate

that frontline workers had lower average hourly wages ($22.76 versus $27.05 for all workers). This is even true for healthcare workers, where the case for hazard pay is strongest. While healthcare practitioners and technicians earn more than $40 per hour, Blau, Koebe, and Meyerhofer (2021, p. 172) find that healthcare support workers earn less than $20 per hour. The other five lowest-wage frontline occupations the authors identify are food preparation and serving; building and grounds cleaning and maintenance; personal care and service occupations; farming, fishing, and forestry; and transportation and material moving. Many of these are occupations that would be next in line after healthcare to receive hazard pay based on their relative COVID-19 risk.

Other studies reach similar conclusions about the low-wage nature of much elevated-risk work. Kinder, Stateler, and Du (2020) calculate that "as of 2018, nearly half (47%) of all frontline essential workers earned less than a living wage" (which they identify as $16.14 in 2018). For example, personal care aides had a median wage of $11.55, and janitors and cleaners had a median wage of $12.55. Kearney and Muñana (2020), using the Kaiser Family Foundation Tracking Poll, find that essential workers working outside the home were more likely to earn less than $40,000 than other currently employed workers (31 percent versus 19 percent). Forty-nine percent of them said they would struggle to pay a $500 unexpected medical bill, while only 31 percent of other workers said they would.

That high-risk workers are disproportionately low-wage and would struggle to pay bills suggests they are likely to have a higher marginal propensity to consume than a typical worker. A higher MPC should translate into a higher fiscal multiplier. Thus, hazard pay could pack a larger stimulatory impact than broader types of stimulus, such as general tax cuts or widely available one-time payments. This extra stimulatory impact could be enhanced by limiting hazard pay to low-wage workers, as in the Pennsylvania program.

## Conclusion

In many ways, our social insurance perspective on fiscal policy harkens back to an older literature. Rather than focusing on aggregate demand management, we emphasize the more traditional role of government in providing insurance against life's vicissitudes. This perspective is particularly appropriate for fiscal policy during a pandemic, when output needs to remain low in some sectors for health reasons, and aggregate demand stimulus cannot flow to many affected workers because their sectors are shut.

Our framework shows that thinking in terms of social insurance leads naturally to directing government aid to those directly harmed by the pandemic—particularly the unemployed and those who work in essential jobs with a high risk of infection. Our more practical analysis of unemployment insurance and hazard pay shows how a social insurance perspective can provide guidance on who should receive these benefits, how large they should be, and how long they should last. An analysis of the

policies actually taken or proposed for unemployment insurance and hazard pay in the United States during the pandemic shows that many of the actions follow what a social insurance perspective would recommend, but a number did not.

An obvious question about the social insurance perspective on fiscal policy is whether it's likely to have usefulness beyond the COVID-19 pandemic. We believe it does. First, it is all too likely that there will be future pandemics. The implications of the social insurance perspective we have discussed could yield much more successful fiscal policy in any future public health crises.

Second, it's possible that the United States and other countries could face more regionally concentrated recessions in the future that share important similarities to a pandemic. For example, parts of the American West and Australia have experienced prolonged economic disruption due to drought-induced fires. As with a pandemic, such natural-disaster-fueled downturns aren't easily remedied with broad aggregate demand stimulus. They are also likely to involve high risks to certain essential workers. The lessons derived from a social insurance perspective for pandemics about targeting relief to those most affected and paying a hazard premium to essential high-risk workers are likely to carry over to these downturns as well.

Finally, while the unique features of the pandemic have made a social insurance perspective vital in the current situation, it may have value in more ordinary downturns. Most recessions involve highly unequal impacts on different types of workers, and general stimulus often takes a long time to help some workers regain employment. A fiscal response that focuses on both aggregate demand management and social insurance might prove more effective in dealing with future recessions regardless of their cause.

■ *We are grateful to Jacob Weber for research assistance and to Peter Ganong and the editors for helpful comments.*

## References

**Baker, Scott R., R.A. Farrokhnia, Steffen Meyer, Michaela Pagel, and Constantine Yannelis.** 2021. "Income, Liquidity, and the Consumption Response to the 2020 Economic Stimulus Payments." https://drive.google.com/file/d/19KaPY-xV27feRZF74EBby3DZ3RW9K3Bp/view.

**Billingsley, Sunnee, Maria Brandén, Siddartha Aradhya, Sven Drefahl, Gunnar Andersson, and Eleonora Mussino.** 2020. *Deaths in the Frontline: Occupation-Specific COVID-19 Mortality Risk in Sweden*. Stockholm: Stockholm University Demography Unit.

