Idaho Economic Forecast

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Division of Financial Management
Executive Office of the Governor

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- **Forecast begins the second quarter of 2024**
- **Baseline outlook**
- **Alternative forecasts**
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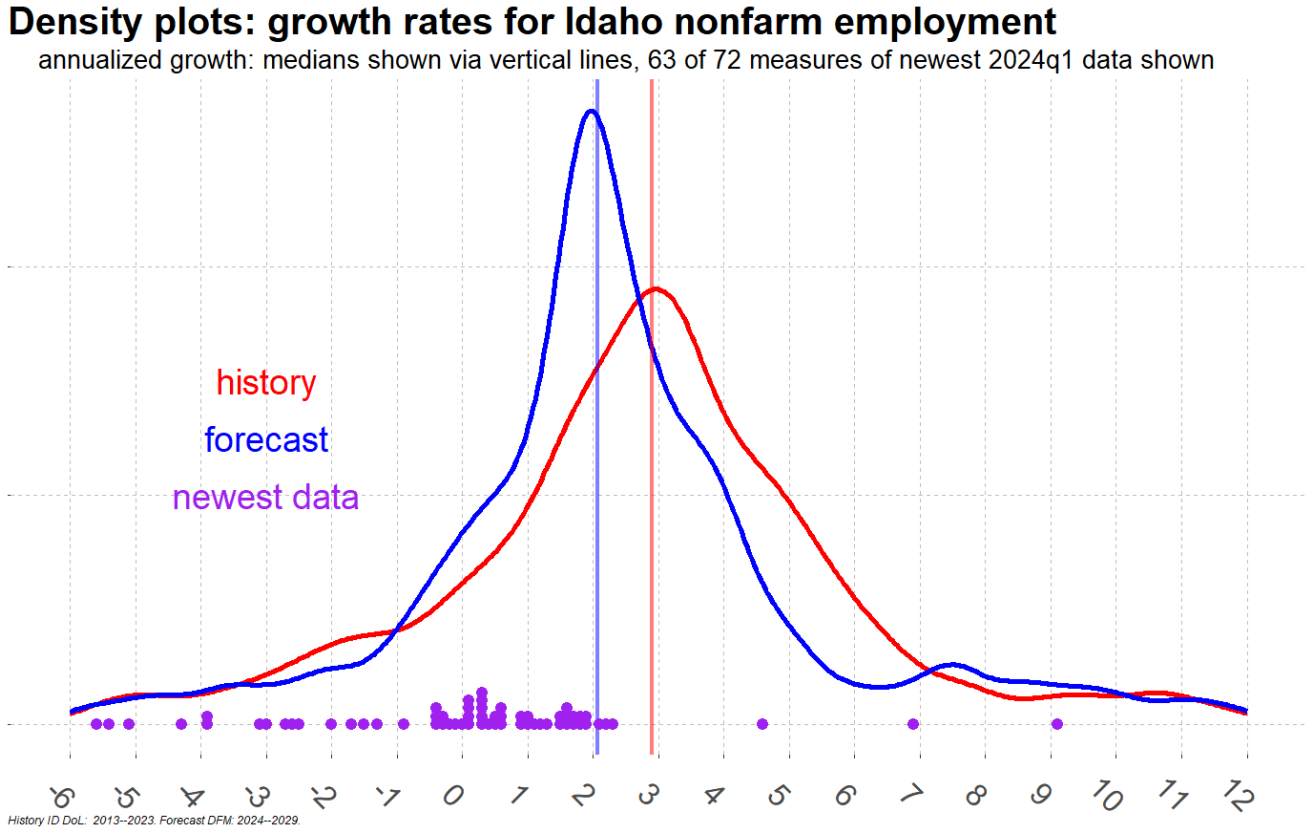

Idaho Economic Forecast 2024–2029

State of Idaho
BRAD LITTLE
Governor

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Introduction

This document summarizes Idaho's economic forecast for 2024 through 2029. The primary national forecast in this report is the July baseline forecast for the US economy by Moody's Analytics. The Idaho economic model takes the national forecast as an input.

Idaho Department of Labor provides monthly historical employment data. Employment data is now used at the monthly frequency, and seasonal adjustment is not performed perfunctory. Data is complete through 2024m3. Wage data is also supplied by the Idaho Department of Labor. This data is only collected at the quarterly frequency. This is adjusted by DFM to monthly data consistent at the quarterly level.

Historical and forecast data for Idaho are available. These are now provided via this link. The linked xlsx file includes data for broad sectors of the Idaho economy at the monthly frequency, and data for narrower sectors of the Idaho economy at the half-year frequency.

Cover. The cover graph is an illustration of typical annualized growth of the nonfarm jobs count in Idaho. It is very similar to the cover shown on the prior edition, but this version shows an accumulation of additional points in purple. These are 63 of the 72 measurements for annualized growth coming from the three new data points 2024m1 – 2024m3. Each data point leads to 24 measures of annualized growth by looking back across the prior 24 months. The 9 points not shown all record contractions at rates steeper than -6 percent. Consequently the newest data points support the forecast median being left of the history median. The remainder of our discussion of the cover graph is nearly the same as that provided in the prior edition of this report.

The historical density[1] shows that the majority of expected annualized growth rates are somewhere in the range of $[-2\%, 7\%]$, with rarer occurrences of growth either $< -2\%$ or $> 7\%$. The graphical indication that these are rarer growth rates is that the historical graph is substantially closer to the horizontal axis in those more extreme cases. The most typical historical growth rate has been about 3%. That is both the median observed historical growth rate,[2] as well as the modal historical growth rate.[3]

The forecast density shows that the median growth rate in the forecast of Idaho's nonfarm job count, at about 2% annualized growth, is expected to be slower than has historically been observed. It also shows that there is more expectation that annualized growth above 7% is possible than the historical density would suggest.

The relative heights of the two graphs indicate that their concentration of annualized growth rates are different. More annualized growth rates are expected to be observed very near 2% in the forecast than would be expected to be found very near 3% if history was our only guide. Said another way, there is greater dispersion in annualized growth rates across history than is expected across the forecast.

[1] The coding generating these density plots was pioneered by our summer intern, Sean Murphy, of Grinnell College in Grinnell, IA. Sean is a graduate of Skyview HS in Nampa.

[2] meaning that half of the observed growth rates are above and half are below

[3] meaning that is the growth rate showing the highest likelihood of occurrence which is reflected by that being the horizontal measure associated with the peak of the historical curve

Both graphs use computation of annualized growth rates by comparing not only a month to its predecessor, but also by comparing a month to two months ago, three months ago, ..., all the way back to comparing a month to twenty-four months ago. Thus, 2020m1 gives rise to twenty-four observations of annualized growth rates, as does every other month in history. Using time periods spanning at least a year is helpful for understanding growth using data that has not been seasonally adjusted, something that the interior of the prior edition discussed further. It also means that the associated densities are quite smooth, so easing their interpretation.

Readers with any questions should contact Greg Piepmeyer at (208) 334-3900 or via email using greg.piepmeyer@dfm.idaho.gov.

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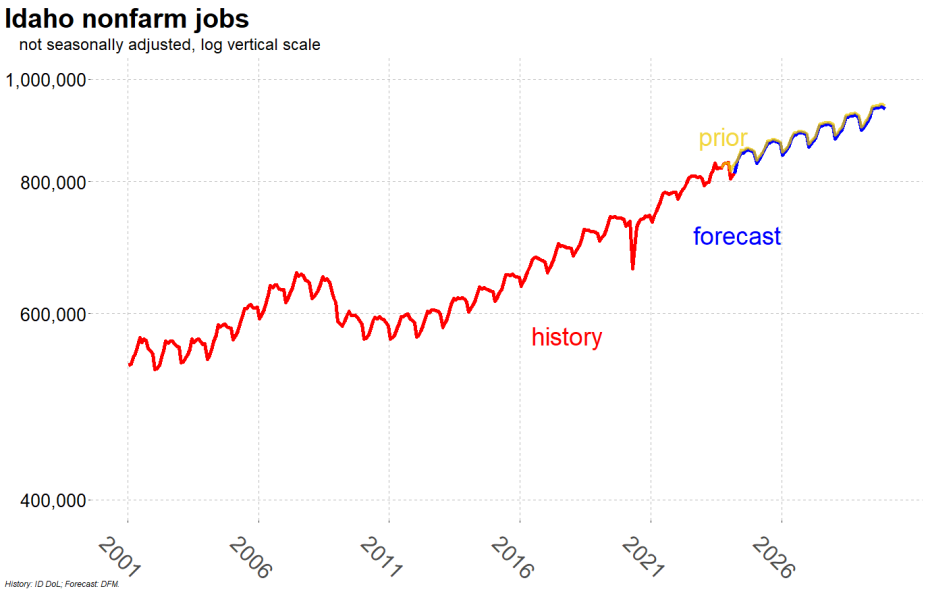
Overview

Our prior edition indicated a primary concern leading to our adoption of using not seasonally adjusted data where available: the economic forecast is the main input into the revenue forecast, and that last forecast is necessarily not seasonally smoothed. A secondary concern, but one which also supports the decision, is that a smoothly operating economy need not be uniformly expanding from time period T to $T+1$ for every time T and for every component of the economy. As we have illustrated, there are natural cycles in several sectors of the economy. Unfortunately, by only reporting smoothed graphs historically, it is possible that we have contributed to the impression that every minute turn in a variable could be an indication of an actual downturn (or alternatively, an upswing) in the economy. The Idaho Department of Labor at regular frequency[4] gets questions akin to: since the unemployment rate moved 0.1, does that mean that we are at an inflection point[5] in the economy? Most of the time, the appropriate answer to such a question is, no, that is not enough of a signal. However, it is the case that many downturns or many upswings begin innocuously. Discerning the typical from the atypical, then is a challenge, but context is the appropriate mediator. Using not seasonally adjusted data provides some of that context. Fortunately, as we have also seen in our prior report, seasonal adjustment remains possible after-the-fact. The two data streams together, we feel, provides a valuable tool for understanding what is occurring.

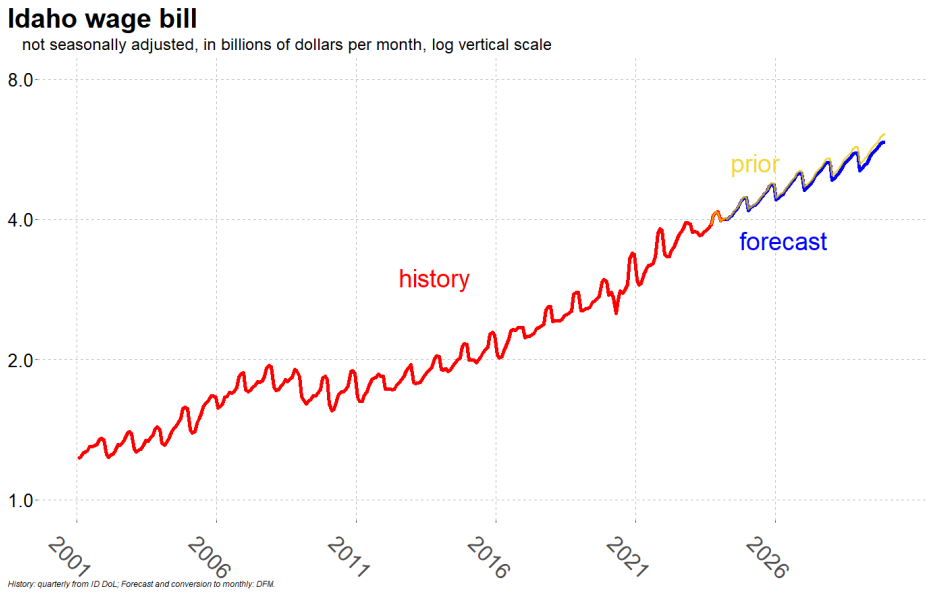
Modeling. The data for 2023q4 was only slightly revised between the April edition and this July edition. New preliminary data is available now for 2024q1. These six months of data are the transition between red (history) and blue (forecast). Our prior understanding for them is highlighted in gold in the accompanying graph. The regular jobs contraction at the start of the year appears to have exceeded the prior forecast's prediction. The Idaho economy, though, is still expected to maintain healthy growth across the next few years. Indeed, as indicated in our cover graph, nonfarm employment growth is predicted to center on 2% per year.



