

Efficiency Neglect: Why People Are Pessimistic About the Effects of Increasing Population

Jason Dana¹, George E. Newman², and Guy Voicheck³

¹School of Management, Yale University

²Rotman School of Management, University of Toronto

³Imperial College Business School, Imperial College London

In six studies, we find evidence of efficiency neglect: when thinking about the effects of population growth, people intuitively focus on increased demand while neglecting the changes in production efficiency that occur alongside, and often in response to, increased demand. In other words, people tend to think of others solely as consumers, rather than as consumers as well as producers. Efficiency neglect leads to beliefs that the real costs of some consumer goods are rising when they are actually decreasing and may contribute to antiimmigration sentiments because of the fear that increasing local population creates competition for fixed resources. We demonstrate that economic pessimism and antiimmigration sentiments are reduced when people are prompted to consider their own beliefs about increased productivity over time, but are unchanged when they consider their beliefs about increases in demand. Together, these findings shed light on people's lay economic theories and suggest promising interventions.

Public Significance Statement

This article demonstrates the psychology behind a form of economic pessimism that has persisted for millennia and leads people to favor harmful policies.

Keywords: economic pessimism, immigration, lay economics

Supplemental materials: <https://doi.org/10.1037/xge0001569.supp>

Psychologists have long been interested in people's lay theories and how they systematically differ from scientific understanding. For example, in the domain of physics, many people believe that a ball exiting a C-shaped tube will continue to follow a curved path, rather than a straight line (McCloskey & Kohl, 1983). In the domain of biology, people tend to believe there are specific genes that are common to all members of a species, when in fact species are defined by a distribution of similar, but not identical, genetic sequences (Hull, 1965; Keil, 2007; Mayr, 1982). Investigating lay theories not only highlights differences between lay judgments

and expert knowledge; it can also provide important insights regarding the attitudes and preferences that result from those theories.

Here we investigate a persistent lay economic belief which can be called "depletionism" (Desrochers, 2020). Depletionism is the belief that as populations grow, resources cannot keep up with demand. As a result, individuals will become more impoverished because the things they consume will be less abundant. In other words, more people means more mouths to feed and thus, less food for all.

Depletionism appears throughout written history (Desrochers, 2020; Stokstad, 2005). In *Laws*, Plato argued that if a city-state's population exceeded 5,040 households, it could deplete resources to the point that people might need to be cast off. More than 2,000 years later, Malthus advocated for celibacy and reduced food consumption because he believed the demand created by exponential population growth would overwhelm food supplies. In 1968, biologist Paul Ehrlich published *The Population Bomb*, which argued that mass starvation was imminent because population growth was already on pace to outstrip the supply of food and resources. Several years later, Ehrlich lost a public wager with Julian Simon, an economist, betting that real costs of several natural resources would surely increase over the next decade—in fact, they decreased dramatically.

Studying the nature and pervasiveness of depletionism is important because expectations of economic patterns impact consumption, savings, and political attitudes. For example, widespread expectations of inflation can be self-fulfilling. Depletionist beliefs can also affect policy preferences. Just as Plato's concerns about economic decline were

Jason Dana  <https://orcid.org/0000-0003-3558-5208>

The order of authorship is alphabetical. The ideas in this article and data from some of the studies (1a, 3, and 4) were presented in research seminars for the Data Colada Seminar Series, the Decision Making and Economic Psychology Seminar at Ben-Gurion University, the Decision Research @ Warwick Seminar at Warwick University, and the Four Schools Marketing Conference. Materials for all studies can be found in the [online supplemental materials](https://osf.io/3uj8f/?view_only=f69f67e636b647eda92cfe3aa190fea6). All data are available at: https://osf.io/3uj8f/?view_only=f69f67e636b647eda92cfe3aa190fea6.

Jason Dana, George E. Newman, and Guy Voicheck contributed equally to conceptualization, formal analysis, writing—original draft, writing—review and editing, methodology, and data curation.

Correspondence concerning this article should be addressed to Jason Dana, School of Management, Yale University, 165 Whitney Avenue, New Haven, CT 06511, United States. Email: jason.dana@yale.edu

used to support population control in the past, depletionist beliefs today are used to support protectionist and antiimmigrant policies (Caplan, 2001; Desrochers, 2020), which can give rise to destructive strains of populism. For example, in September 2022, the right-wing populist Swedish Democrats became the second-most powerful party in Sweden, running on a platform that “immigration entails significant costs for Sweden.” The party argued that “queues for basically most things are long... Adding more people cannot be the solution (Sverigedemokraterna, 2022).”

Efficiency Neglect

The present studies elucidate the role of a psychological mechanism that underlies depletionism, which we refer to as efficiency neglect. People are correct to assume that more demand means less supply per person (as a static effect). But we argue that they often fail to consider the changes in production efficiency that arise alongside and in response to rising demand. More people means more mouths to feed, but it also means more arms to work and more minds to innovate. Economic growth is driven by people discovering new ideas and the challenges of increased demand bring greater incentives for innovation, such that more people, perhaps counterintuitively, can lead to more abundance (Bricker & Ibbitson, 2019; Jones, 2022).

To illustrate, consider a layperson who thinks about how population growth since the 1980s has affected the supply of bananas. That person may readily consider a rising population—that there are nearly twice as many people on Earth today as there were in 1980—and the challenges of feeding a growing population with limited farmland. They may be less likely to spontaneously consider the innovations in agriculture and commerce that those challenges have spurred, resulting in an increased per-acre yield of bananas, and transportation that is faster, cheaper, and results in less spoilage than in the 1980s. Relatedly, when predicting how increased immigration would affect economic conditions for current citizens, people may focus on the impact of increased local population on demand for food, while neglecting to consider how increased population also strengthens the agricultural industry through more workers and more innovators. Indeed, existing research has argued that depletionist ideas are often used to promote ideas such as closed borders (Caplan, 2002).

We do not argue that laypeople are unaware that technology has progressed over time or that it can create more abundance. Rather, we suggest that, by default, they fail to draw upon this knowledge when considering the effects of population growth on the economy. In other words, when considering the effects of population growth, people intuitively apply a static analysis that focuses on the limitations of satisfying an increase in demand with existing resources. They tend not to consider how an increase in demand also creates incentives to produce more efficiently and invent substitutes. Thus, people think of others solely as consumers, rather than as consumers as well as producers. We will show, however, that reminding people to consider their own beliefs about technological progress does mitigate the expectation that more people means fewer goods per person.

Efficiency neglect is related to prior research findings that people often ignore dynamic and indirect effects (Baron et al., 2006; McCaffery & Baron, 2006; Sloman & Fernbach, 2011). For instance, people often fail to account for how a future increase in their income would lead to an increase in their expenses (Berman et al., 2016).

Efficiency neglect is also closely related to a belief in zero sum (Chernev, 2007; Johnson et al., 2022; Newman et al., 2014). People often perceive competition even for unlimited resources (Meegan, 2010), and zero-sum interpretations have been argued to be more intuitive than positive-sum interpretations (Baron et al., 2006; Bhattacharjee et al., 2017; Leiser & Shemesh, 2018; Rubin, 2003). Consequently, people may perceive population growth as intensifying a competition over a limited supply of resources, rather than as more working hands and minds helping to increase the supply of resources.