**Bitler, Marianne P., Hilary W. Hoynes, and Diane Whitmore Schanzenbach.** 2020. "The Social Safety Net in the Wake of COVID-19." *Brookings Papers on Economic Activity* (Summer): 119–45.

**Blau, Francine D., Josefine Koebe, and Pamela A. Meyerhofer.** 2021. "Who Are the Essential and Front-line Workers?" *Business Economics* 56: 168–78.

**Cajner, Tomaz, Andrew Figura, Brendan M. Price, David Ratner, and Alison Weingarden.** 2020. "Reconciling Unemployment Claims with Job Losses in the First Months of the COVID-19 Crisis." Federal Reserve Board, Finance and Economics Discussion Series 2020–055.

**Centers for Disease Control and Prevention.** 2021a. "Estimated Disease Burden of COVID-19." https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/burden.html (accessed May 1, 2021).

**Centers for Disease Control and Prevention.** 2021b. "Weekly Updates by Select Demographic and Geographic Characteristics." https://www.cdc.gov/nchs/nvss/vsrr/covid_weekly/index.htm (accessed May 1, 2021).

**Chen, Yea-Hung, Maria Glymour, Alicia Riley, John Balmes, Kate Duchowny, Robert Harrison, Ellicott Matthay, Kirsten Bibbins-Domingo.** 2021. "Excess Mortality Associated with the COVID-19 Pandemic among Californians 18–65 Years of Age, by Occupational Sector and Occupation: March through November 2020." *PLoS ONE* 16 (6).

**Chodorow-Reich, Gabriel, and John Coglianese.** 2019. "Unemployment Insurance and Macroeconomic Stabilization." In *Recession Ready: Fiscal Policies to Stabilize the American Economy*, edited by Heather Boushey, Ryan Nunn, and Jay Shambaugh, 153–79. Washington, D.C.: Brookings Institution.

**Duncan, Greg J.** 1977. "Earnings Functions and Nonpecuniary Benefits." *Journal of Human Resources* 11 (4): 462–83.

**Farrell, Diana, Peter Ganong, Fiona Greig, Max Liebeskind, Pascal Noel, and Joseph Vavra.** 2020. "Consumption Effects of Unemployment Insurance during the COVID-19 Pandemic." https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3654274.

**Ganong, Peter, Fiona Greig, Max Liebeskind, Pascal Noel, Daniel M. Sullivan, and Joseph Vavra.** 2021. "Spending and Job Search Impacts of Expanded Unemployment Benefits: Evidence from Administrative Micro Data." Becker Friedman Institute Working Paper 2021-19.

**Ganong, Peter, and Pascal Noel.** 2019. "Consumer Spending during Unemployment: Positive and Normative Implications." *American Economic Review* 109 (7): 2383–2424.

**Ganong, Peter, Pascal Noel, and Joseph Vavra.** 2020. "US Unemployment Insurance Replacement Rates during the Pandemic." *Journal of Public Economics* 191.

**Greenhalgh, Trisha, Matthew Knight, Christin A'Court, Maria Buxton, and Laiba Husain.** 2020. "Management of Post-Acute COVID-19 in Primary Care." *British Medical Journal* 370: m3726.

**Guerrieri, Veronica, Guido Lorenzoni, Ludwig Straub, and Iván Werning.** 2020. "Macroeconomic Implications of COVID-19: Can Negative Supply Shocks Cause Demand Shortages?" https://cpb-us-w2.wpmucdn.com/voices.uchicago.edu/dist/6/2265/files/2019/04/macro_covid_GLSW_July_2020.pdf.

**Islam, Nazrul, Vladimir M. Shkolnikov, Rolando J. Acosta, Ilya Klimkin, Ichiro Kawachi, Rafael A. Irizarry, Gianfranco Alicandro et al.** 2021. "Excess Deaths Associated with COVID-19 Pandemic in 2020: Age and Sex Disaggregated Time Series Analysis in 29 High Income Countries." *British Medical Journal* 373: n1137

**Karger, Ezra, and Aastha Rajan.** 2021. "Heterogeneity in the Marginal Propensity to Consume: Evidence from COVID-19 Stimulus Payments." Federal Reserve Bank of Chicago Working Paper 2020–15.

**Kearney, Audrey, and Cailey Muñana.** 2020. "Taking Stock of Essential Workers." *Kaiser Family Foundation*, May 1. https://www.kff.org/policy-watch/taking-stock-of-essential-workers/.

**Kinder, Molly, Laura Stateler, and Julia Du.** 2020. *The COVID-19 Hazard Continues, but the Hazard Pay Does Not: Why America's Essential Workers Need a Raise*. Washington, DC: Brookings.