[4] e.g., lmi.labor.idaho reports monthly unemployment rates, for example

[5] while that may satisfy the mathematical definition of a sign change in the rate-of-change in the (yes) rate-of-change, the practical, everyday interpretation of the term is the context that most questioners bring

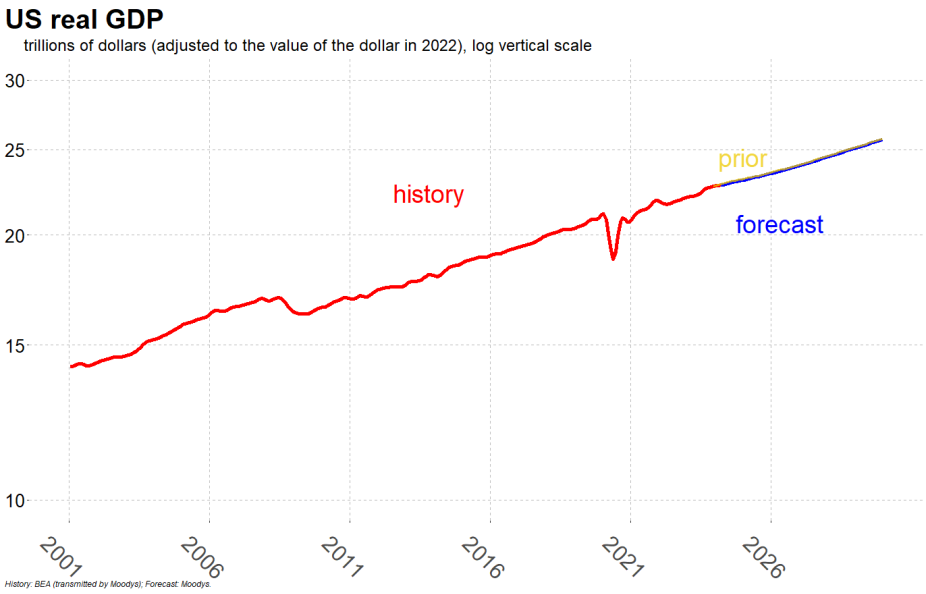
While the employment forecast is revised downward compared to the April forecast, the monthly wage bill forecast is mostly unchanged for the first part of the forecast. In the last two to two-and-half years of the forecast period, the monthly wage bill is noticeably lowered in this forecast. We remarked in the prior edition that "the pattern of the forecast is slightly different from what you might have expected if only you had seen just the historical data. Greater felicity in producing these forecasts may ameliorate this deficiency, but the compound nature of this pattern make it much more difficult to achieve than for the employment counts just discussed." Perhaps it was good fortune, but the initial pattern of the prior forecast seems to have been met by the incoming data. In the accompanying graph, the gold for the prior forecast is centered within the red portion representing the new data history for the six months of 2023q4–2024q1.

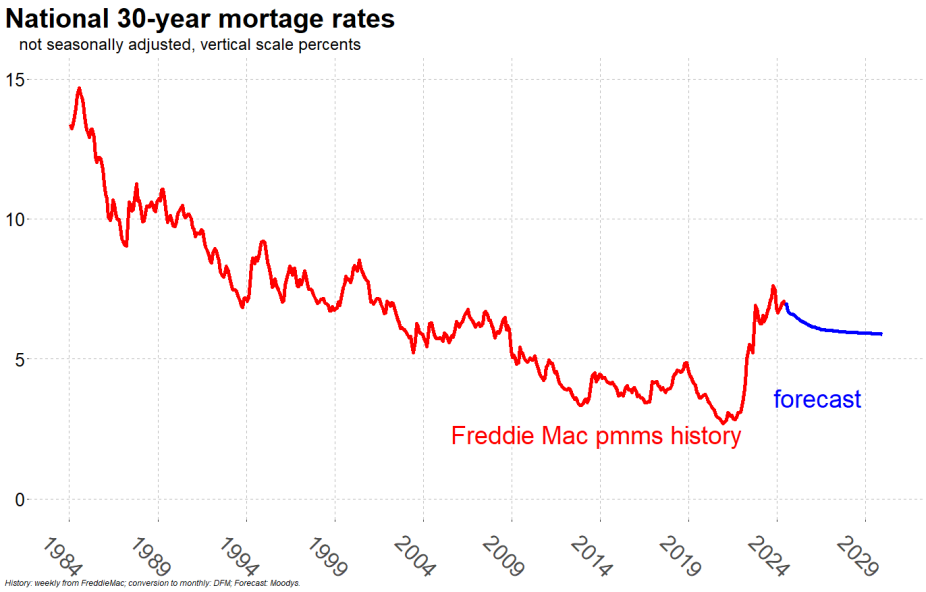


These Idaho data and the corresponding forecasts, along with the housing forecast, are the most influential numeric data inputs for the revenue forecast for Idaho. Law changes can, and in some cases do, supercede the influence of these numeric inputs on the final revenue expectation. Traditionally the governor is the first to discuss the revised revenue forecast in the State of the State speech in early January.

As we have remarked in the introduction, the economic forecast for Idaho, of which total employment and total wage bills are outputs, takes as input the Moody's forecast for the US economy. That forecast is currently fairly optimistic. Inflation has returned to near the Federal Reserve's target and nominal GDP growth exceeds inflation by a considerable amount. Indeed, real GDP, which adjusts for inflation to measure the expansion of the economy, is expected to keep a healthy expansion. This expectation is mildly tempered compared to the April edition; indeed, the gold portion of the accompanying graph, set a bit thinner than the red and blue lines, allows a bit more of the blue forecast from the July edition to be clearly visible below its trajectory than above its trajectory. However, the new (blue) forecast remains along the lines of the prior (gold) forecast.

Looking only at GDP, then, we would expect a slightly cooler July forecast for Idaho than the April edition. The two Idaho data, total employment and total monthly wage bills, conform to that conclusion.





With inflation continuing to moderate towards the Federal Reserve's 2% goal, Moody's maintains an unwinding of mortgage rates. The main implications of this are elevated housing permit activity, and likely higher transaction volumes than we have seen since rates hit nearly 8% about a year ago. Through our model, higher permits translates into elevated housing starts and eventual completions, so augmenting the stock of housing in the state. We give the outlook for local housing activity (permits, starts, completions) in the summary section to follow.

Summary. We find that the following data tables quickly describe a lot about the national and state economies. The first records variables key to the national economy. All of the data here is due to Moody's.

US	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
inflation, CPI measure	1.3	4.7	8.0	4.1	3.2	2.5	2.4	2.2	2.2	2.2
real GDP growth	-2.2	5.8	1.9	2.5	2.3	1.7	1.9	2.2	2.4	2.3
Federal Funds rate	2.2	0.4	0.1	1.7	5.0	5.2	4.3	3.3	3.0	2.9
mortgage rates	3.9	3.1	3.0	5.3	6.8	6.8	6.3	6.1	6.0	5.9
employment growth	-5.8	2.9	4.3	2.3	1.6	0.7	0.3	0.3	0.3	0.3

The housing output for Idaho is summarized next. The data is recording "thousands of units" per year, and the measure record activity from July of the prior year until July of the named year;

that is the way the Census studies housing. All of the data here is due to the Idaho economic model's computation based upon the Moody's forecast of the US economy. We are likely to have an additional measure from the Census of the stock change available for publication only in the January edition of this report. We find this information important because our jobs forecast relies upon people being here to fill those jobs and people need places to live.

ID housing units	2003	2004	2005	2006	2007	2008	2009	2010	2011
permits	13.9	15.8	19.4	20.6	14.8	9.8	5.2	5.6	3.7
starts	12.6	14.5	18.0	20.3	15.9	10.8	6.3	5.5	4.1
completions	11.6	14.2	16.7	19.9	17.1	13.1	8.4	6.3	4.6
Census: stock change	14.3	16.0	18.9	21.9	17.2	12.4	6.8	5.1	4.1
IEM: stock change	12.9	14.6	16.5	19.9	20.9	16.4	11.1	6.6	4.8

ID housing units	2012	2013	2014	2015	2016	2017	2018	2019	2020
permits	5.5	7.5	9.1	9.2	10.5	11.8	14.6	14.5	16.6
starts	4.8	6.8	8.4	8.6	9.6	10.9	13.5	13.9	15.5
completions	4.5	6.0	7.6	8.3	9.5	10.7	12.4	14.1	14.4
Census: stock change	3.9	6.2	8.5	8.5	9.7	11.8	13.9	15.6	5.1
IEM: stock change	3.9	4.4	6.7	8.4	8.7	10.1	12.2	14.5	12.8

ID housing units	2021	2022	2023	2024	2025	2026	2027	2028	2029
permits	19.0	21.2	15.3	19.0	21.4	23.5	25.4	27.1	28.4
starts	17.2	19.3	15.7	17.6	19.5	21.4	23.4	25.0	26.5
completions	17.3	17.7	17.4	17.1	17.7	19.4	21.3	23.0	24.7
Census: stock change	18.8	21.6	18.6						
IEM: stock change	8.8	19.3	20.9	18.0	18.3	20.4	22.4	24.2	25.9

Another table summarizing Idaho's expected growth trajectory, including the expected expansion of jobs within the state, is provided on page 17. The forecast is for more moderate expansion of personal income than in the early pandemic years; the growth seen in 2023 (mid-5%) is more typical of the likely growth through 2029. Details are provided in that table. Jobs and associated wage payments should continue the expansion, but they are both likely to be a bit more moderate in their augmentation than in 2023. Broad context for this is provided in two places, both having to do with demography. See pages 13 and 16.

Current economic conditions

Economic Watch. Releases of real GDP estimates for the US have been 1.6% (April 25, first estimate), 1.3% (May 30, second estimate), and finally 1.4% (June 27, third estimate). Those three readings provide context for the first estimate, at 2.8%, for 2024q2, published July 25. Growth in 2022 was 1.9% and in 2023 it was 2.5%.

Moody's July forecast for real GDP growth is 2.3% for 2024 over 2023 and 1.7% for 2025 over 2024. For estimates using the latest available data, the Atlanta Federal Reserve Bank and the New York Federal Reserve Bank produce nowcasts of real US GDP growth. Those are available: GDPnow and Nowcast. Both of these estimates are recorded as real annualized growth rates, i.e., taking into account expected inflation. These can give some indication as to the likelihood of meeting or beating the full-year forecast by Moody's.

International. The International Monetary Fund (IMF) released its July edition of its World Economic Outlook. The IMF forecast is for real US GDP growth of 2.6% in 2024 and 1.9% in 2025. Among the first explanations given with that release is the following: "The United States shows increasing signs of cooling, especially in the labor market, after a strong 2023."[6] The world output is expected to expand by 3.2% and then 3.3% in 2025. Chinese growth forecasts are for 5.0% and 4.5%.[7] Mexico's growth is forecast for 2.2% and 1.6% by the IMF.

The OECD[8] expects the world growth of 3.1% in 2024 and 3.2% in 2025, quite similar to the IMF predictions. US growth in their forecast is expected at 2.6% then 1.8%, a bit higher than Moody's this year, though right in line with the IMF for 2024. Expected growth rates are quite similar for the US across all three forecasts for 2025.

Monetary policy. The impression is that central banks are moving away from monetary restriction towards monetary easing; and some have already begun. As there are not yet indications of a recession, this easing is a resumption of neutral monetary policy after a (sometimes) year-long period of restriction. The Federal Reserve left interest rates unaltered through July. However, the broad expectation is that central banks from advanced economies will be cutting interest rates in the last half of the calendar year. A few have begun already. The Bank of Canada trimmed rates in June and July, lowering from 5.0% to 4.5% in two quarter-point cuts. The Bank of England cut by one-quarter point to close July. The Swiss National Bank began its policy easing earlier in 2024 and has also stepped back by a half-point.

National. Moody's position on the US economy is summarized by the firm as:

> A full-employment economy is one with an unemployment rate around 3.5% to 4%, a 62.5% labor force participation rate, and a prime-age employment-to-population ratio in the range of 80%. The economy is at that level now. . . . Inflation seems to be slowing as needed for the Federal Reserve to implement its first cut in September.

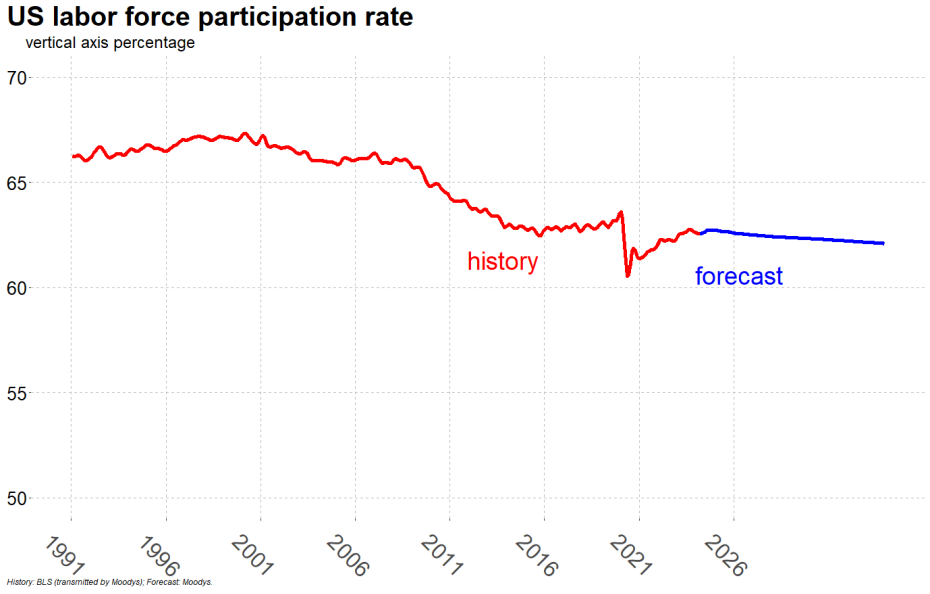
[6] from the accompanying blog by the IMF chief economist.