The Consequences of Efficiency Neglect

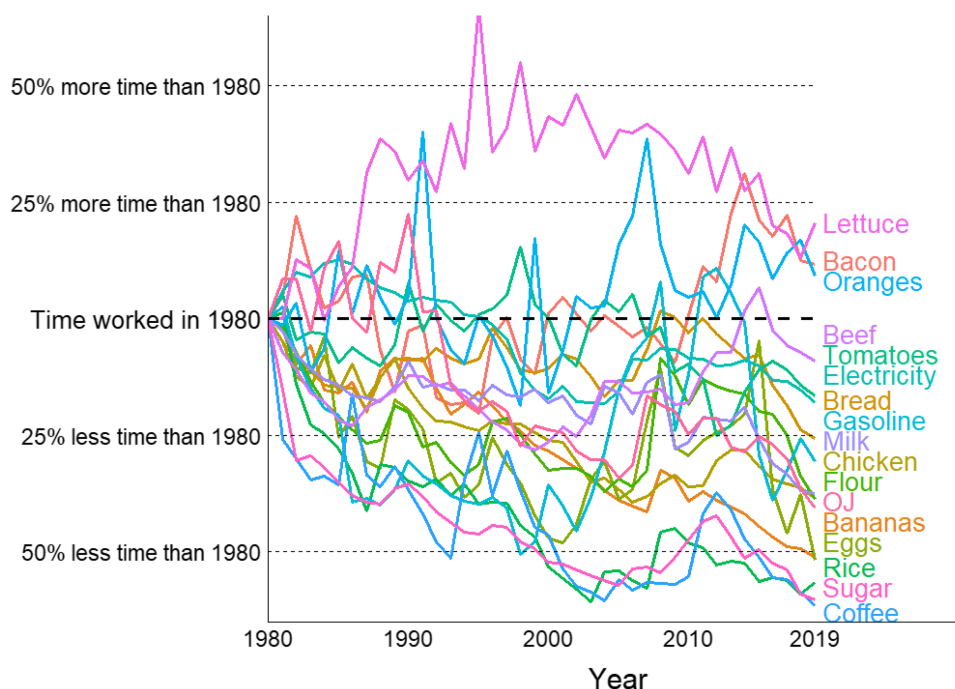
The present studies demonstrate efficiency neglect and some of its consequences. First, we show that efficiency neglect leads to a systematic misperception of how the real costs of goods have changed over time. It is important to distinguish between real costs versus nominal prices. Of course, the nominal price of most things tends to rise over time. That phenomenon reflects inflation, which monetary policy typically seeks to create in small amounts. But nominal wages also rise over time, such that it is hard to get a sense of whether things are getting more or less expensive in real terms without taking into account changes in wages. One way to get a sense of how the real costs of goods have changed is to calculate how long people have to work to purchase similar goods at different times. Here we calculate such a metric (hours worked) by dividing nominal prices at a given time by the concurrent average hourly wage (see Cox & Alm, 1999).

Using this metric, one sees that the real costs of many goods have decreased substantially over time. In 1980, it would have taken the average American worker¹ approximately 80 hr of work to afford a Sears Kenmore refrigerator-freezer unit. Today, a similarly sized unit requires about 20 hr of work. Moreover, today’s model uses about a third as much electricity, and that electricity itself can be purchased with nearly 30% less hours of work. The refrigerator exemplifies how, over the past several decades, technological advances have made the production of many goods—groceries, appliances, tools, and energy—more efficient, thus increasing purchasing power for those goods. Figure 1 depicts a similar analysis of changes for various food and energy goods. A discrepancy between the trends depicted in Figure 1 and lay economic beliefs about these trends provides an opportunity to study efficiency neglect because gains in production efficiency are the reason why goods produced from limited resources (e.g., farmland or raw materials) have gotten cheaper over time, despite dramatic population growth.

We do not make the broad claim that everything is getting less expensive, or that the general cost of living has fallen. Whether innovation lowers real costs depends in part on the market structure for the good in question (e.g., whether there is a monopoly over the good). Moreover, we stress that productivity should not be expected to lower the costs of human services. In the case of something like child-care, one person’s “cost” is another person’s “wage,” so that the very factors that we describe as increasing the buying power of average workers will make hiring people more expensive. This duality is

¹ We use the term “average worker” to refer to the Board of Labor Statistics’ “production and nonsupervisory employees on private nonfarm payrolls,” about which average hourly wage data has been collected for many decades.

Figure 1
Changes in the Real Costs of Consumer Goods in the United States Since 1980



Note. Data are compiled from the U.S. Board of Labor Statistics and calculated by dividing the national average retail price by the average hourly wage of private nonsupervisory and production workers. Through June 2023, results are qualitatively similar despite a recent surge in inflation. In fact, the only three items in the figure that were more expensive than in 1980 (lettuce, bacon, and oranges) have now fallen in real terms to be equal to that in 1980, while bananas, rice, and coffee continue to require less than half as much work as they did in 1980. OJ = orange juice concentrate.

exemplified in Agatha Christie's autobiography, which discusses how 100 years ago, middle-class Londoners could afford to have a live-in maid and nurse, but not dream of affording a car (Christie, 1977). "Cost disease" describes the economic phenomenon where rising productivity in other areas raises salaries even in areas where productivity is not as relevant, such as orchestra musicians (see Baumol, 2012). For this reason, our studies focus on how people think about cost trends for goods such as groceries, consumer durables, and energy that are impacted by production efficiency.

Interestingly, Americans have largely remained pessimistic about their living standards as these trends have occurred. For example, nearly every year since Gallup started asking Americans what they thought about the direction of "economic conditions in the country as a whole," most responded that they are "getting worse" (Gallup, 2023). Pew surveys found that most Americans expect the economy to weaken over the coming decades (Pew Research Center, 2019) and that only a third expect their children to be "better off than people are today" (Pew Research Center, 2006). In short, many Americans seem to believe that the real cost of living is continually on the rise and are pessimistic about the present and future economy. Global surveys find similar patterns of pessimism in developed nations across the world (Pew Research Center, 2017).

We argue that efficiency neglect plays an important role in driving such economic pessimism. For example, we demonstrate that among a nationally representative American panel, respondents indicated that all of the consumer goods that they purchase regularly have gotten

more expensive in real terms. In reality, nearly all have become cheaper. Such systematic misperceptions of economic trends are important because misperceptions of trends lead people to support policies that they otherwise would not (Mastroianni & Dana, 2022). If people overestimate the degree to which things have been getting more expensive, it could change their economic policy preferences.

Because this misperception is driven by a tendency to focus on some effects of population growth (increased demand) and not others (increased efficiency), we argue that it can be mitigated with attentional interventions. Specifically, prompting people to consider the ways population growth affects production efficiency should attenuate their economic pessimism. Returning to the bananas example, for example, we expect that prompting people to consider the agricultural innovation that occurred since the 1980s should attenuate their belief that bananas have become less affordable. In contrast, prompting people to consider the increased demand for bananas as a result of population growth should have no effect, because it is already top of mind for most people. Similarly, efficiency neglect leads to a belief that having more people will make the average person poorer, thus favoring antiimmigrant attitudes. Indeed, we show that reminding people to consider the effects of population growth on innovation and labor can engender more favorable attitudes regarding immigration. In contrast, asking people to consider how immigration increases demand does not affect immigration attitudes. Therefore, while depletionist beliefs appear to be pervasive, the present studies demonstrate that they can be mitigated by prompting people to consider what they already know.

We do not address how efficiency gains have accrued and fluctuated over time, whether they apply to all domains of consumer spending, and whether they are too unequal. Moreover, there may be other causes of economic pessimism besides efficiency neglect. Existing research has shown, for example, that people tend to evaluate monetary transactions in terms of nominal rather than real value, an error sometimes referred to as the “money illusion” (Shafir et al., 1997), and thus conflate inflation with cost of living (Bryan, 2002). We discuss these additional factors in the General Discussion.

Lay Economics

The current research adds to a growing literature on lay beliefs about economic phenomena. Boyer and Peterson (2018) suggest that our models of the economy are a product of the past in which we evolved (see also Rubin, 2014). Whereas modern market economies rely heavily on specialization, trade, and impersonal transactions, our ancestral past relied more on collective work such as hunting and gathering in small, closed groups in which it was key to make sure everyone pulled their weight in service of a common cause. Accordingly, our intuitions may lead us to mistrust a modern, impersonal market economy that relies on people acting largely in their own self-interest.

Continuing in the vein of zero-sum thinking, Johnson et al. (2022) show that laypeople tend not to believe in mutually beneficial trade—arguably the most basic building block of economics—instead believing that the seller benefits at the expense of the buyer. Because consumers believe that companies profit at the expense of people, rather than sharing a surplus with them, they may derive less meaning as a result of their purchases (Mead & Williams, 2022). Williamson and Wearing (1996) interviewed 95 subjects to understand how they thought about economics. They found that while each subject’s models were somewhat unique, they all tended to confound social, psychological, and moral issues. Subjects understood phenomena like the connection between government revenue and expenditure but did not marshal this knowledge to answer questionnaires correctly.

Caplan (2001, 2002) analyzed a large survey of both professional economists and a panel of Americans and found systematic divergence between how laypeople and economists think about labor, trade, profits, and immigration, suggesting that biases lead people to support bad economic policies. Consistent with our view that efficiency neglect leads to economic pessimism, the most pronounced difference was that “economists are systematically more optimistic about the past, present, and future of the economy than other people are (Caplan, 2002).” More recently, economists (Andre et al., 2022) asked economists and laypeople to consider the effects of hypothetical shocks, such as an increase in oil prices, on inflation and unemployment. Economists and laypeople differed considerably in their expectations, in part because they differ in whether they tend to focus on supply-side or demand-side effects.