**Magnusson, Karin, Karin Nygård, Fredrik Methi, Line Vold, and Kjetil Telle.** 2021. "Occupational Risk of COVID-19 in the 1st vs 2nd Wave of Infection." https://doi.org/10.1101/2020.10.29.20220426.

**McLernon, Lianna Matt.** 2020. "COVID-Related Nursing Shortages Hit Hospitals Nationwide." *Center for Infectious Disease and Research Policy News*, November 30. https://www.cidrap.umn.edu/news-perspective/2020/11/covid-related-nursing-shortages-hit-hospitals-nationwide.

**Milne, Alistair.** 2020. "A Critical COVID-19 Economic Policy Tool: Retrospective Insurance." https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3558667.

**Mutambudzi, Miriam, Claire Niedzwiedz, Ewan Beaton Macdonald, Alastair Leyland, Frances Mair, Jana Anderson, Carlos Celis-Morales et al.** 2021. "Occupation and Risk of Severe COVID-19: Prospective Cohort Study of 120 075 UK Biobank Participants." *Occupational and Environmental Medicine, British Medical Journal* 78 (5): 307–14.

**Nguyen, Daisy.** 2020. "US Hospitals Facing Worrisome Shortages of Nurses, Doctors." *Associated*

*Press,* December 22. https://www.usnews.com/news/business/articles/2020-12-22/california-desperately-searches-for-more-nurses-and-doctors.

**O'Driscoll, Megan, Gabriel Ribeiro Dos Santos, Lin Wang, Derek A.T. Cummings, Andrew S. Azman, Juliette Paireau, Arnaud Fontanet, Simon Cauchemez, and Henrik Salje.** 2020. "Age-Specific Mortality and Immunity Patterns of SARS-CoV-2." *Nature* 590: 140–45.

**Pennsylvania Department of Community and Economic Development.** 2020. "COVID-19 PA Hazard Pay Grant: Program Guidelines." https://dced.pa.gov/download/covid-19-pa-hazard-pay-grant-guidelines-2020/?wpdmdl=95560.

**Rogers, Luke, and Kristie Wilder.** 2020. "Working-Age Population Not Keeping Pace with Growth in Older Americans. https://www.census.gov/library/stories/2020/06/working-age-population-not-keeping-pace-with-growth-in-older-americans.html.

**Rowe, Nick.** 2020. "Relative Supply Shocks, Unobtainium, Walras' Law, and the Coronavirus." *Worthwhile Canadian Initiative: A Mainly Canadian Economics Blog.* https://worthwhile.typepad.com/worthwhile_canadian_initi/2020/03/relative-supply-shocks-unobtainium-walras-law-and-the-coronavirus.html.

**Saez, Emmanuel, and Gabriel Zucman.** 2020. "Keeping Businesses Alive: The Government Will Pay." https://econfip.org/wp-content/uploads/2020/03/20.Keeping-Businesses-Alive.pdf.

**Song, Hummy, Ryan M. McKenna, Angela T. Chen, Guy David, and Aaron Smith-McLallen.** 2021. "The Impact of the Non-Essential Business Closure Policy on COVID-19 Infection Rates." *International Journal of Heath Economics and Management* 21 (4): 387–426.

**US Bureau of Labor Statistics.** 2019. "May 2019 National Occupational Employment and Wage Estimates, United States." https://www.bls.gov/oes/2019/may/oes_nat.htm (accessed September 19, 2021).

**US Congress.** 2020. "H.R. 6800." 116th Congress, 2d Session. https://www.congress.gov/bill/116th-congress/house-bill/6800/text.

**US Environmental Protection Agency.** 2016. "Valuing Mortality Risk Reductions for Policy: A Meta-Analytic Approach." https://yosemite.epa.gov/sab/sabproduct.nsf/0/0CA9E925C9A702F285257F380050C842/$File/VSL%20white%20paper_final_020516.pdf.

**US Office of Personnel Management.** 2021. "Fact Sheet: Computing Hourly Rates of Pay Using the 2,087-Hour Divisor. https://www.opm.gov/policy-data-oversight/pay-leave/pay-administration/fact-sheets/computing-hourly-rates-of-pay-using-the-2087-hour-divisor/.

**Weinzierl, Matthew.** 2014. "The Promise of Positive Optimal Taxation: Normative Diversity and a Role for Equal Sacrifice." *Journal of Public Economics* 118: 128–42.

**Woodford, Michael.** 2020. "Effective Demand Failures and the Limits of Monetary Stabilization." NBER Working Paper 27768.