[7] from that same blog: "Growth in India and China is revised upwards and accounts for almost half of global growth."

[8] Organization for Economic Cooperation and Development—this is a group of 35 countries including the US.

> . . . A slowdown in growth remains the expectation for the remainder of the year. . . . We still expect job growth to cool to about 100,000 [jobs/month for the US] by the end of the year.

With regard to the labor force participation, aside from the disruption of the pandemic, the forecast is a continuation of a long-running trend. Diminishing labor force participation reflects continued transitions into retirement, continued interest and pursuit of higher education, and more broadly, a society affluent enough that individuals can make the choice to exit the workforce for these and other reasons.



Moody's expects the first interest rate cut by the Federal Reserve to occur in September and among the most important contexts for that is "home building is expected to pick up next year as interest rates moderate and as underlying demand for houses remains strong."

That demand for housing is sustained through the expectation of a steady jobs market.

Local. Some parts of the Idaho economy are largely determined within the state's boarders. Idaho State Police recently reported that crime in Idaho, particularly of the most egregious sorts such as murder, was at a 5-year low in 2023. Generally a safe and prosperous economy is the desired aim. It is welcome to recognize an improvement on the first measure. For the other measure, two Idaho resorts have found Idaho's winter recreationalists sufficiently prosperous to expand their offerings. Schweitzer (near Sandpoint and Lake Pend Oreille) acquired Selkirk Power's snow-cat and snowmobile operations, opening more back-country skiing to its patrons. Brundage (in Valley County) is to open its Mountain Adventure Center. This is part of the resort's 10-year improvement plan from 2021.

There are, of course, many interactions between the US economy and Idaho's economy. Some come directly from the federal government. Recently these have included \$7.5 m destined for the Idaho National Laboratory (INL) for commercialization efforts. Among these is a method of producing insulation from materials which would otherwise be waste. The Nez Perce tribe is to receive \$37 m from the EPA, in part to expand the tribe's renewable energy infrastructure (rooftop solar and battery storage). Another tranche of money headed to Idaho is more than \$40 m in Payments in Lieu of Taxes (commonly referred to as PILT), which are payments to states based upon the federal land holdings within the state. One use of these is for public schools.

An educational opportunity opening up is a collaboration between Idaho State University's Albion Center and the Wasmuth Center for Human Rights. Together they will provide online professional development courses for K-12 teachers across the nation. The Albion Center at ISU already serves 60+ thousand across the US, including four-in-five Idaho teachers. This effort matches a need recognized by HCR 25 from the 2024 legislative session.

College of Eastern Idaho is beginning[9] construction of its new two-story building (called Future Tech). This is jointly funded by state funds and private donations. CEI has significantly grown its enrollment, serving a region which had not had a two-year state school.

Lewis-Clark State College in Lewiston has approval and accreditation for its first master's degree. This new MS will focus on nursing, adding to LPN and BSN (undergraduate nursing degree) programs at the school. The MS program will be leadership (i.e., management) focused. Other healthcare programs at LCSC train students to be medical assistants and radiation technologists. Demand for healthcare education is certainly indicated by healthcare being the most common intended destination for the Idaho Launch inaugural class (state funding for recent graduates to pursue post-secondary education). Over a quarter of Launch recipients are pursuing healthcare careers.[10]

Within the Treasure Valley, there is consolidation of schools amid declining enrollment (in Caldwell, Nampa, and Boise). Several of the school buildings and grounds will be repurposed by the districts and cities, sometimes splitting the use of the building between pre-K programs, after-school programs, Boys-and-Girls clubs, administrative work, and even other community needs such as housing local police substations.

Several other changes are headed for the Lewiston-Clarkston area. Another change appears to be ownership of the ammunition maker Vista Outdoor's operations there. It appears that an existing ammunition maker, known as the Czechoslovak Group, is likely to be the new owner. Approval has been given for the sale,[11] and an initial vote by Vista Outdoor's shareholders was scheduled for July 23, though later postponed till July 30.

Clearwater Paper, whose manufacturing facility is in Lewiston, is also selling part of its operations. This involves its tissue making and packaging facility, but not its pulp production. This sale is to Sofidel, an Italian maker of tissue. This sale is likely to affect 500 of the 1,300 people who work at the Lewiston facility. Clearwater has also been updating its facility, using up to 800 people for the upgrade.

Further details on the proposed Albertsons/Kroger merger of grocery store chains indicate that rather than divesting 13 Idaho stores, just 10 would be sold (to C&S Wholesale Grocers). Of those, eight are in the Treasure Valley, with one each in Twin Falls and Pocatello. The merger faces court challenges; these are scheduled in August and September. Another large change in the Boise/Eagle area is the shuttering of Intuit's office off of Eagle Road. This is reported to affect

[9] just after the close of July

[10] engineering is the next most common aim, followed by teaching

[11] Vista Outdoor's makes ammunition for a lot of law enforcement agencies in the US, so there are national security concerns in such a deal

almost 160 employees. Intuit will keep them on payrolls through September 9, and will provide six months of health insurance.

Though Saltzer shut its operations in the Treasure Valley, Saint Alphonsus was able to acquire the Nampa urgent care location and was able to retain 90% of the Saltzer staff associated with it. The ribbon-cutting for the re-opening was July 8.

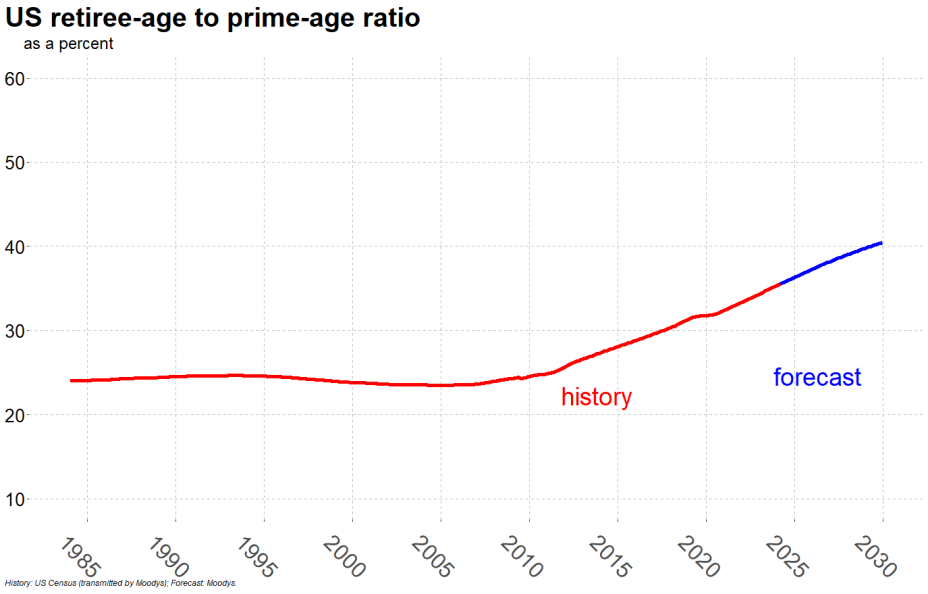
Construction activity continues at great pace within Idaho. A couple of new hotels are planned by Marriott for the Boise area, to open in 2026. These are expected to have almost 300 rooms to add to the stock. While hotel construction has been a reoccurring theme in the Treasure Valley, a more novel project is taking place in Mountain Home at its municipal airport. An expansion is underway to provide for more single-engine air-tankers (i.e., fire fighting airplanes). This construction is to begin in late July and be complete by next May.

Further east along the freeway, at Pocatello's regional airport, there will be an expansion of a flight school from Oregon. This school will offer programs to which veterans can receive scholarships; it is expected to bring several aircraft and a helicopter to the airport, and may expand to include flight simulators and possibly a jet plane. That school could employ 15.

Economic outlook

Take note that Moody's predicts nonfarm jobs growth and US population growth as likely to be quite similar beginning by 2026. The average wage growth reflects the firm's view that inflation will return to the Federal Reserve's 2% target and that productivity will be near that as well.

US growth rates	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
US nonfarm jobs	-5.8	2.9	4.3	2.3	1.6	0.7	0.3	0.3	0.3	0.3
US population	0.3	0.2	0.4	0.5	0.4	0.4	0.4	0.4	0.3	0.3
Total personal income	6.9	9.1	2.0	5.1	4.7	4.3	4.3	4.5	4.6	4.6
... inflation adjusted ...	5.8	4.8	-4.2	1.3	2.1	2.0	2.0	2.3	2.4	2.4
Wage & salary payments	1.5	8.9	7.8	6.1	5.0	4.6	4.0	3.9	4.0	4.0
... average US wage ...	7.9	5.8	3.4	3.7	3.3	3.8	3.6	3.7	3.7	3.6



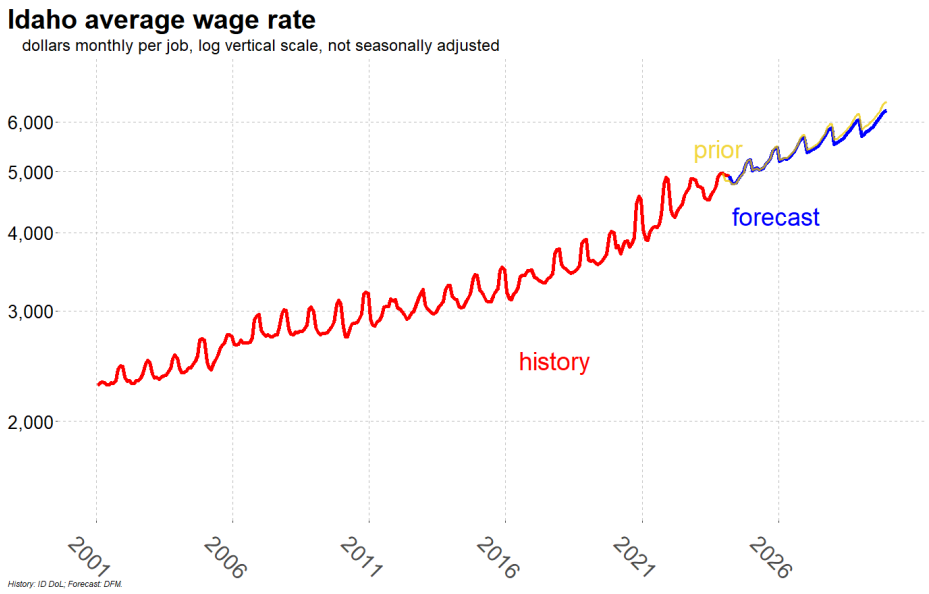
Here we see that US population growth is not expected to differ much from year to year, nor is it expected to differ much from recent history. Earlier we saw that labor force participation rates are expected to gradually diminish across the forecast horizon. Partly binding the two together is the demographic pyramid of the US. One way to investigate that is to look at the ratio of typical retiree ages (so 65+) to prime-age people in the US (25–64 year of age). There had not been much movement of that ratio until the past dozen or so years. As it is, 2024 is the year that the last of the baby-boomer cohort begins turning 60; all earlier years of that cohort have already reached that milestone. Consequently, there is a demographic bulge which is now traveling through typical retirement ages. While those in that age-range are still able to participate in the workforce, and hence always included within the denominator of the labor force participation rate, they typically participate to a lesser degree, and that degree lessens as their ages advance.

The short plateau in 2020 likely reflects several features. One is the pandemic's direct effect through loss of lives. Another is the near-curtailment of immigration in that year. But 2020 was also a US Census year, and with that came new data as well as the task of updating the annual population estimates that the Census produces to arrive at the intercensal population

values (which harmonizes those population estimates with the book-ending census counts). This feature of 2020 in the graph well illustrates that often there is a confluence of influences that impact observed changes in data. Though our language may allow us to separate the influences with distinct sentences describing them, untangling the causes and effects mathematically can be beyond tough.