Perhaps the most widely examined lay economic beliefs relate to price perceptions. Contrary to price being the point at which supply and demand curves meet, consumers tend to view prices as determined conspiratorially by sellers (Leiser & Shemesh, 2018; Rubin, 2003), as if different prices result from firms being monopolists of varying altruism (Caplan, 2002). One reason that people may overestimate the amount of monopoly power that firms hold is that they overlook the disciplining effects of competition on what products firms can offer and how profitable they can be (Bhattacharjee et al.,

2017). As such, consumers think that goods have a fair price that is substantially lower than their retail price (Bolton et al., 2003).

Several articles to date have identified ways in which laypeople are mistaken about various macroeconomic measures, for example, overestimating upward mobility (Davidai & Gilovich, 2015) or inflation (Bruine de Bruin et al., 2012; Georganas et al., 2014). Many of these results can be characterized as miscalibrations. Efficiency neglect is somewhat different. Instead, the error results from a tendency to focus on some effects of population growth (increased demand) and not others (increased efficiency). Therefore, to some extent, the effects of efficiency neglect can be mitigated by reminding people of information that they already know, which is distinct from existing phenomena of which we are aware.

Overview of Studies

Across six studies, we show that efficiency neglect leads to economic pessimism and negative attitudes toward immigration. Importantly, in our studies, we focus on perceptions of the amount of work required to purchase individual items. Thus, our study design allows us to identify perceptions that are independent of beliefs about inflation.

Study 1 shows that a nationally representative sample of Americans significantly overestimates the degree to which the real costs of consumer goods have increased. Indeed, the real costs of almost all the items in question have fallen, such that the majority of Americans do not merely underestimate decreases in real costs, but get the direction of change wrong. Study 1b shows a similar pattern even when considering changes since further back in time and for more expensive items. Study 2 documents the prevalence of depletionist thinking, showing that the majority of respondents believe population growth leads to scarcity, and cite depletionist reasoning as the root cause.

Study 3 demonstrates the role that efficiency neglect plays in these misperceptions. Prompting participants to consider how demand is increasing has no effect on beliefs about how the costs of goods have changed over time (relative to control), but asking people to consider their own beliefs about technological progress mitigates the tendency to see real costs as rising. These findings suggest that people already consider increased demand, but not increased productivity when thinking about how costs have changed. Finally, Study 4 shows that efficiency neglect also affects antiimmigration sentiment. Prompting people to consider how immigration affects efficiency reduces the belief that the economic effects of immigration are zero sum, while again, prompting them to consider how immigration affects increased demand has no effect.

In short, our studies show that most of our participants default to a depletionist theory about the economy: they believe population growth means they have to work for longer than people did in previous decades to purchase the same goods, and that they are in greater competition with others for a fixed supply of resources. We also show that this economic pessimism is mitigated (although not eliminated) when people are prompted to consider the ways population growth affects production efficiency but is not impacted when people are prompted to consider the ways population growth affects the demand for goods.

Study 1

Studies 1a and 1b were surveys designed to assess Americans’ beliefs about changes in the real costs of products with which they

are familiar. To disentangle beliefs about inflation from beliefs about real costs, we asked about real costs as measured in terms of labor—that is, the amount of time an average American worker would have to work to afford each product. We then compared people’s beliefs with actual changes in real costs.

Of course, innovation has created many products that were not available in the past (e.g., smartphones, high-powered personal computing, the internet) and has changed others so much that they are fundamentally not the same (e.g., televisions, medical care, the fuel efficiency and safety of modern cars). Asking people to track the changes in real costs of such items is not indicative of beliefs about economic change, because people simply could not pay for these things in the past. Therefore, we tried to select goods that are roughly comparable across time, such as a pound of rice or a kilowatt-hour of electricity for one’s home.

Method

Transparency and Openness

Sample sizes were determined before data collection. We report all manipulations, all measures, and do not exclude any participant who completed a study. Study materials and data are posted on the Open Science Framework (https://osf.io/3uj8f/?view_only=f69f67e636b647eda92cfe3aa190fea6; Dana et al., 2024).

Study 1a

Using Prolific (<https://www.prolific.co>), we recruited a nationally representative sample of 1,000 Americans (51% female, 49% male; mean age 46). We presented participants with a list of 20 everyday consumer products and asked them to select the 10 products for which they could most confidently estimate the price in both 2009 and 2019. This and all subsequent studies were granted exemption by the Institutional Review Board at Yale University.

The 20 products were selected according to the following criteria:

1. Historical average price data on the product was available from the U.S. Bureau of Labor Statistics (BLS). Having this data allowed us to compare answers to a factual benchmark and precisely define for participants the real cost measure described below.
2. The product was roughly comparable across time periods. A gallon of gasoline, dried spaghetti, and lettuce are basically equivalent consumer products in different time periods. A basic laptop has changed substantially even in the last decade, as has state-of-the-art health care.
3. The product was frequently purchased in the United States.

To avoid cost estimations that were confounded with inflation, for each product participants selected they were provided with the “real cost” of the product in 2009 in terms of work needed to purchase. This cost was calculated by dividing the average nominal price of the good in 2009 by the average hourly wage of a nonsupervisory production worker in 2009, both of which are recorded by the BLS.² Participants had to pass a quiz to ensure that they understood this before proceeding to estimate how costs have changed.

We then used two measures to assess participants’ beliefs about changes in the costs of the products they selected. The first measure was a 5-point Likert-type scale that asked, for each product, whether the average worker in the United States in 2019 had to work for

much less time (coded as -2), *much more* time (coded as 2), or *about the same* (coded as 0) to afford that product, relative to 2009. The second measure asked participants to estimate, as best they could, the amount of work time required to buy the product today. We used an incentive-compatible design, where participants were given a bonus of \$0.20 for every 2019 estimation that was within $\pm 10\%$ of the true value. In this study and in Studies 3 and 4, we also asked participants to estimate how the cost of living, in general, changes over time. Those measures and their analysis appear in the [online supplementary materials](#).

Study 1b

We conducted a second survey with a nationally representative sample of 499 Americans (50% female, 49% male, 1% other; mean age 46), also recruited from Prolific. The design of Study 1b was nearly identical to Study 1a with the following exceptions: (a) To ensure that any misperceptions in costs were not due to extreme beliefs about the last decade, we asked participants about a longer time horizon, comparing costs from 1980 to 2023. (b) The products that participants in Study 1a said that they purchased regularly were all relatively low-cost (e.g., bananas, apples, eggs, etc.). To ensure that any misperceptions in costs were not restricted to low-cost products, eight out of the 18 products in Study 1b were high-cost (dishwasher, washing machine, refrigerator, oven, storage shed, lawn mower, water heater, and disc saw). These additional products were selected according to the following criteria:

1. The product is found in many households so that participants might have an idea of what it costs.
2. Versions of the product appeared in the 1980 Sears catalog, which served as our measure of nominal price, versus the price of the most functionally similar version that we could find currently on [sears.com](https://www.sears.com). Again, this allowed us to calculate the actual real cost and define for participants how it should be calculated. Participants were given pictures from [sears.com](https://www.sears.com) and basic product specifications.

Results

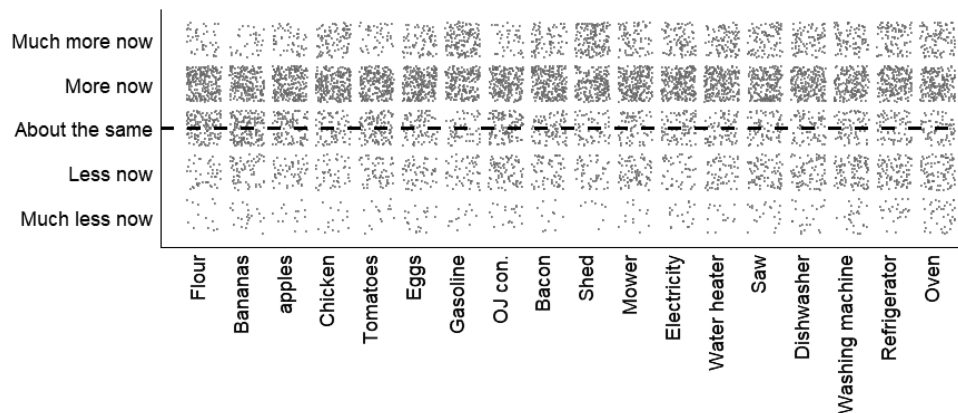
For all the goods used in Study 1 except for bacon and beef, real costs decreased from 2009/1980 to 2019/2023. However, a series of one-way *t* tests confirmed that participants believed all products required more work to purchase in 2019/2023 than in 2009/1980 (all *ps* < .001, see [Figure 2](#)). A similar pattern was observed for the incentivized estimations. For all of the products, participants’ estimates of the amount of labor required to afford the item in 2019/2023 were significantly greater than the provided 2009/1980 amount (all *ps* < .05, see [Figure 3](#)).