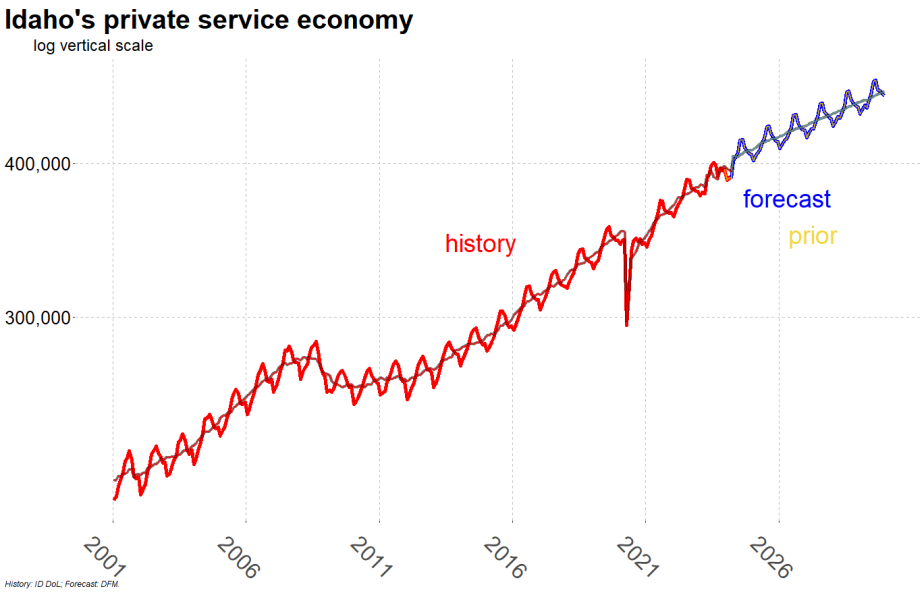
The outlook for Idaho is for more robust growth. As we have often mentioned, this remains tied to population moving into Idaho.

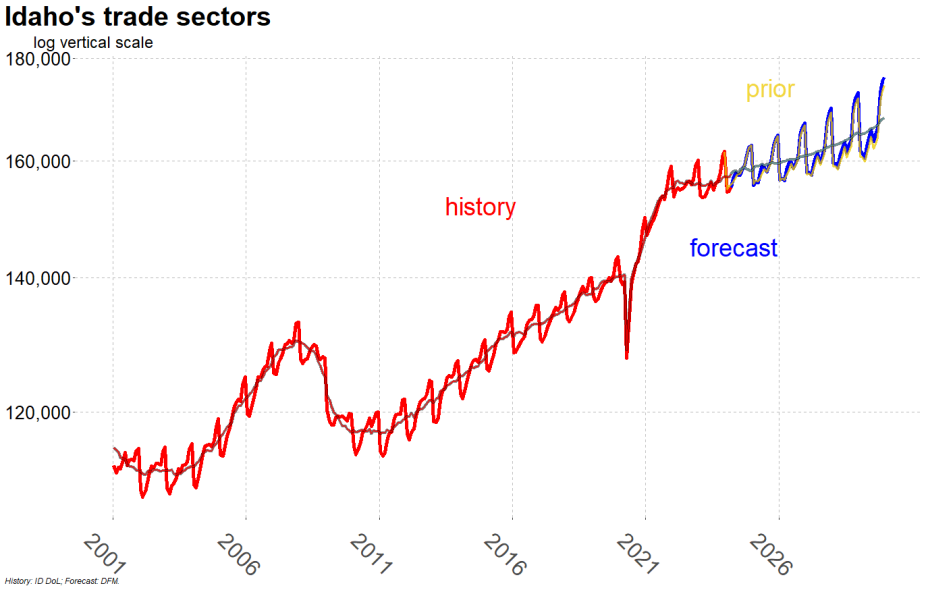
ID growth rates	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
ID nonfarm jobs	-0.6	5.8	4.0	2.6	2.7	2.4	1.8	1.8	1.9	1.8
ID population	3.4	3.0	1.8	1.3	1.4	1.4	1.3	1.3	1.4	1.4
Total personal income	10.7	12.3	6.4	5.4	4.2	5.0	6.1	5.8	6.0	6.0
. . . inflation adjusted . . .	9.5	7.9	-0.2	1.7	1.6	2.7	3.8	3.6	3.7	3.8
Wage & salary payments	7.2	12.6	11.1	6.4	8.0	7.0	5.9	5.5	5.2	5.3
. . . average ID wage . . .	7.7	6.4	6.9	3.8	5.1	4.5	4.0	3.6	3.3	3.4



The outlook for wages remains much as it was in the April edition, at least across the next couple of years. In the out-years of the forecast, the revision is downwards, though. The new data indicates that the expected dip in monthly average wages in the first quarter was not as steep as had been forecast. Looking through history, the monthly pattern is not a totally fixed pattern. As we mentioned in the April edition, this pattern comes from a confluence of patterns. The rhythm of jobs counts underlies part of it. The types of jobs, which vary across the months, contributes, too. The cycle of bonus payments does as well.

Labor market data. For private services employment, which encompasses a lot of Idaho's total nonfarm jobs, the expectation is that a seasonal pattern will re-establish. This reflects Moody's view that within the next couple of months, the lingering effects on the jobs market of the pandemic will have faded. Here we display the not seasonally adjusted historical data and forecast in bold colors. The grayish lines indicate the seasonal adjustment. The gold line shows our forecast for private services using the data available in April. For private services, the revisions are minimal. The outlook across the 2024 summer has an employment jump.[12]





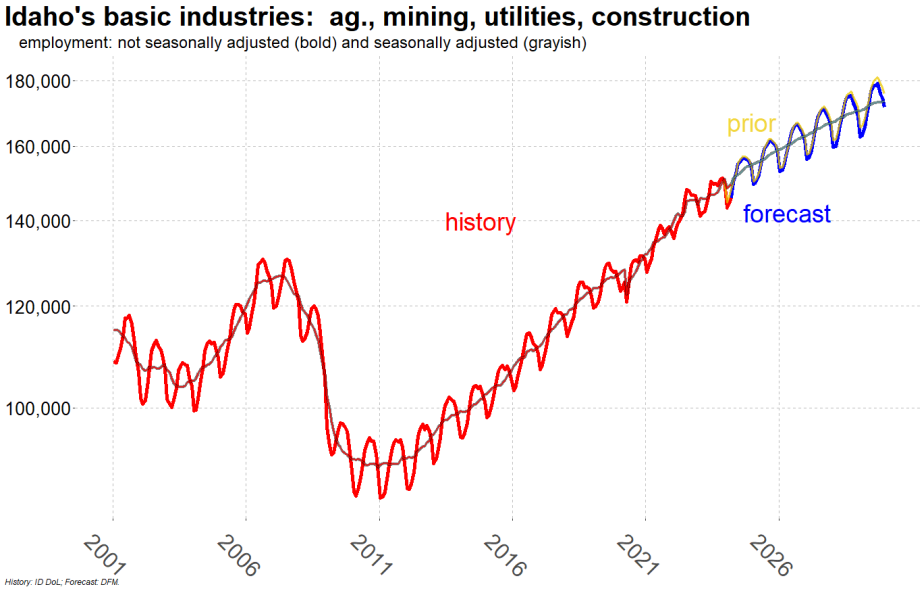
Some of the conclusion for private services holds for trade as well in the Idaho forecast. The revision is not pronounced and the resumption of a seasonal pattern is coming from the modeling. The new months of data suggest that trade was a little bit weaker than was forecast in April. However, the forecast is expecting stronger growth in trade towards the end of the horizon, at least in comparison to the April's edition.

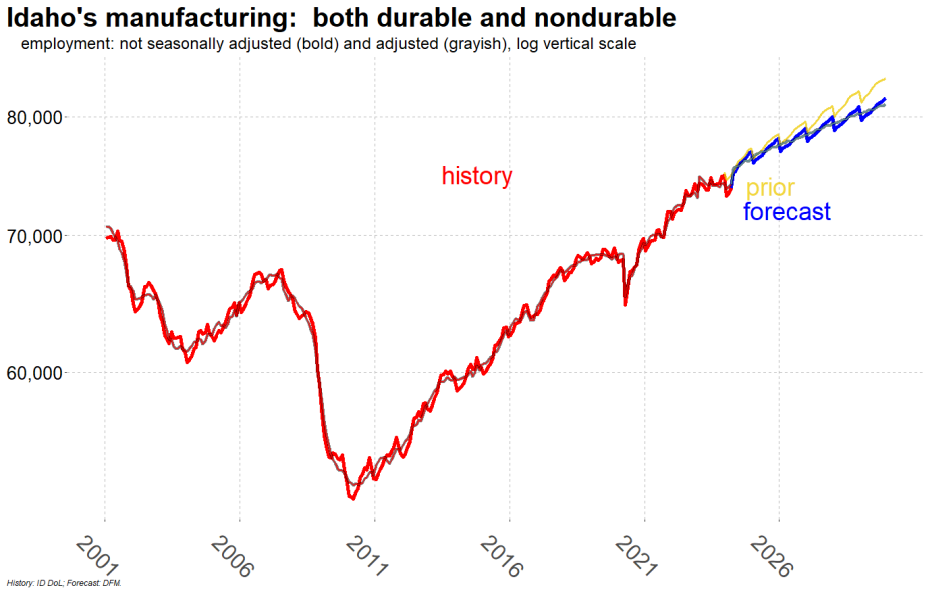
It is instructive to notice that the trade sectors variability in the forecast increases across the forecast horizon. While that is to be expected, it is easy to ignore that if only seasonally adjusted data is presented. Looking at the last trough-to-peak, there is about a 15,000 job swing within the year. That is nearly replicated in the next graph as well. The reliability of the pattern in

[12] The last data in July is through 2024m3, with the months 2024m1–m3 being preliminary data.

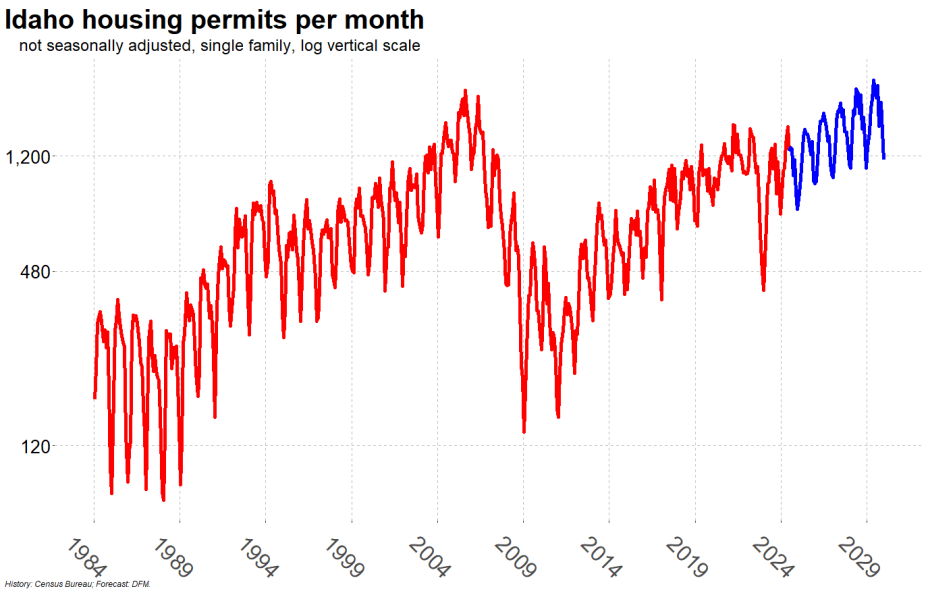
it (for basic industries) is greater than for trade. Just as well, the vertical scale is larger for the basic industries, largely owing to the 2007–2011 period's jobs losses. However, if you consult the last trough-to-peak on that graph, it is again about a 15,000 job swing within the year.

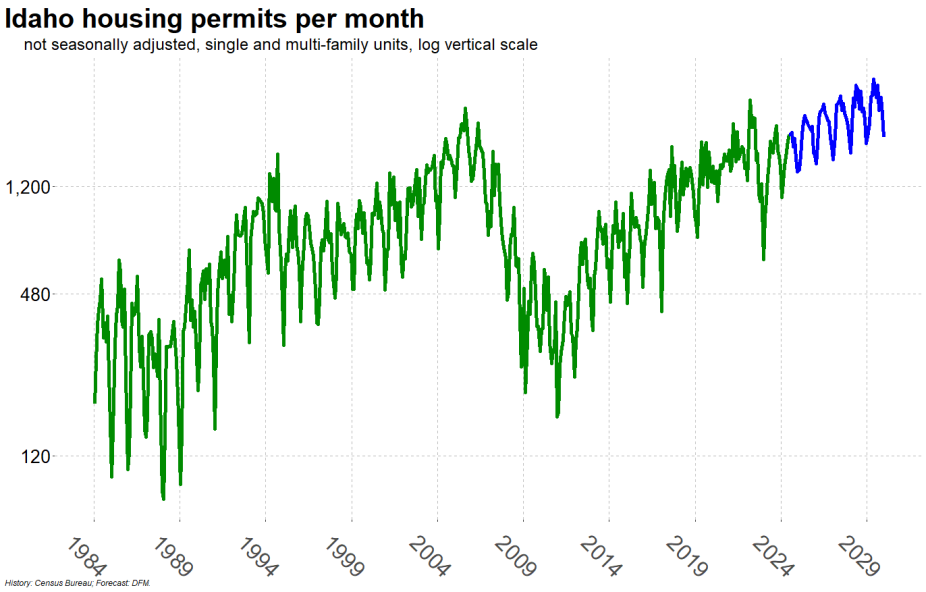
For the basic industries, those needed in order to have a service economy, the outlook in April saw a regular seasonal drop in employment occurring at the start of 2024. Preliminary data indicate that the drop was deeper than expected. This translates across the forecast horizon to a slight downward revision. There remains plenty of news data suggesting that construction in particular is expected to be in high demand.





Some of that news data relates to the ongoing project at Micron's Boise campus. Many electricians will be employed to bring the new factory online. As indicated earlier in this report, there are changes to the manufacturing employers in the Lewiston underway. Neither change is expected to shutdown lines. Adding to the buffer, food manufacturing remains a steady contributor to jobs within the state. The revision downward, which is clear across the forecast horizon, is initiated by the three new months of data. This did not meet the expectations set in the April forecast. It should be noted, though, that the vertical scale for the manufacturing jobs graph represents a narrow range.





Housing and construction. Here we include the historical data on housing permits in Idaho, both for the single-family category and for all housing units. These permits represent the counts of housing units intended to be constructed.

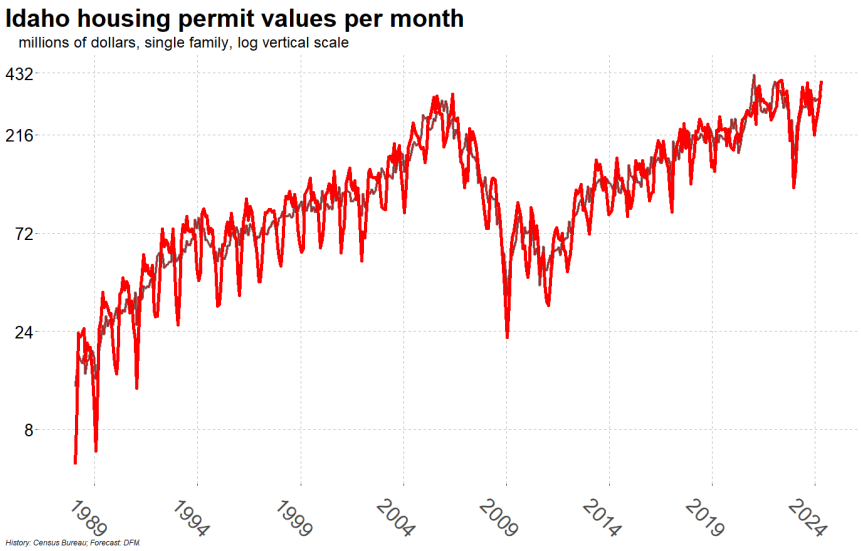
Permit counts do not fully inform pricing. Permit values are also available. These give another view on the housing sector in Idaho. The permit values may also be useful for better understanding sales taxes, one of the main interests of this office. We include the seasonally adjustment graphs as well when we consider these permit values. These illustrate that seasonal adjustment really is more useful for regularly patterned data.

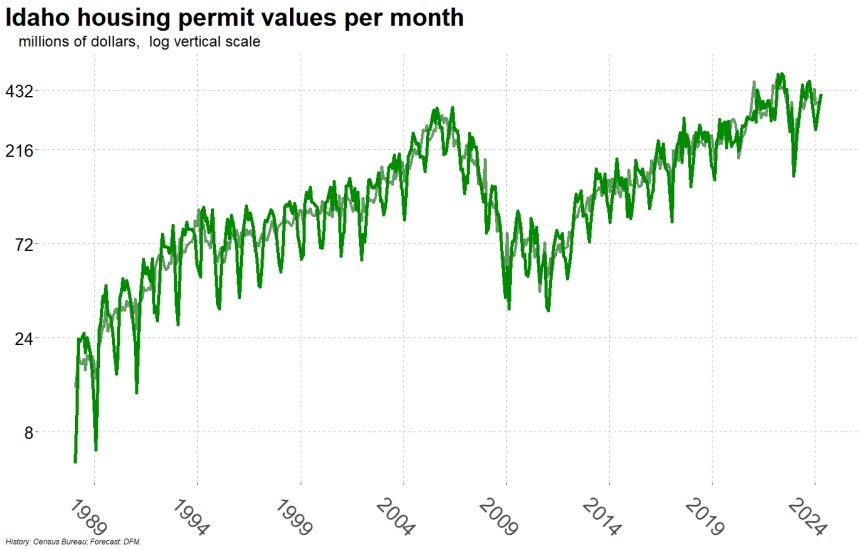
There may be other uses of permit values, supplementing permit counts or perhaps replacing them.[13] Finally, we look to adjust permit values for the changing value of the dollar. The main difference visible is that the vertical scale is much smaller, representing about half of the range that the nominal permit values indicate. Permit counts have more than doubled in the 1991–present time; this cpi-adjusted view suggests that permit costs per unit have been more stable than might reasonably have been assumed given the run-up in house values, particularly since the mid 20-teens.

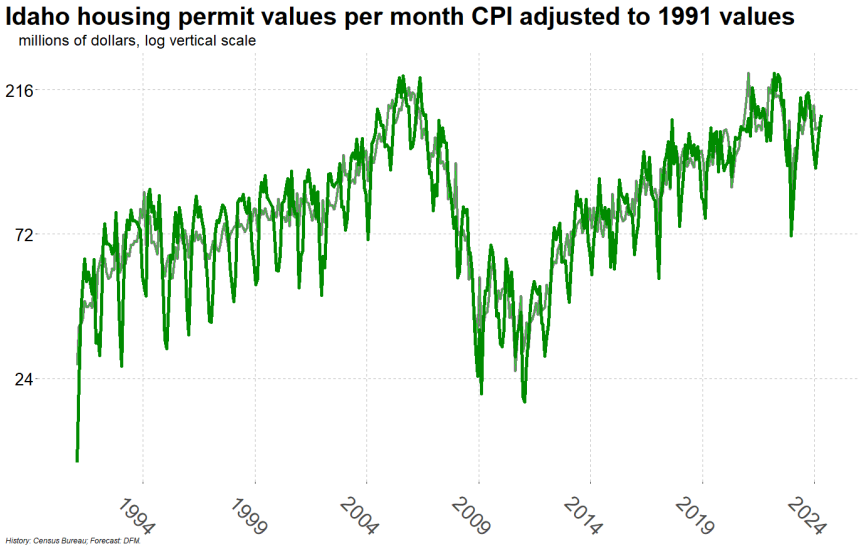
[13] Our summer intern, Sean Murphy, from Grinnell College in IA and a Skyview HS graduate collected this data for us. He used it to forecast construction jobs via a VAR model (discussed in the final paragraph this page), and we incorporated that forecast of construction jobs into our employment model. See the basic industries graph on page 19 and the construction graph to follow.

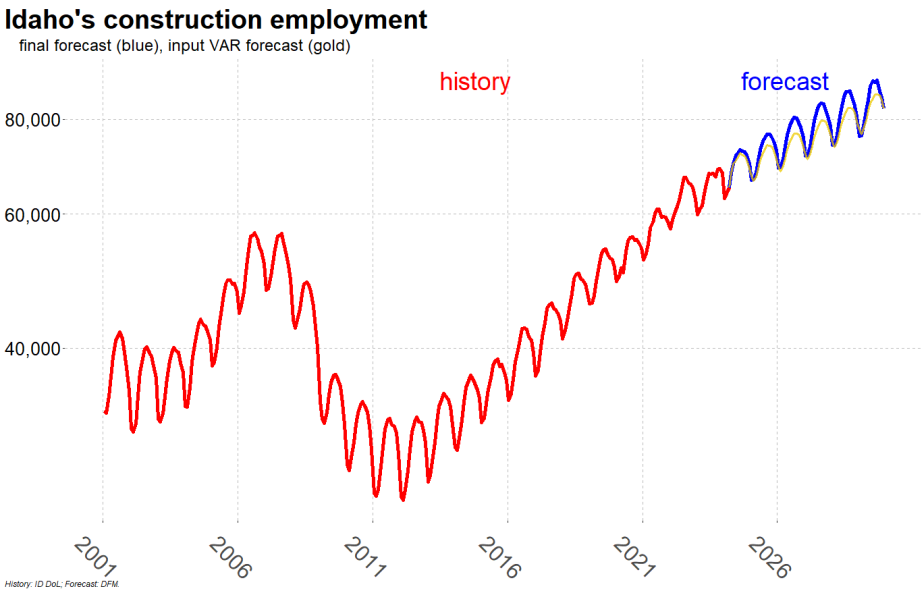
We are becoming familiar with the permit values data. It is expected that within one-to-two editions of this publication, forecasts of that may begin being incorporated into our output. In the interim, preliminary forecasts of permit values have been used to aid in the production of our construction jobs forecast. There is an appeal to using permit values — a simple equation structure produced a reliable seasonal pattern for construction jobs and an overall trajectory that reflects the strength of this expanding sector within the Idaho economy.

We include one last look at the single-family permit values and their use. Our default equation for construction jobs in the state uses nine variables. These include employment in the sector in the US, the not seasonally adjusted U3 unemployment rate, personal consumption expenditures inflation, productivity measures, dummy variables (which are like on-off switches for months), and long lags (up to twelve months) of employment in the construction and the manufacturing sectors in Idaho. The VAR method also yields a forecast of construction jobs in the state, using an intercept, one month's lag, and one other variable—single-family permit values; being a









VAR (V for "vector"), it links construction jobs and sales tax history. The two outputs for construction jobs are shown here. The simplification in equation structure certainly has appeal. The final forecast (blue) is a weighted average of that VAR prediction (gold) and the nine-variable default prediction.

Forecast analysis

Forecast comparison. The forecast from Moody's continues to evolve modestly.

US forecasts. The outlook for the US is for slightly less employment than envisioned in April. This takes into account an indicated revisions by the Bureau of Labor Statistics.[14] By the end, real GDP is inbetween what was forecast in January and later in April.

Jul. '24 forecast		**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
GDP	b (2017) $	22,377	22,896	23,286	23,719	24,239	24,813	25,388
P. income	b $	22,961	24,043	25,072	26,150	27,316	28,582	29,887
Population	m	335	337	338	339	340	342	343
Nonfarm	m ct.	156	159	160	160	161	161	162
Wages	b $	11,798	12,388	12,956	13,469	14,001	14,559	15,136
Apr. '24 forecast		**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
GDP	b (2017) $	22,380	22,960	23,340	23,780	24,300	24,870	25,440
P. income	b $	22,980	24,110	25,130	26,210	27,380	28,630	29,920
Population	m	335	337	338	339	340	342	343
Nonfarm	m ct.	156	158	159	160	161	161	162
Wages	b $	11,820	12,470	13,030	13,550	14,090	14,650	15,230
Jan. '24 forecast		**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
GDP	b (2017) $	22,340	22,710	23,100	23,620	24,180	24,770	25,340
P. income	b $	23,010	24,080	25,070	26,170	27,360	28,610	29,890
Population	m	335	337	338	339	341	342	343
Nonfarm	m ct.	156	157	158	158	159	160	160
Wages	b $	11,830	12,480	13,010	13,530	14,070	14,630	15,210

The outlook in the table is put into graphical context via GDP in our plot on page 10.

[14] May revised down March and April; June revised down April and May; July revised down May and June. Despite these downward revisions, all months thus far in 2024 show net jobs gains.

ID forecasts. Idaho's forecast is showing resilience. Population forecasts have consistently shown that Idaho should be crossing the 2 m person level late this calendar year.