Discussion

The results of Study 1 indicated that most Americans vastly overestimate the current prices of various goods, leading them to believe that those goods have become more costly over the last decades,

²Due to sharp increases in the income of the wealthiest Americans, including them in our average income calculations may overstate how much wages increased for the average American. We avoid this by basing our calculations on the average wage of American nonsupervisory and production workers, which includes laborers in sectors such as retail, manufacturing, and construction.

Figure 2
Study 1b, Beliefs About the Amount of Labor It Took to Afford Various Goods in 2023, Relative to 1980



Note. Dots reflect individual responses. OJ con. = orange juice concentrate.

when in reality, nearly all became less costly. We suggest that this misperception results from efficiency neglect: when thinking about how prices change over time, people spontaneously consider how population growth leads to increased demand, but neglect to consider how it leads to increased supply.

Study 2

Although Study 1 demonstrated a misperception of trends consistent with efficiency neglect, it does not directly demonstrate that people are invoking depletionist reasoning. The aim of Study 2 was to assess whether people spontaneously supply depletionist explanations when evaluating a novel context. We used a combination of Likert-type scales and free responses. Participants were told about a hypothetical thriving nation. Then, participants were asked to predict how 10 years of population growth due to increased immigration, high birth rates, and low death rates would affect the supply of goods in that nation using an open-ended response. We coded for the frequency of depletionist explanations (i.e., that more people would translate into fewer goods and resources).

Next, half of the participants were asked to reconsider their reasoning while considering that population growth also means more available workers and greater incentives toward innovation, after which they were asked to predict how the abundance of goods would change (using a Likert scale, ranging from *much more abundant* to *much less abundant*). In a control condition, participants were asked to reconsider their response and responded using the same scale but were not prompted to consider how population growth affects production efficiency.

We predicted that most participants would invoke depletionist reasoning and that reminding them of the production efficiency resulting from population growth would attenuate pessimistic beliefs about the impact of population growth on the supply of goods.

Method

Transparency and Openness

Sample sizes were determined before data collection. We report all manipulations and all measures and do not exclude any

participant who completed a study. Study materials and data are posted on the Open Science Framework (https://osf.io/3uj8f/?view_only=f69f67e636b647eda92cfe3aa190fea6).

Participants

Using Prolific, we recruited a sample of 200 Americans (50% female, 50% male; mean age 39).

Procedure

All were given the following prompt:

Imagine a fictitious country named *Gauderia*. *Gauderia* is a peaceful nation. The residents of *Gauderia* live comfortably: equality, prosperity, health, and well-being are all relatively high in *Gauderia* compared to other nations.

Now, suppose that the population of *Gauderia* dramatically increases due to a combination of factors including high birth rates, low death rates, and increased immigration. How will this population growth impact the economy?

Specifically, we'd like you to imagine 10 years in the future after the population increase. What do you think will happen to the supply of everyday goods like food, consumer products and household items? Will those things be more abundant, less abundant or about the same?

Participants were given an opportunity to write whatever they wished in a free-response text box.

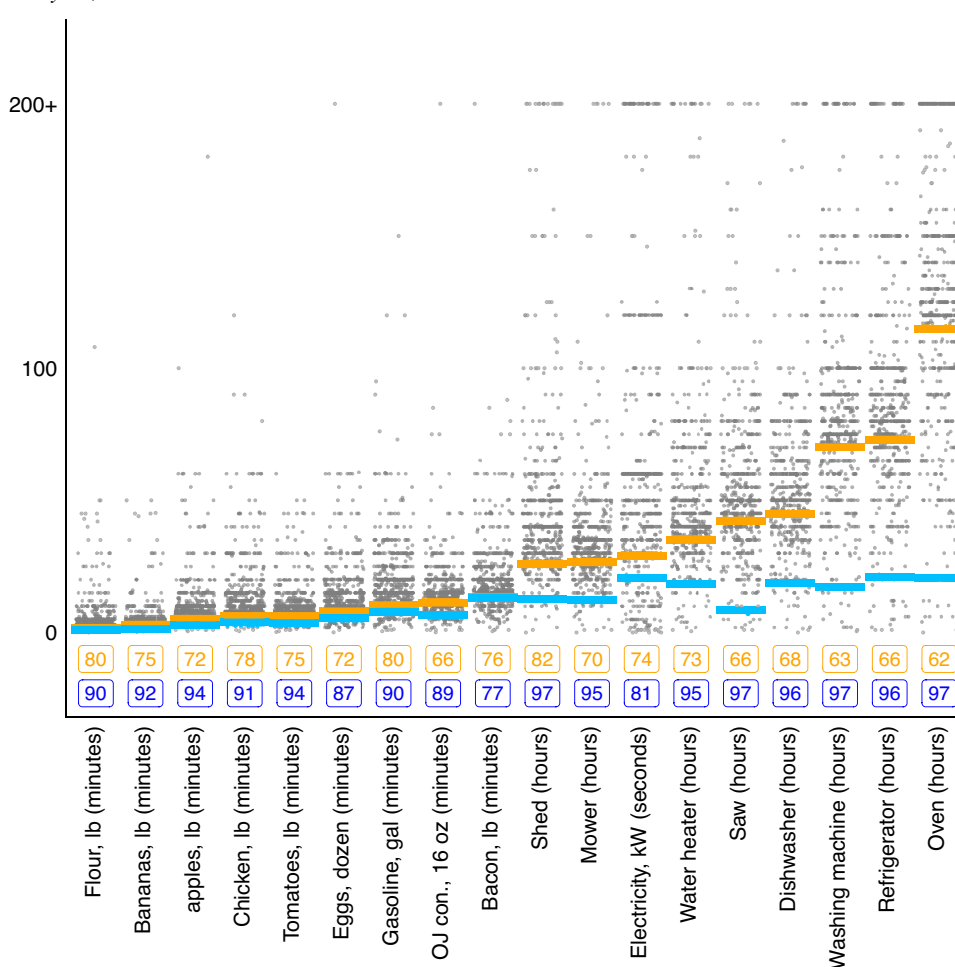
On the next page, participants were given one of two prompts. In the default belief condition, participants read:

Past research has found that sometimes providing an opportunity to "think again" changes peoples' opinions. Please take a moment to reflect on the same problem. Now, we'd like you to imagine 10 years in the future after the population increases in *Gauderia*.

In the efficiency prompt condition, participants were prompted to consider the effects of technological and production efficiency arising from an increased population. They read:

Past research has found that sometimes providing an opportunity to "think again" changes peoples' opinions. Please take a moment to reflect

Figure 3
Study 1b, Cost Estimations



Note. Dots reflect participants' estimates of the amount of labor required to afford various consumer goods in 2023. Blue/dark gray lines indicate the actual costs of those goods in 2023. Orange/light gray lines indicate the actual cost of those goods in 1980. Along the *x*-axis, orange/light gray numbers indicate the percentage of goods that was greater in 2023 than in 1980, and blue/dark gray numbers indicate the percentage of participants who overestimated 2023 prices. OJ con. = orange juice concentrate; lb = pound, gal = gallon, oz = ounce, kW = kilowatt. See the online article for the color version of this figure.

on the same problem. This time, we'd like you to focus on other aspects of population growth. It's true that more people means more consumers. But, more people also means that there are more workers, more ideas to contribute to innovation, and greater incentives to improve technology. Now, we'd like you to imagine 10 years in the future after the population increases in Gauderia.

By comparing this "heavy-handed" manipulation, which explicitly drew participants' attention to production efficiency, to the default belief condition, we were able to assess the extent to which people spontaneously consider production efficiency in their reasoning about population growth.