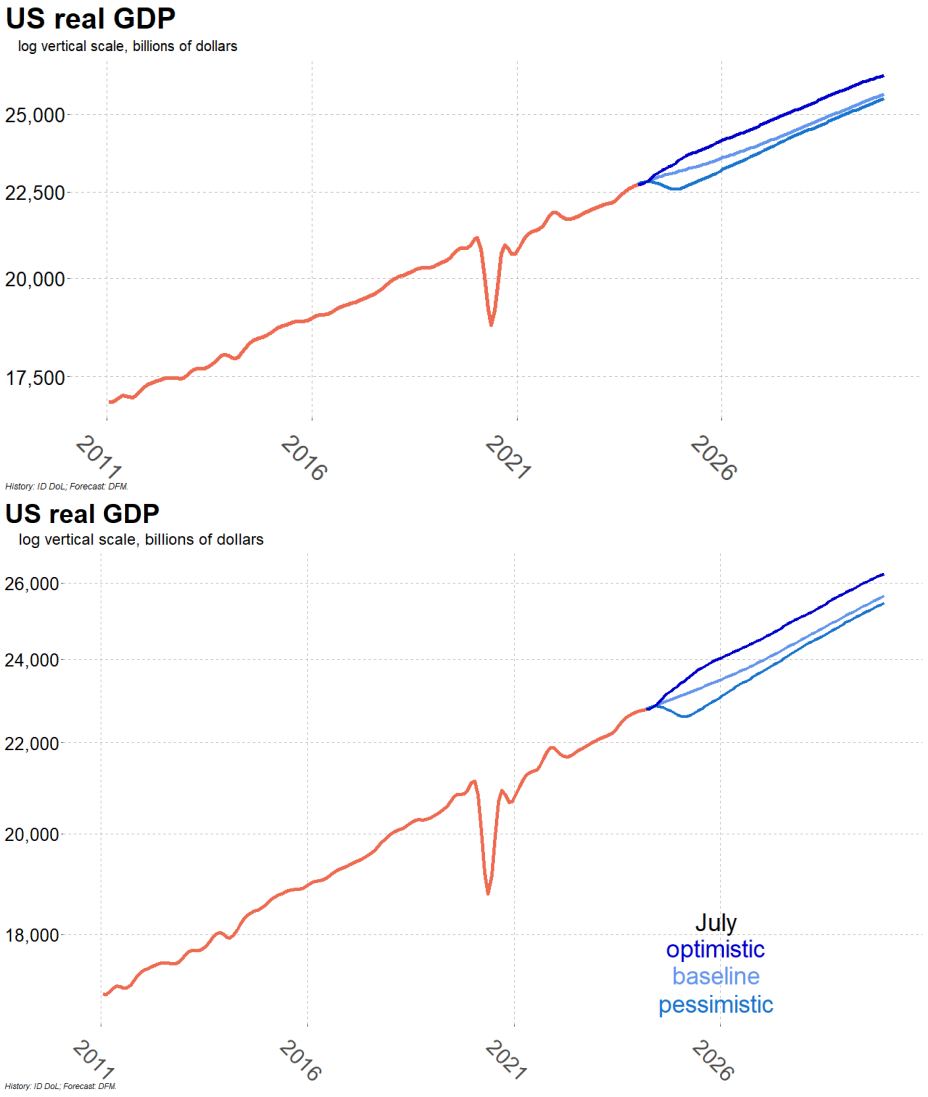
Jul. '24 forecast		**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
P. income	$ m	115,750	120,575	126,639	134,344	142,160	150,626	159,616
Wages	$ m	50,843	54,349	58,040	61,309	64,526	67,761	71,207
Population	ct	1,964,726	1,991,425	2,018,403	2,044,996	2,072,399	2,100,652	2,129,620
Nonfarm	jobs	818,518	840,373	860,568	876,062	892,089	908,773	925,438
Apr. '24 forecast		**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
P. income	$ m	115,989	119,352	127,203	134,696	142,130	150,133	158,693
Wages	$ m	51,051	54,567	58,339	61,798	65,347	69,056	73,105
Population	ct	1,964,726	1,992,911	2,019,231	2,045,836	2,073,301	2,101,656	2,130,765
Nonfarm	jobs	818,458	846,999	864,081	879,665	896,095	913,435	931,017
Jan. '24 forecast		**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	
P. income	$ m	114,900	122,776	129,867	137,495	145,156	153,868	
Wages	$ m	51,170	55,026	58,604	61,994	65,546	69,379	
Population	ct	1,988,810	2,008,714	2,038,713	2,062,648	2,081,655	2,098,946	
Nonfarm	jobs	843,117	877,558	901,856	920,909	936,845	952,591	
Oct. '23 forecast		**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	
P. income	$ m	116,117	123,436	131,626	140,982	150,957	161,954	
Wages	$ m	51,377	55,873	60,432	65,199	70,234	75,673	
Population	ct	1,966,398	1,996,663	2,026,390	2,051,878	2,073,376	2,093,516	
Nonfarm	jobs	851,065	878,787	904,572	930,874	957,266	984,377	

Graphical context for the revision to wages is provided on page 9. Various subsectors of the total Idaho nonfarm jobs market are graphically shown in our labor market data subsection beginning on page 18. The prior, April, forecast is shown in gold while the current, July, forecast is shown in blue. The most notable revision is within manufacturing, although we point out that the scale of the graph for that is much smaller than for services or trade, two other subsectors detailed graphically within that subsection.

Baseline is the median forecast for Moody's. We discuss an upside as well as a downside case.

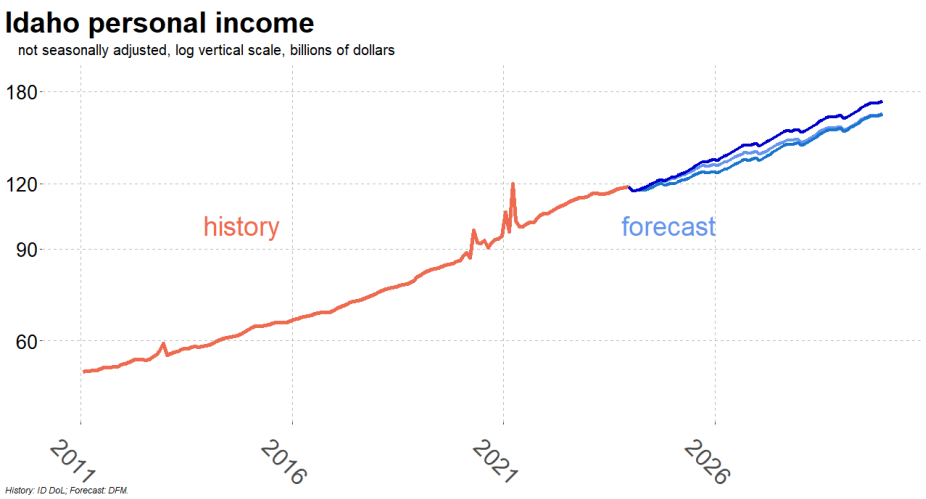
Alternative forecasts.

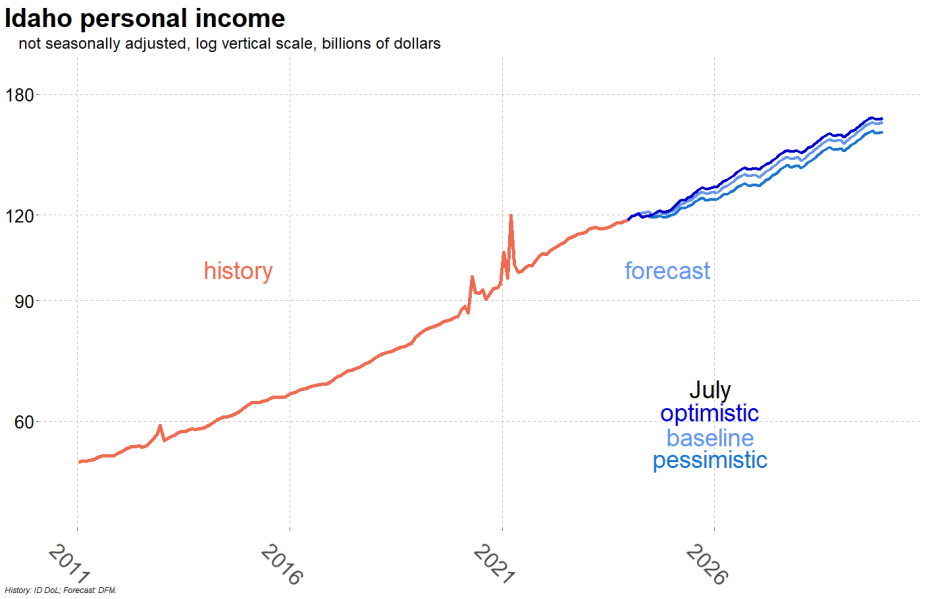
US trajectories. We give an indication of the range of real GDP scenarios envisioned by Moody's as the most likely scenarios on which to plan. The first graph shows what was envisioned in April. The second one shows July's scenarios. Note that the downside scenario nearly recovers GDP from the baseline by the close of the forecast horizon, though this is more pronounced in the April output than in the July output. The upside scenario has a consistent lead over the baseline's GDP in both readings from Moody's.



As is typical of these scenarios, Moody's upside is the 10-percentile upside. Thus of the range of scenarios Moody's sees as plausible, 10 percent will beat this upside one in terms of growth, but 90 percent will not. For the downside scenario, the percentile is the 75th. Thus only 25 percent of the plausible scenarios result in less growth than the downside case indicated here.

Typically, to achieve a downside, a mild recession is envisioned by the firm. As is often the case, this (with a delay) causes the Federal Reserve to react through interest rates, lowering them to counter the downturn. Typically, to achieve an upside, enhanced productivity is envisioned. Root causes for that enhancement are often left ambiguous. An understanding, though, can come from better matching of employers and employees, and greater acceptance and use of technologies by industry.





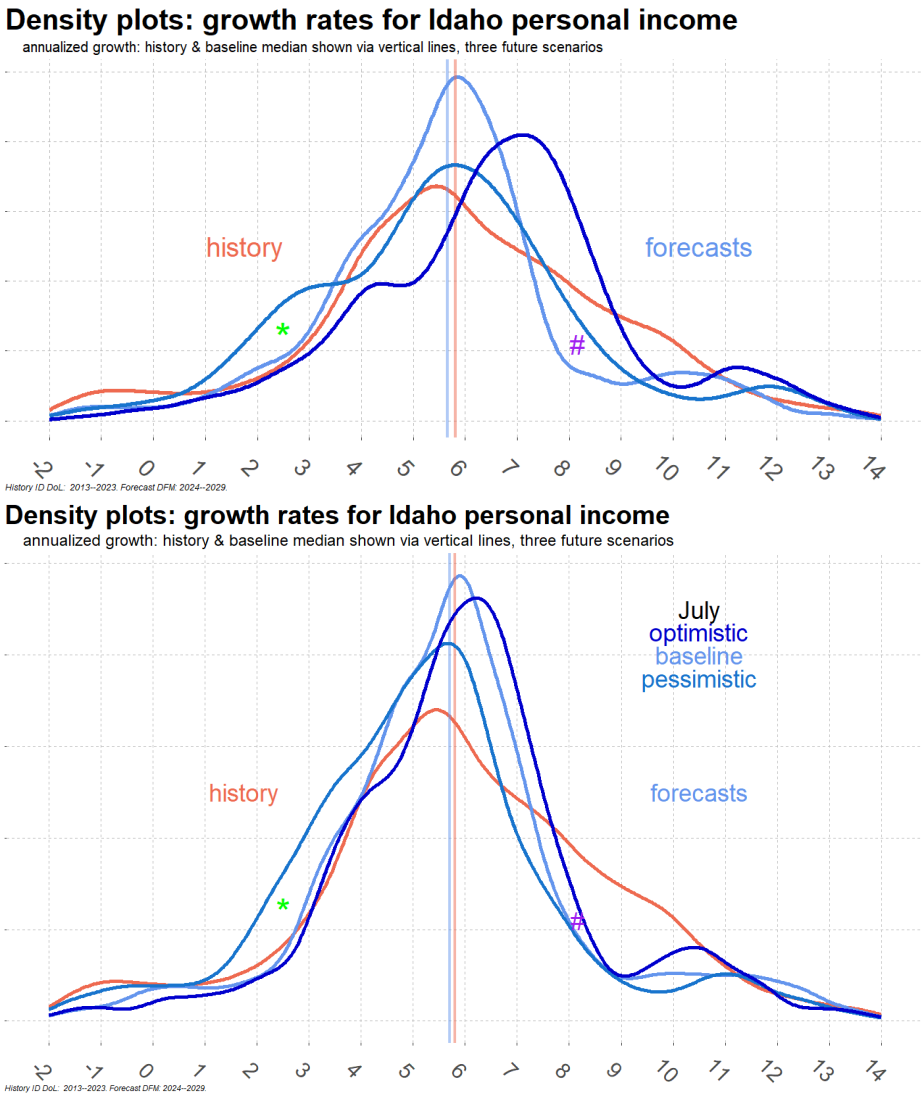
Idaho trajectories. In considering the baseline, upside 10th percentile, and downside 75th percentile national forecasts within the Idaho economic model, we have the following, showing first what was seen in April, and second what was seen in July. The step-off in April was a bit abrupt for the forecast portion. That appears to be better handled in the July edition. The other improvement in this latest forecast is that the baseline income trajectory hews closer to the optimistic income trajectory. Recent history in Idaho suggest that this is most often the case.

In the accompanying table, we see that there is not a lot of variation in housing stock by the end of the forecast period, though the routes to that end do vary each year. The differences in nonfarm jobs propagate through the wage bills. While employment is expected to be over 97 thousand jobs higher at the close of the forecast, total wages paid are expected to have grown by at least $18 billion per year.