All participants then responded to the following question: "What do you think will happen to the supply of everyday goods like food, consumer products and household items? Will those things be less abundant, more abundant or about the same?" using a 5-point scale

(2 = much more abundant, 1 = somewhat more abundant, 0 = about the same, -1 = somewhat less abundant, -2 = much less abundant).

Coding of Responses

Responses were coded by a separate sample of 300 Prolific participants. Each of the coders was provided with 20 randomly selected responses (from the pool of 200). For each response, a participant indicated whether the statement contained a "depletion" argument (yes vs. no) and whether the statement contained an "efficiency" argument (yes vs. no). Coders were instructed that a response contained a depletionist argument if it talked about how having more people creates competition over goods. Example language provided to participants included "things will be harder to afford," "resources will be strained," "there will be less of everyday goods to go around," "there will be less jobs for everybody," or "demand will

outweigh supply.” The focus, they were told, “was on the increased number of people as consumers of the things Gauderia already has.”

Coders were instructed that a statement contained an efficiency argument if it talked about how having more people increases the production of goods. For example, the response might include language like “there will be more innovation,” “there will be more people to contribute to the economy,” “there will be more workers and more jobs,” “over time, things will become as/more abundant,” or “a higher population means more people producing.” The focus in this case “was on the increased number of people as producers, or as leading to new production of things in Gauderia.”

Each response was independently coded by 30 coders, and a response was categorized as containing “depletionist” (yes vs. no) and “efficiency” (yes vs. no) arguments if at least two thirds of coders categorized it as such ($p < .05$ via a binomial test). This coding scheme produced four categories of responses: depletionist, efficiency, both, and neither.

Results

Overall, 49% of participants invoked only depletionist reasoning. By comparison, 25.5% invoked only efficiency reasoning; 9% of

participants invoked both kinds of argument, and 16.5% provided reasoning that could not be coded as either depletionist or efficiency. Further, when we examined how the written responses related to the judgments of abundance (described further below), of the participants who invoked efficiency explanations, only 12 predicted that things would become more abundant as a result of a growing population. Thus, just 6% of our sample both spontaneously talked about people producing things and thought that Gauderia would have more abundance. Examples of depletionist and efficiency reasoning are presented in Table 1 (all responses are available at the OSF).

After being asked to think again, participants on average thought that goods would become less abundant ($M = -.34$). As predicted, these ratings differed between the default belief condition ($M = -.60$) and the efficiency prompt condition ($M = -.07$), with participants in the default condition predicting significantly less abundance, $t(198) = 3.84$, $p < .001$. This implies that while most participants did not spontaneously consider production efficiency resulting from population growth, highlighting it increased the extent to which they thought goods would be more abundant in the future. Notably, even when given the efficiency prompt only 27% of participants rated that goods would be somewhat or much more abundant,

Table 1
Examples of Depletionist and Efficiency Reasoning in Study 2a

Examples of depletionist reasoning
10 years in the future, this country is beginning to struggle. There is only so much land and resources, so goods are starting to become more scarce. There are more people fighting over resources than ever before. A once peaceful nation has become more tense and there is a sense of danger brewing due to the economic conditions
I think this place sounds like a nice place to go to but with the population increasing then I think it could lead to resources being scarce and fighting happening
The supplies of food, consumer products, and household items will be too low, and in high demand, driving up the prices
The economy will become worse as people experience high inflation due to the population increase without an increase in available jobs. Unemployment is high, and people are angry
It is very simple—10 years after a large population boom, supply would decrease. It boils down to basic economic theory/principles: as demand increases, supply decreases
The supply of everyday goods would decrease and the demand for them increase due to the drastic population increase
I imagine that the peaceful nation of Gauderia thrives as it does because of population control, whether natural or other. If the population of this city were to increase substantially, it would have lasting effects on the economy and other aspects of community life. More people in a country means less resources to go around
I feel that with the continuation of the population increase, resources and supplies will become less abundant. The cost of living would increase as the supply would not be able to meet the demand of this population. It would require more imports or goods from other countries which could become very costly
As the population increases, demand for items increases. This will increase the costs of the items. Supplies will decrease due to the increase in demand
Less abundant/more expensive due to increased demand
I think things will become less abundant because of the amount of individuals consuming it
Examples of efficiency reasoning
It would be good for the economy. People will work hard the talented will rise and be prosperous
I believe 10 years would cause a temporary boom in economic prosperity, but reduce the overall value of the currency. The population increase would give more work and more production, but more production of basic items, and more consumption would raise prices overall
The influx of immigrants will increase new ideas and the increase in population pressure will present a need for those new ideas. They will come up with new solutions to bring equilibrium back to their community
I think that the increase in the population would be a good thing. There would be people from all over coming into the country, bringing their life and traditions with them. I think there would be an increase in supplies. More consumers, more workers
More abundant, more workers and farmers to harvest and come up with innovative ways to grow food efficiently. Though maybe there is a problem with not having enough land, I am not sure how big this fictional place is
I could see it having both costs and benefits, but overall I think the economy would benefit. There would be some costs in terms of people living past retirement age, more childcare, and increased consumption of food and other products. But I think they would be outweighed by the benefits of immigration, because that would introduce many working-age adults into the economy, increasing production and allowing the country to keep its supply of consumer products relatively stable
I think that it really depends. Obviously, demand for supplies will increase significantly. But with the increase in population comes the increase in economy and workers. So if things are planned right, the nation should be able to thrive
I think that the overall economic output of the country would increase. There would be more people available to contribute to the economy, thinkers, and workers and this would improve the quality and quantity of consumer goods. There may be inflation involved, but that would be expected
The knee-jerk reaction is to assume that inflation will occur as supply cannot keep up with demand. But that is not necessarily the case. Gauderia may have been planning for an increasing population and may actually need more workers to fully utilize all their natural resources
It is also possible that the immigrants could bring new skills, ideas, and entrepreneurship and the country will then begin to export products resulting in an overall increase in the successfulness of the country

suggesting that depletionist intuitions may be quite “sticky” and difficult to override.

Study 2b

We conducted a follow-up study using a simplified design. In Study 2b, 400 Americans (46% female, 49% male, 5% other or prefer not to answer; mean age 35) reviewed very similar materials, but the “think again” part of the protocol was omitted. In the default belief condition, participants read the same paragraph about Gauderia and were asked: “What do you think will happen to the supply of everyday goods like food and consumer products in Gauderia after 10 years of population growth? Will they be less abundant, more abundant, or about the same as before?” In the efficiency prompt condition, participants read the same information with the additional prompt at the end: “When answering, consider how population growth affects the number of Gauderian workers such as farmers and factory workers, as well as incentives for technological innovation and production efficiency.” Thus, this manipulation did not suggest that population growth would increase production efficiency.

The results were the same as in Study 2a. Participants on average thought that goods would become less abundant ($M = -.23$, $p < .001$). As predicted, these ratings differed between the default condition ($M = -.48$) and the efficiency prompt ($M = 0.02$), with participants in the default condition predicting significantly less abundance, $p < .001$.

Discussion

Unprompted, 58% of participants spontaneously mentioned some form of a competition for goods resulting from more people—that is, more people = fewer resources. Some of these responses cited that it was “basic economic theory.” Only 26% of participants mentioned the productive aspects of more people. Moreover, only 12 participants out of 200 (6%) provided reasoning that unambiguously supported the conclusion that more people lead to more resources, a mainstream conclusion in macroeconomic modeling (Jones, 2022); even in cases where participants did mention that having more people increases the production of goods or the number of available workers, they did not expect those efficiencies to translate into an overall increase in resources. Taken together, these data provide strong evidence that people are depletionist by default. Providing evidence for the hypothesis that efficiency neglect drives depletionist reasoning, we also found that prompting participants to consider production efficiency somewhat attenuated pessimistic predictions about population growth, whereas merely prompting participants to reconsider their response did not.

Study S1 in the online supplemental materials provides additional evidence of depletionism as it relates to reasoning about changes in real costs. Participants’ aggregate judgments of how the real costs of several products from Study 1 would change in the future were almost perfectly correlated with their aggregate beliefs about how limited (vs. unlimited) were the inputs used to make these products. Such expectations that cost increases are purely determined by limits on resources ignore the dynamics of supply and demand, reflecting depletionist reasoning that ignores how efficiency might impact the supply of goods.

Studies 3 and 4 directly show that efficiency neglect leads to economic pessimism. They find that prompting participants to consider

what they already know about changes in efficiency attenuates economic pessimism, but prompting consideration of changes in demand does not affect beliefs.

Study 3

We propose that when people think about how the costs of goods change over time, they intuitively focus on increases in demand, while neglecting increases in production efficiency. Therefore, prompting people to consider changes in production efficiency over time should reduce perceptions of rising real costs. By contrast, asking people to consider changes in demand should have no effect, because demand is already top of mind.

In Study 3 participants were again asked to estimate how the amount of labor required to purchase various products has changed over time. However, before estimating the labor cost of each product, participants either made no additional evaluation (control condition), evaluated whether production of that product became more or less efficient over time, or evaluated whether demand for that product increased or decreased over time. We predicted that asking participants about changes in production efficiency would reduce the extent to which they believe products have become more costly. However, asking participants about changes in demand should not affect their judgments relative to control, since we hypothesize that demand is already top of mind when evaluating changes in cost.

Method

Transparency and Openness

Sample sizes were determined before data collection. We report all manipulations, all measures, and do not exclude any participant who completed a study. Study materials and data are posted on the Open Science Framework (https://osf.io/3uj8f/?view_only=f69f67e636b647eda92cfe3aa190fea6).

We recruited 298 Americans on Amazon Mechanical Turk (39% female, 61% male; mean age 36). Participants were randomly assigned to one of three between-subjects conditions: efficiency, demand, or control. In all conditions, participants were asked to estimate how the real prices—that is, amount of work required at the average hourly wage—of six products (gasoline, chicken, refrigerator, eggs, electricity, and tomatoes) had changed from 1980 to 2018, using the same 5-point scale as in Studies 1a and 1b.

Before providing a response for each product, participants in the efficiency focus condition were asked to evaluate whether production of that good was more or less efficient in 2018 than it was in 1980. For example, before rating how much the real price of tomatoes had changed, participants answered the question is the average yield per acre of agricultural land today higher or lower than it was in 1980? on a 5-point scale from *much lower* to *much higher* than 1980. Participants in the demand focus condition were asked to evaluate whether the resources required for production were more or less strained than in 1980. Continuing with the tomatoes example, participants answered the question are there more or less acres of agricultural land per person today than there were in 1980? on a 5-point scale from *much less* to *much more*. Participants in the control condition did not make any evaluation before estimating price changes. A complete list of these prompts is in the online supplemental materials.

Answering such questions immediately before estimating prices might seem like a heavy-handed manipulation. However, we did

not tell participants whether tomatoes are grown and harvested more efficiently or whether farmland is more limited; we allowed participants to invoke their preexisting beliefs. Furthermore, the manipulation is equally heavy-handed in the demand focus conditions, where we predict the manipulation to have no effect.

Results

Efficiency and Demand Focus Prompts

For all six items, participants in the efficiency and demand focus conditions responded to the initial prompts as expected. Compared with 1980, resources were seen as significantly more strained (all means higher than scale midpoint, $p < .01$). Conversely, production was seen as significantly more efficient compared with 1980 (all means higher than scale midpoint, $p < .001$).

Real Price Estimates

Averaging across conditions, participants believed that all the goods became more costly since 1980 (all $p < .01$). An analysis of variance (ANOVA) revealed a significant effect of the focus manipulation on evaluations of price changes, $F(2, 294) = 5.22$, $p = .006$, $\eta_G^2 = .034$; see Figure 4. Follow-up ANOVAs revealed that priming an efficiency focus attenuated the extent to which participants thought costs had increased, relative to control; $F(1, 196) = 7.53$, $p = .007$, $\eta_G^2 = .037$, whereas priming a demand focus had no effect, $F(1, 195) < .01$, $p = .926$, $\eta_G^2 < .001$.

Notably, participants in the efficiency prime condition still believed that prices are increasing for refrigerators ($M = 0.26$, $SD = 1.24$), $t(99) = 2.09$, $p = .039$; chicken ($M = 0.29$, $SD = 1.15$), $t(99) = 2.53$, $p = .013$; and gasoline ($M = 0.49$, $SD = 1.23$), $t(99) = 3.99$, $p < .001$. Even when the efficiency prime eliminated the belief that prices are increasing, it did not lead participants to believe that prices are decreasing, eggs: $M = 0.09$, $SD = 1.14$; $t(99) = 0.79$, $p = .431$; tomatoes: $M = 0.20$, $SD = 1.23$; $t(99) =$

0.11, $p = .107$; electricity: $M = 0.19$, $SD = 1.22$; $t(99) = 1.56$, $p = .123$.

Discussion

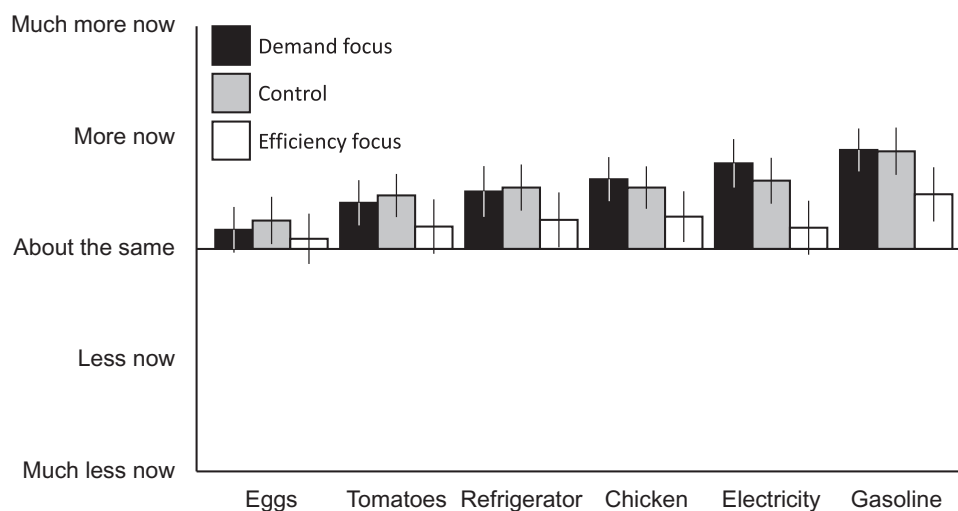
Priming people to consider what they already know about changes in production efficiency somewhat attenuates their belief that prices are increasing. Priming people to consider changes in demand does not affect these beliefs. This supports our proposition that beliefs that prices are increasing are partly driven by an intuitive focus on changes in demand, and an intuitive neglect of changes in productivity. As we discuss in the General Discussion section, our finding that prompting people to consider efficiency gains did not “reverse” economic pessimism suggests that efficiency neglect is only one of several factors underlying it.

Study 4

In Study 4, we examined how efficiency neglect affects beliefs about the impact of immigration on the economy. We suggest that when thinking about the impact of immigration, people intuitively focus on how immigration affects demand (that there will be more people in the country vying for goods) while neglecting the impact of immigration on efficiency (that there will be more workers participating in the production of goods). This may result in a view of immigration as a zero sum—that is, that economic benefits for immigrants come at the expense of current citizens. If true, asking people to consider how immigration affects the labor force should reduce the extent to which they perceive immigration as zero sum. In contrast, asking people to consider how immigration affects demand should not affect immigration attitudes, because the impact of immigration on demand is already top of mind.

Of course, people may have many reasons to be optimistic or pessimistic about immigration, some of which are unrelated to efficiency neglect or even to economics. For example, people may favor

Figure 4
Study 3, Beliefs About the Amount of Labor It Took to Afford Various Goods in 2018 Relative to 1980, as a Function of Condition



Note. Error bars are 95% confidence interval.

immigration because they think accepting immigrants is a moral duty, or oppose immigration because they think it causes culture clashes. However, we focus only on how people think immigration impacts the abundance of goods.

Method

Transparency and Openness

Sample sizes were determined before data collection. We report all manipulations and all measures and do not exclude any participant who completed a study. Study materials and data are posted on the Open Science Framework (https://osf.io/3uj8f/?view_only=f69f67e636b647eda92cfe3aa190fea6).

Using Prolific, we recruited a nationally representative sample of 601 Americans (49% female, 50% male, 1% other; mean age 31). Study 4 employed a three between-participants conditions design (focus: efficiency, demand, and control). In the efficiency focus condition, participants were asked to write about how immigration can increase the pool of available workers. In the demand focus condition, participants wrote about how immigration can increase the amount of food that is consumed. In the control condition, participants were not asked to write anything.