Idaho		2022	2023	2024	2025	2026	2027	2028	2029
Nonfarm jobs	baseline	798,120	818,520	840,370	860,570	876,060	892,090	908,770	925,440
	optimistic	798,120	818,520	848,470	872,000	893,020	912,440	931,520	950,540
	pessimistic	798,120	818,520	834,630	839,550	858,430	878,930	898,390	916,350
wages, m $ (ID DoL)	baseline	43,521.0	46,316.8	50,000.6	53,520.9	56,669.7	59,762.8	62,874.5	66,196.8
	optimistic	43,521.0	46,316.8	50,262.1	54,484.7	58,413.7	62,316.4	66,341.4	70,716.7
	pessimistic	43,521.0	46,316.8	49,776.0	52,600.2	55,647.6	58,638.5	61,454.7	64,449.8
Housing stock	baseline	782,890	803,750	822,190	841,550	862,160	884,660	908,880	934,820
	optimistic	782,890	803,750	821,730	839,990	860,320	882,500	906,520	932,240
	pessimistic	782,890	803,750	821,730	840,150	861,050	883,830	908,150	934,040

We also note differences in the densities for personal income growth between the April edition (top graph) and the July one. The concentration of peaks in the densities is much greater in the July forecast when compared with the April one. Now median growth is expected at 5.70 percent in the baseline, with the optimistic version at 5.93, and the pessimistic version at 5.16. The total spread is thus less than 0.8 percentage points. In the prior edition the total spread was 1.1 percentage points.

The shoulder region shown with the green * again (in the lower, July graph) shows that the pessimistic case expects growth in the 1–4 percent range more often than the baseline. Previously that concentration was in the 1–3 percent range (in the top, April graph). The region labeled by the purple # (in the top, April graph) was showing growth rates in the pessimistic case would have had a better chance of being in the 7–9 percent range than the baseline. That region has disappeared between the pessimistic and baseline cases in the lower (July) forecast. The optimistic case still retains the higher likelihood of growth in the 6.5–8.5 range than the baseline does, though. That is what the purple # indicates in the lower (July) density graph.



We are pleased to see better step-off of the personal income trajectories between the historical record and the forecast portion within the July data. That is a small indication of better stability within the modeling of Idaho's economy. A larger indication of that stability is the coherence of the density curves in the three scenarios for July. Having peak likelihood of personal income growth center near 6 percent in all three cases reinforces that as the likely outcome across the forecast horizon. Though the median growth expected in the baseline did not differ much (just

below 6 percent in both April and July), we find that the model offers greater confidence in that prediction within this edition because the three scenarios more closely agree, as shown by their density plots.

Look ahead. The economic forecast presented here is the basis for the August version of the general fund revenue forecast. This is generally discussed in the August edition of the General Fund Revenue Report. The revisions to the jobs outlook, the wage bill outlook, and the housing construction market within Idaho between the April and July data are not negligible, but they are modest enough that we can characterize likely changes to the revenue forecast as being driven by revenue data primarily. Thus, the most important factor expected to impact the revenue forecast released in January will be the collections reported through the General Fund Revenue Reports issued in the intervening months. Those reports can be found at this page on the DFM website.

Appendix

US Macroeconomic Model by Moody's Analytics

Moody's model is a structural model based upon the IS-LM demand model and the Phillips curve for supply. It has about 2,300 variables forecast in their macroeconomic model, with more than 9 in 10 determined within the model (i.e., endogenously, rather than exogenously, or external to the model.) The firm also characterizes the model as a Keynesian model, with short-term fluctuations largely driven by demand. The firm indicates that substantial shocks can take up to two years to unwind back to an equilibrium path.

There are some particular variables which are central in the model. Moody's says:

> The federal funds rate's effect in the model is systemic. It affects the yield curve, which is critical to consumer spending and business investment. Therefore, it affects real GDP growth, the labor market, and inflation.

To illustrate why shocks may take time to dissipate in the model, Moody's also indicates:

> Monetary policy operates with a lag in the model. Eventually the model's inflation and unemployment rate forecasts return to equilibrium, and the federal funds rate follows.

Monetary policy includes setting and adjusting the federal funds rate, but it also includes other tools that the Federal Reserve has. A recent example of this has been both Quantitative Easing (during the acute phase of the pandemic), and its opposite, Quantitative Tightening (during 2022–present).

Moody's organizes its model into blocks: These include

(1) Consumption through consumer spending
(2) Investment
(3) International trade[15]
(4) Fiscal policy
(5) Supply (labor force potential, for example)
(6) Inflation
(7) Monetary policy and its transmittal
(8) Personal Income
(9) Corporate income
(10) Labor markets (actual employment by sector)
(11) Housing

Moody's provides a detailed look at parts of each of these blocks in their model. Doing so takes the firm 25+ pages. To not extend the length of this publication, we will take only a couple of these for further discussion. The few we do are quite parallel to the Idaho economic model.

Moody's indicates that their model is anything but static, much as the US economy.

[15] Moody's emphasises trade in their model.

> Rarely does a month go by when no changes are made to the model. Equations that are no longer performing well are re-specified, and variables are occasionally added to the model as more data become available or the dynamics of the economy change.

Their wording here also applies to the Idaho economic model.

5 Supply means the long-term economic potential of the US. It is goverened by innate parts of the economy, including population forecasts. As we have learned, it is difficult to find labor without having a population of workers appropriate for the labor, in location, age, skill, and desire to work. Moody's says;

> Labor force supply is a key determinant of potential GDP, which largely depends on demographics. Population is estimated based on Census Bureau birth and death rates and immigration rates that are determined by the economic performance of the U.S. relative to the rest of the world.

Here we see a couple of potential exogenous variables in the Moody's model, namely the data coming from Census Bureau estimates. We also see that each block can and does interact with other blocks in the Moody's model: here international trade interacts with the population portion of the supply block though the strength of the immigration draw that the US economy represent, or will represent in the future.

Another input in the potential labor force is an estimate of what is called the Non-Accelerating Inflation Rate of Unemployment (NAIRU). This concept is a Phillips curve one: if unemployment rates are too low, inflation is expected to not only be present, but to increase in rate. Such a situation is one that the Federal Reserve works to prevent. One of its two charges by Congress is stable prices; that is, the Fed must not allow accelerating inflation to persist. Thus the NAIRU is important for understanding potential labor force; it is not as simple as computing the 16–64 year-olds in the US. NAIRU is another example of an exogenous variable. In this case:

> We use the [Congressional Budget Office] CBO's long-term NAIRU forecast and make that variable exogenous in our model. We then specify an error correction model to predict the value of short-term NAIRU.

This also indicates that parts of Moody's model may have equations of varying types. We have already seen that Moody's employs demographic models to estimate population. These are different from the Ordinary Least Squares (OLS) equations, which dominate the Labor block 10 of Moody's model.

8 The Personal Income block is illustrative of the pervasiveness of Bureau of Economic Analysis data organization across almost all economic forecasts. Principal parts are wage and salaries, supplements to wages and salaries (that is the BEA name; largely this is benefits such as health insurance), dividends, interest, and rent (modeled separately), and proprietors' income.

> Individual wage and salary categories are modeled as functions of industry employment, industry average hourly earnings, and a broad measure of hours worked.

The personal income block certainly interacts with the labor market block 10. Another interaction is present with the Inflation block 6. While industry average hourly earnings are used for each industry, behind the scenes is average hourly earnings in all private industries. Forecasting that broad measure is "the most important wage equation in the macroeconomic model," though Moody's makes this statement within their discussion of the Employment Cost Index, in order to understand CPI inflation.

Idaho Economic Model. The Idaho Economic Model (IEM) is an income and employment-based model of Idaho's economy. The Model consists of a simultaneous system of linear regression equations.

These have historically been estimated at the quarterly frequency as that is the frequency of data provided by IHS Markit (our prior provider of the US forecast) as well as Moody's (our current provider of the US forecast). Some of the source data is available at the monthly frequency. Examples of this include personal income for the US (source: BEA), inflation as measured by the Consumer Price Index (CPI inflation, source: BLS), and local employment (source: Idaho Department of Labor — available in quarterly batches of monthly measurement). We are now running parallel monthly frequency level. Where source data is available at the monthly level, it is used[16] and where it is not readily available for our own collection, the monthly version from Moody's is used. We have indicated[17] an example where the monthly Moody's data is available as is the original source data, and it is visible that there is a slight distinction between the two.

The primary exogenous variables are obtained from the national forecast provider (now Moody's). Endogenous variables are forecast at the state level.

The focal point of the IEM is Idaho personal income, which is given by the identity:

> **personal income = wage and salary payments + other labor income + farm proprietors' income + nonfarm proprietors' income + property income + transfer payments - contributions for social insurance + residence adjustment.**

Except for farm proprietors' income and wage and salary payments, each of the components of personal income is estimated stochastically by a single equation. Farm proprietors' income and wage and salary payments each comprise sub-models containing a system of stochastic equations and identities.

The farm proprietor sector is estimated using a sub-model[18][19] consisting of equations for crop marketing receipts, livestock marketing receipts, production expenses, inventory changes, imputed rent income, corporate farm income, and government payments to farmers. Farm proprietors' income includes inventory changes and imputed rent, but this component is netted out of the tax base.

At the heart of the IEM is the wage and salary sector, which includes stochastic employment equations for North American Industry Classification System employment categories (NAICS). Conceptually, the employment equations are divided into basic and domestic activities. The basic employment equations are specified primarily as functions of national demand and supply

[16] the quarterly values recorded by the US forecast provider have always been the average values for the corresponding months

[17] see the graph on page 10

[18] As the exogenous variables for the farm model are only available at the annual frequency, the farm model is now computed at that frequency, and monthly values are interpolated from these. The source for the exogenous regressors in the farm model is the FAPRI institute of the University of Missouri, Columbia.

[19] The US Bureau of Economic Analysis has a note indicating that farm income data at the state level is likely to be discontinued; see BEA discontinuation of SAINC45 .

variables. Domestic employment equations are specified primarily as functions of state-specific demand variables. Average wage rates are estimated for each of these employment categories and are combined with employment to arrive at aggregate wage and salary payments.

The demographic component of the model is used to forecast components of population change and housing starts. Resident population, births, and deaths are modeled stochastically. Net migration is calculated residually from the estimates for those variables. Housing starts are divided into single and multiple units. We model housing starts on permits based upon equations estimated for the Western US, and for completions upon starts in a similar manner. These are then used to forecast housing stock, which is also estimated by the US Census Bureau. In this last step, we have a check on our housing model.

The output of the IEM (i.e., the forecast values of the endogenous variables) is determined by the parameters of the equations and the values of exogenous variables over the forecast period. The values of equation parameters are determined by the historic values of both the exogenous and endogenous variables. IEM equation parameters are estimated using the technique of ordinary least squares. Model equations are occasionally re-specified in response to the dynamic nature of the Idaho and national economies. Parameter values for a particular equation (given the same specification) may change as a result of revisions in the historic data or a change in the time interval of the estimation. In general, parameter values should remain relatively constant over time, with changes reflecting changing structural relationships.

Like in Moody's US economic model, most equations are specified in log form. This is generically

$$\log(y) = c_0 + c_1 \cdot \log(x_1) + \cdots + c_n \cdot \log(x_n)$$

which means that

$$y = e^{c_0} \cdot x_1^{c_1} \cdots x_n^{c_n} .$$

These mathematical forms are sufficient to enable good fits of the data without overly complicated equations. This helps to avoid "over-fit", which can precipitate small changes of the inputs redirecting the output in unreasonable directions.

While the equation parameters are determined by structural relationships and remain relatively fixed, the forecast period exogenous variable values are more volatile determinants of the forecast values of endogenous variables. They are more often subject to change as expectations regarding future economic behavior change, and they are more likely to give rise to debate over appropriate values. As mentioned above, the forecast period values of exogenous variables are primarily obtained from Moody's US macroeconomic models.

Since the output of the IEM depends in large part upon the output of the US model, an understanding of the US model, its input assumptions, and its output is useful in evaluating the results of the IEM's forecast. The assumptions and output of the US model are discussed in the National Forecast section, and a discussion of the details of the IEM build and of the Moody's follows.

Idaho Time Series Model. The Idaho Time Series Model (ITS)[20] is a new numeric model of Idaho's economic activity. The model consists of sequential equations solved in modules with dependencies such that downstream modules can rely on data forecasted in earlier modules. The regression equations are estimated using time series forecasting techniques covered by the R 'seasonal' package. The package uses the X-13 ARIMA-SEATS method to understand the typical monthly or quarterly trend from data before creating a forecast. The method is a joint development by the US Census Bureau, Stats Canada, and the Bank of Spain. ARIMA models are time-series models, which means they look to prior measurements of a variable in order to understand subsequent measurements of that *same* variable.[21]

The guiding principal of the time series model is to let the data speak for itself and involve exogenous regressors sparingly. Several equations in the model, such as the adult share of the population, are computed exclusively as ARIMAs with no exogenous regressors. Fewer than five equations in the model use more than two exogenous regressors. Time series models tend to produce accurate forecasts, but without the linkages of multiple regression models like the IEM. For time series forecasts it can be difficult to explain why a forecast is evolving in a particular way.