Next, participants rated their agreement with four statements that measured the extent to which they thought of immigration as a zero sum using 5-point scales that were adapted from prior research (Esses et al., 1998).

Results

We averaged the four immigration attitude items to form a single score of the degree to which participants viewed immigration as a zero sum ($\alpha = .94$). Consistent with our predictions, prompting participants to consider the effect of immigration on production efficiency reduced their belief that immigration is a zero sum ($M = 3.32$, $SD = 1.67$ vs. $M = 2.98$, $SD = 1.65$), $t(401) = 2.11$, $p = .035$, $d = 0.21$, while prompting participants to consider the effect of immigration on demand had no effect ($M = 3.32$, $SD = 1.67$ vs. $M = 3.33$, $SD = 1.65$), $t(411) = .02$, $p = .981$, $d < 0.00$.

General Discussion

The idea that supply cannot keep up with demand as the population increases is a persistent lay economic belief (Desrochers, 2020; Stokstad, 2005). Across millennia, thinkers from Plato to Malthus have argued that population growth will necessarily lead to fewer resources. Similar views are still marshaled to support protectionist sentiment and promote ideas such as closed borders and population control.

We identify efficiency neglect as a cause of depletionism: when thinking about the economic consequences of population growth, people spontaneously focus on changes in demand, while neglecting to consider changes in production efficiency that occur alongside, and often in response to, changes in demand. As a result, people believe that as the population grows, it becomes more difficult for the average worker to afford the same products. Put differently, people seem to intuitively think of additional people solely as consumers, overlooking their additional role as producers. This leads to a failure to acknowledge the forces that push prices down and causes people to believe real prices increase over time even as they drop sharply.

Psychologists have long been interested in lay theories of scientific domains such as physics and biology (Keil, 2007; McCloskey & Kohl, 1983; Rozenblit & Keil, 2002). Far less work has examined how people think about economic forces (Leiser & Shemesh, 2018). This gap is unfortunate because lay economic beliefs are consequential (Day & Fiske, 2019; Roos, 2007, 2008). Even people who cannot plot the trajectory of objects dropped from airplanes usually avoid walking into walls. Faulty economic beliefs, however, lead to bad policies. Throughout history and still today, they are used to support destructive strains of populism across the political spectrum.

Our work demonstrates ways efficiency neglect drives laypeople's depletionist economic theories. Moreover, we show that simply prompting people to consider what they already know about gains in production efficiency reduces their economic pessimism and anti-immigration sentiment.

Limitations and Future Directions

It is important to note that the points we make in this article are positive, not normative. We do not claim that life today is easier for everyone, that everything is more affordable, that prices will continue to drop indefinitely, or that people should be optimistic about the economy or about anything at all. We only show that people generally fail to consider how population growth has affected efficiency in the economy and that this leads them to underappreciate the forces that push prices down. Although this point is illustrated most starkly when people believe that prices are increasing even as prices really are decreasing, this mismatch is merely a consequence of the mechanism we uncover, and not necessary for it to hold. Efficiency neglect occurs whenever people fail to consider efficiency changes regardless of whether prices are falling or not.

Relatedly, we chose which items to include in our studies based on whether they were tracked by the BLS or appeared in different issues of the Sears catalog and are reasonably comparable across decades. We do not claim that those items represent the whole economy. Whereas the real prices of food and other basic goods have generally decreased, other things—notably ones whose price is largely independent of production efficiency such as services, nonfungible goods, premier education, and real estate—have often gotten more expensive. We claim that efficiency is generally neglected. We do not claim that efficiency made everything cheaper for everyone.

The present studies may have interesting applications to other literature, such as those which aim to better understand political differences. As noted earlier, lay economics differs from lay physics or lay biology in that they have consequences for political attitudes and voting behavior. Note, however, that depletionism per se is not a partisan belief, and different groups may be motivated to exploit efficiency neglect for different political ends. Some of our examples include attitudes, which may be thought of as right wing, but efficiency neglect can also be used to support policies usually found on the political left such as population control and, more generally, to push toward a command-and-control economy. Understanding the role of such motivated processes, especially in highly politicized domains, may prove informative as they, too, may be an important reason why depletionist beliefs persist.

Constraints on Generality

A limitation of the current investigation is our use of only American samples. Because we were interested in comparing beliefs

to the actual changes in the costs of goods over time, it was necessary to focus on one country (in this case, the United States). As a result, we are limited in our ability to generalize these findings to other populations/nations. That said, international polling suggests that general economic pessimism is a global phenomenon (Deloitte, 2019). More research is needed to determine whether such widespread pessimism does indeed have common psychological causes.

A second limitation of the present studies is that efficiency neglect appears to be only a partial explanation of depletionism and its consequences for economic beliefs. Studies 2a, 3, and 4 demonstrated that while prompts to consider production efficiency attenuate depletionist thinking, they do not lead the majority of respondents to judge that more people will mean more abundance and cheaper goods. It is very likely that depletionism is multiply determined. We noted earlier in the article that other phenomena may contribute to the belief that costs are rising, for example, confusing inflation with cost-of-living and zero-sum reasoning. Depletionism and economic pessimism may also reflect a general negativity bias (Soroka et al., 2019), a tendency to be more attentive to negative news. These factors may exert a powerful effect on people's judgments such that they are reluctant to say that the costs of consumer goods have decreased historically, or that they will be cheaper in the future. Analogously, antiimmigration sentiment clearly has other causes besides depletionism (Dennison & Geddes, 2019; Fetzer, 2000).

Concluding Remarks

Depletionism is fascinating. It is a belief that has persisted across the world throughout the ages in the face of ample contradictory evidence. Population levels have risen beyond what many depletionists throughout history could have imagined, and so has abundance. And yet, depletionism persists. We hope the present studies are a first step toward uncovering its psychological foundations.

References

- Andre, P., Pizzinelli, C., Roth, C., & Wohlfart, J. (2022). Subjective models of the macroeconomy: Evidence from experts and representative samples. *Review of Economic Studies*, 89(6), 2958–2991. <https://doi.org/10.1093/restud/rdac008>
- Baron, J., Bazerman, M. H., & Shonk, K. (2006). Enlarging the societal pie through wise legislation: A psychological perspective. *Perspectives on Psychological Science*, 1(2), 123–132. <https://doi.org/10.1111/j.1745-6916.2006.00009.x>
- Baumol, W. J. (2012). *The cost disease: Why computers get cheaper and health care doesn't*. Yale University Press.
- Berman, J. Z., Tran, A. T., Lynch, J. G., Jr., & Zauberman, G. (2016). Expense neglect in forecasting personal finances. *Journal of Marketing Research*, 53(4), 535–550. <https://doi.org/10.1509/jmr.15.0101>
- Bhattacharjee, A., Dana, J., & Baron, J. (2017). Anti-profit beliefs: How people neglect the societal benefits of profit. *Journal of Personality and Social Psychology*, 113(5), 671–696. <https://doi.org/10.1037/pspa0000093>
- Bolton, L. E., Warlop, L., & Alba, J. W. (2003). Consumer perceptions of price (un)fairness. *Journal of Consumer Research*, 29(4), 474–491. <https://doi.org/10.1086/346244>
- Boyer, P., & Petersen, M. B. (2018). Folk-economic beliefs: An evolutionary cognitive model. *Behavioral and Brain Sciences*, 41, Article e158. <https://doi.org/10.1017/S0140525X17001960>
- Bricker, D., & Ibbitson, J. (2019). *Empty planet: The shock of global population decline*. Crown.
- Bruine de Bruin, W., van der Klaauw, W., Topa, G., Downs, J., Fischhoff, B., & Armantier, O. (2012). The effect of question wording on consumers' reported inflation expectations. *Journal of Economic Psychology*, 33(4), 749–757. <https://doi.org/10.1016/j.joep.2012.02.001>
- Bryan, M. F. (2002). *Is it more expensive, or does it just cost more money?* Economic Commentary, Federal Reserve Bank of Cleveland.
- Caplan, B. (2001). What makes people think like economists? Evidence on economic cognition from the "Survey of Americans and Economists on the economy". *Journal of Law and Economics*, 44(2), 395–426. <https://doi.org/10.1086/322812>
- Caplan, B. (2002). Systematically biased beliefs about economics: Robust evidence of judgemental anomalies from the survey of Americans and Economists on the economy. *Economic Journal*, 112(479), 433–458. <https://doi.org/10.1111/1468-0297.00041>
- Chernev, A. (2007). Jack of all trades or master of one? Product differentiation and compensatory reasoning in consumer choice. *Journal of Consumer Research*, 33(4), 430–444. <https://doi.org/10.1086/510217>
- Christie, A. (1977). *An autobiography*. Collins.
- Cox, M. W., & Alm, R. (1999). *Myths of rich and poor: Why we're better off than we think*. Basic Books.
- Dana, J., Newman, G. E., & Voicheck, G. (2024, January 25). *Investigating the origins of economic pessimism*. <https://osf.io/3uj8f>
- Davidai, S., & Gilovich, T. (2015). Building a more mobile America—One income quintile at a time. *Perspectives on Psychological Science*, 10(1), 60–71. <https://doi.org/10.1177/1745691614562005>
- Day, M. V., & Fiske, S. T. (2019). Understanding the nature and consequences of social mobility beliefs. In J. Jetten & K. Peters (Eds.), *The social psychology of inequality* (pp. 365–380). Springer.
- The Deloitte Global Millennial Survey*. (2019). <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/About-Deloitte/deloitte-2019-millennial-survey.pdf>
- Dennison, J., & Geddes, A. (2019). A rising tide? The salience of immigration and the rise of anti-immigration political parties in Western Europe. *The Political Quarterly*, 90(1), 107–116. <https://doi.org/10.1111/1467-923X.12620>
- Desrochers, P. (2020). The Paradoxical Malthusian. A Promethean perspective on Vaclav Smil's growth: From microorganisms to megacities (MIT Press, 2019) and energy and civilization: A history (MIT Press, 2017). *Energies*, 13(20), Article 5306. <https://doi.org/10.3390/en13205306>
- Esses, V. M., Jackson, L. M., & Armstrong, T. L. (1998). Intergroup competition and attitudes toward immigrants and immigration: An instrumental model of group conflict. *Journal of Social Issues*, 54(4), 699–724. <https://doi.org/10.1111/j.1540-4560.1998.tb01244.x>
- Fetzer, J. S. (2000). Economic self-interest or cultural marginality? Anti-immigration sentiment and nativist political movements in France, Germany and the USA. *Journal of Ethnic and Migration Studies*, 26(1), 5–23. <https://doi.org/10.1080/136918300115615>
- Gallup. (2023). *Economy: Gallup Economic Confidence Index, 1996-2023*. <https://news.gallup.com/poll/1609/consumer-viewseconomy.aspx>
- Georganas, S., Healy, P., & Li, N. (2014). Frequency bias in consumers' perceptions of inflation: An experimental study. *European Economic Review*, 67, 144–158. <https://doi.org/10.1016/j.euroecorev.2014.01.014>
- Hull, D. L. (1965). The effect of essentialism on taxonomy—Two thousand years of stasis (II). *The British Journal for the Philosophy of Science*, 16(61), 1–18. <https://doi.org/10.1093/bjps/XVI.61.1>
- Johnson, S. G. B., Zhang, J., & Keil, F. C. (2022). Win-win denial: The psychological underpinnings of zero-sum thinking. *Journal of Experimental Psychology: General*, 151(2), 455–474. <https://doi.org/10.1037/xge0001083>
- Jones, C. I. (2022). The end of economic growth? Unintended consequences of a declining population. *American Economic Review*, 112(11), 3489–3527. <https://doi.org/10.1257/aer.20201605>
- Keil, F. C. (2007). Biology and beyond: Domain specificity in a broader developmental context. *Human Development*, 50(1), 31–38. <https://doi.org/10.1159/000097682>
- Leiser, D., & Shemesh, Y. (2018). *How we misunderstand economics and why it matters: The psychology of bias, distortion and conspiracy*. Routledge.

- Mastroianni, A., & Dana, J. (2022). Widespread misperceptions of long-term attitude change. *Proceedings of the National Academy of Sciences*, 119(11), Article e2107260119. <https://doi.org/10.1073/pnas.2107260119>
- Mayr, E. (1982). *The growth of biological thought: Diversity, evolution, and inheritance*. The Belknap Press of Harvard University.
- McCaffery, E. J., & Baron, J. (2006). Isolation effects and the neglect of indirect effects of fiscal policies. *Journal of Behavioral Decision Making*, 19(4), 289–302. <https://doi.org/10.1002/bdm.525>
- McCloskey, M., & Kohl, D. (1983). Naive Physics: The curvilinear impetus principle and its role in interactions with moving objects. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 9(1), 146–156. <https://doi.org/10.1037/0278-7393.9.1.146>
- Mead, N. L., & Williams, L. E. (2022). Can't buy me meaning? Lay theories impede people from deriving meaning and well-being from consumption. *Current Opinion in Psychology*, 46, Article 101332. <https://doi.org/10.1016/j.copsyc.2022.101332>
- Meegan, D. V. (2010). Zero-sum bias: Perceived competition despite unlimited resources. *Frontiers in Psychology*, 1, Article 191. <https://doi.org/10.3389/fpsyg.2010.00191>
- Newman, G. E., Gorlin, M., & Dhar, R. (2014). When going green backfires: How firm intentions shape the evaluation of socially beneficial product enhancements. *Journal of Consumer Research*, 41(3), 823–839. <https://doi.org/10.1086/677841>
- Pew Research Center. (2006). *Once again, the future ain't what it used to be*. <https://www.pewresearch.org/social-trends/2006/05/02/once-again-the-future-aint-what-it-used-to-be/>
- Pew Research Center. (2017). *Public divided on prospects for the next generation*. <https://www.pewresearch.org/global/2017/06/05/2-public-divided-on-prospects-for-the-next-generation/#americans-canadians-and-europeans-generally-pessimistic>
- Pew Research Center. (2019). *Looking to the Future, Public Sees an America in Decline on Many Fronts*. <https://www.luminafoundation.org/resource/looking-to-the-future-public-sees-an-america-in-decline-on-many-fronts/>
- Roos, M. W. (2007). Nonexpert beliefs about the macroeconomic consequences of economic and noneconomic events. *Public Choice*, 132(3–4), 291–304. <https://doi.org/10.1007/s11127-007-9152-2>
- Roos, M. W. (2008). Predicting the macroeconomic effects of abstract and concrete events. *European Journal of Political Economy*, 24(1), 192–201. <https://doi.org/10.1016/j.ejpoleco.2007.07.001>
- Rozenblit, L., & Keil, F. (2002). The misunderstood limits of folk science: An illusion of explanatory depth. *Cognitive Science*, 26(5), 521–562. https://doi.org/10.1207/s15516709cog2605_1
- Rubin, P. H. (2003). Folk economics. *Southern Economic Journal*, 70(1), 157–171. <https://doi.org/10.2307/1061637>
- Rubin, P. H. (2014). Emporiophobia (fear of markets): Cooperation or competition? *Southern Economic Journal*, 80(4), 875–889. <https://doi.org/10.4284/0038-4038-2013.287>
- Shafir, E., Diamond, P., & Tversky, A. (1997). Money illusion. *The Quarterly Journal of Economics*, 112(2), 341–374. <https://doi.org/10.1162/003355397555208>
- Sloman, S. A., & Fernbach, P. M. (2011). Human representation and reasoning about complex causal systems. *Information Knowledge Systems Management*, 10(1–4), 85–99. <https://doi.org/10.3233/IKS-2012-0187>
- Soroka, S., Fournier, P., & Nir, L. (2019). Cross-national evidence of a negativity bias in psychophysiological reactions to news. *Proceedings of the National Academy of Sciences*, 116(38), 18888–18892. <https://doi.org/10.1073/pnas.1908369116>
- Stokstad, E. (2005). Will Malthus continue to be wrong? *Science*, 309(5731), Article 102. <https://doi.org/10.1126/science.309.5731.102>
- Sverigedemokraterna. (2022). *Myter om invandring*. Retrieved November 28, 2022, from https://sd-se.translate.google.com/vad-vi-vill/myter-om-invandring/?_x_tr_sl=sv&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=sc
- Williamson, M. R., & Wearing, A. J. (1996). Lay people's cognitive models of the economy. *Journal of Economic Psychology*, 17(1), 3–38. [https://doi.org/10.1016/0167-4870\(95\)00033-X](https://doi.org/10.1016/0167-4870(95)00033-X)

Received February 2, 2023

Revision received January 25, 2024

Accepted February 5, 2024 ■