The first module estimates monthly values for Idaho births, deaths, and net migration and combines these to get a measure for monthly change in population. This contrasts with the IEM which treats migration as a residual. The only exogenous regressors used in this portion of the ITS model are mortgage rates, the US unemployment rate, a dummy for COVID-19, and Idaho housing completions, which are provided by Moody's.

The population estimate feeds into the second module, which then estimates values for the monthly adult population, labor force, and employed persons before estimating monthly levels of employment across the standard employment sectors into which the BEA divides the US economy. To do so, this second module begins by using the population number to create forecasts of the total number of adults, the size of the labor force, and then the number of employed persons.[22] These forecasts rely on Local Area Unemployment Statistics (LAUS, a BLS program) numbers.

Once the labor force is understood, the second module continues by using separate regressions for each major NAICS sector, this time using data from the quarterly Current Employment and Wages (QCEW, another BLS program). An "other" category trues these values up to the total number of employed (since LAUS and QCEW use different definitions). This portion of the

[20] The ITS was pioneered by Matthew Hurt; it has been used for the past year+ in forecasting revenue in a blended model with the IEM. Further integration with this report is the next aim.

[21] An example may be illustrative: an ARIMA forecast of housing would look at prior housing permit activity to predict future housing permit activity; a general regression analysis might look towards population trends to predict future housing permit activity. Both can have merits, and a combination of the methods is often used, though one or the other may be the dominant driver in any particular equation analysis, say the equation analysis of housing permits. The population trends in the second approach are an example of an exogenous regressor for housing starts — they are variables which can be supplied externally from the internal computations of the housing permit equation.

[22] Once the employed number and the labor force number are known, the unemployment rate is easily found: the difference between these gives the unemployed count, and dividing by the labor force number gives the unemployment rate.

second module, focusing on employment categories, uses mortgage rates, the US unemployment rate, the US labor force participation rate, the federal funds rate, and CPI as exogenous regressors. However, each individual regression relies at most on two of these exogenous regressors.

The third model estimates wage rates and wagebills for each of the NAICS categories. The IEM and ITS dis-aggregate labor markets in a similar manner, although the ITS has a finer breakdown. One example is the commonly grouped categories such as 22, 48, and 49 (utilities, and transportation sectors), which the ITS keeps fully separate. The principal data for employment and wages come from the Quarterly Census of Employment and Wages (QCEW). The total QCEW wagebill is the ultimate target, as it is a vital exogenous regressor used in the subsequent personal income and GDP modules.

To get to that total QCEW wagebill, separate wagebills for each NAICS category are computed. These wagebills come about as the product of wage rates and employment numbers. Wage rates are estimated via time-series regression for each NAICS category using the unemployment rate in Idaho and the corresponding national wagerates for each NAICS sector.

The first modules all run on monthly data. If exogenous data come from Moody's on a quarterly basis, the ITS first smooths these data to monthly values and then performs the forecast. The personal income and GDP modules rely on quarterly data. When data is imported from earlier modules in the ITS, these data are monthly, so both the personal income and the GDP modules average the monthly data to obtain quarterly data, and these two modules are run. Currently the GDP module is only for state-level real GDP and only uses the total wagebill as an exogenous regressor. The personal income module forecasts many components of personal income and uses the total wagebill in addition to some of the previously described exogenous regressors.

Variables. It is likely that the choice of variables will change slightly across the next two years. Partly this may reflect removal of what amount to essentially duplications. Partly this may reflect better integration of the components of the model; like Moody's US model, the Idaho economic model is structured in modules or blocks.

Endogenous variables: These are computed within the Idaho economic model.

id_pi	Idaho personal income
id_supp	Idaho supplementary income
id_dir	Idaho dividends, interest, and rent
id_nonfarm_prop	Idaho nonfarm proprietors' income
id_transfer	Idaho transfer payments
id_ra	Idaho residence adjustment
id_si	Idaho social insurance
id_e1133	Idaho employment in wood products industries
id_mwr1133	Idaho monthly wage rates in wood products industries
id_mwb1133	Idaho monthly wage bill in wood products industries
id_e21	Idaho employment in mining
id_mwr21	Idaho monthly wage rates in mining
id_mwb21	Idaho monthly wage bill in mining
id_e22	Idaho employment in utilities
id_mwr22	Idaho monthly wage rates in utilities
id_mwb22	Idaho monthly wage bill in utilities
id_e23	Idaho employment in construction
id_mwr23	Idaho monthly wage rates in construction
id_mwb23	Idaho monthly wage bill in construction
id_e31	Idaho employment in food manufacturing
id_mwr31	Idaho monthly wage rates in food manufacturing
id_mwb31	Idaho monthly wage bill in food manufacturing
id_e32	Idaho employment in other nondurable manufacturing
id_mwr32	Idaho monthly wage rates in other nondurable manufacturing
id_mwb32	Idaho monthly wage bill in other nondurable manufacturing
id_e33	Idaho employment in durable manufacturing
id_mwr33	Idaho monthly wage rates in durable manufacturing
id_mwb33	Idaho monthly wage bill in durable manufacturing
id_e42	Idaho employment in wholesale trade
id_mwr42	Idaho monthly wage rates in wholesale trade
id_mwb42	Idaho monthly wage bill in wholesale trade
id_e44	Idaho employment in retail trade
id_mwr44	Idaho monthly wage rates in retail trade
id_mwb44	Idaho monthly wage bill in retail trade

id_e45	Idaho employment in other retail trade
id_mwr45	Idaho monthly wage rates in other retail trade
id_mwb45	Idaho monthly wage bill in other retail trade
id_e48	Idaho employment in transportation
id_mwr48	Idaho monthly wage rates in transportation
id_mwb48	Idaho monthly wage bill in transportation
id_e49	Idaho employment in delivery and warehousing
id_mwr49	Idaho monthly wage rates in delivery and warehousing
id_mwb49	Idaho monthly wage bill in delivery and warehousing
id_e51	Idaho employment in information
id_mwr51	Idaho monthly wage rates in information
id_mwb51	Idaho monthly wage bill in information
id_e52	Idaho employment in finance and insurance
id_mwr52	Idaho monthly wage rates in finance and insurance
id_mwb52	Idaho monthly wage bill in finance and insurance
id_e53	Idaho employment in real-estate
id_mwr53	Idaho monthly wage rates in real-estate
id_mwb53	Idaho monthly wage bill in real-estate
id_e54	Idaho employment in professional services
id_mwr54	Idaho monthly wage rates in professional services
id_mwb54	Idaho monthly wage bill in professional services
id_e55	Idaho employment in management
id_mwr55	Idaho monthly wage rates in management
id_mwb55	Idaho monthly wage bill in management
id_e56	Idaho employment in administrative services
id_mwr56	Idaho monthly wage rates in administrative services
id_mwb56	Idaho monthly wage bill in administrative services
id_e61	Idaho employment in private education
id_mwr61	Idaho monthly wage rates in private education
id_mwb61	Idaho monthly wage bill in private education
id_e61gsed	Idaho employment in state eduction
id_mwr61gsed	Idaho monthly wage rates in state eduction
id_mwb61gsed	Idaho monthly wage bill in state eduction
id_e61gled	Idaho employment in local education
id_mwr61gled	Idaho monthly wage rates in local education
id_mwb61gled	Idaho monthly wage bill in local education

id_e62	Idaho employment in private healthcare
id_mwr62	Idaho monthly wage rates in private healthcare
id_mwb62	Idaho monthly wage bill in private healthcare
id_e62gshl	Idaho employment in state healthcare
id_mwr62gshl	Idaho monthly wage rates in state healthcare
id_mwb62gshl	Idaho monthly wage bill in state healthcare
id_e62glhl	Idaho employment in local healthcare
id_mwr62glhl	Idaho monthly wage rates in local healthcare
id_mwb62glhl	Idaho monthly wage bill in local healthcare
id_e62gvfhl	Idaho employment in federal healthcare
id_mwr62gvfhl	Idaho monthly wage rates in federal healthcare
id_mwb62gvfh	Idaho monthly wage bill in federal healthcare
id_e71	Idaho employment in hospitality
id_mwr71	Idaho monthly wage rates in hospitality
id_mwb71	Idaho monthly wage bill in hospitality
id_e72	Idaho employment in arts
id_mwr72	Idaho monthly wage rates in arts
id_mwb72	Idaho monthly wage bill in arts
id_e81	Idaho employment in other services
id_mwr81	Idaho monthly wage rates in other services
id_mwb81	Idaho monthly wage bill in other services
id_e92gsad	Idaho employment in state administration
id_mwr92gsad	Idaho monthly wage rates in state administration
id_mwb92gsad	Idaho monthly wage bill in state administration
id_e92glad	Idaho employment in local administration
id_mwr92glad	Idaho monthly wage rates in local administration
id_mwb92glad	Idaho monthly wage bill in local administration
id_e92gvf	Idaho employment in federal administration
id_mwr92gvf	Idaho monthly wage rates in federal administration
id_mwb92gvf	Idaho monthly wage bill in federal administration
id_etribes	Idaho tribal employment
id_mwrtribes	Idaho monthly wage rates for tribal employment
id_mwbtribes	Idaho monthly wage bill for tribal employment
idp_sf	Idaho single-family housing permits
idp_mf	Idaho multi-family housing permits
ids_sf	Idaho single-family housing starts
ids_mf	Idaho multi-family housing starts
idc_sf	Idaho single-family housing completions
idc_mf	Idaho multi-family housing completions

wp_sf	western single-family housing permits
wp_mf	western multi-family housing permits
ws_sf	western single-family housing starts
ws_mf	western multi-family housing starts
wc_sf	western single-family housing completions
wc_mf	western multi-family housing completions
m_idhstk	monthly Idaho housing stock
id0npt	Idaho population
id0nb	Idaho births
id0nd	Idaho deaths
id0nmg	Idaho net migration
id_cow	Idaho income from cattle
id_crop	Idaho income from crops
id_dairy	Idaho income from dairy
id_farm_chem	Idaho farm expenditures on chemicals
id_farm_exp	Idaho farm expenditures
id_farm_gvt	federal transfers to Idaho farms
id_farm_other	other farm income
id_farm_petro	Idaho farm expenditures on fuels
id_farm_prop	Idaho farm proprietors' income
id_farm_receipts	total Idaho farm receipts
id_feed	Idaho farm expenditures on feed
id_hay	Idaho income from hay and related feeds
id_lvstk	Idaho income from livestock
id_seed	Idaho farm expenditures on seed
id_veg	Idaho farm income from vegetables
id_wheat	Idaho farm income from wheat
id_farm_corp	corporate farm income in Idaho
id_farm_inv	Idaho farm inventory change
us_farm_corp	corporate farm income in the US
us_farm_inv	US farm inventory change
us_cow	US farm income from cattle
us_farm_exp	US farm expenditures
us_farm_other	other US farm income
us_farm_petro	US farm expenses on fuel
us_farm_prop	US farm proprietors' income
us_farm_receipts	total US farm reciepts
us_hay	US farm income from hay and related feeds
us_lvstk	US farm income from livestock
us_veg	US farm income from vegetables
us_wheat	US farm income from wheat

Exogenous variables: These are imported into the Idaho economic model from outside sources.

cpi	consumer price index
dum_id_e1133_a	employment dummy for wood products
dum_id_e21	employment dummy for mining
dum_id_e23	employment dummy for construction
dum_id_e44	employment dummy for retail trade
dum_id_e45	employment dummy for other retail trade
dum_id_e48	employment dummy for transportation
dum_id_e49	employment dummy for delivery and warehousing
dum_id_e56	employment dummy for administration
dum_id_e61gled	employment dummy for local education
dum_id_e61gsed	employment dummy for state education
dum_id_e62glhl	employment dummy for local healthcare
dum_id_e62gshl	employment dummy for state healthcare
dum_id_e71	employment dummy for hospitality
dum_id_e72	employment dummy for arts
dum_id_farm_other	employment dummy for other farm income
dum_id_farm_prop	employment dummy for farm proprietors' income
dum_id_farm_receipts	employment dummy for total farm receipts
dum_id_lvstk	employment dummy for farm income from livestock
dum_id_mwr1133	employment dummy for woods products wage rates
dum_id_mwr23	employment dummy for construction wage rates
dum_id_mwr33	employment dummy for durable manufacturing wage rates
dum_id_mwr62	employment dummy for healthcare wage rates
dum_shift_id_farm_corp	employment dummy for corporate farm income
dum_shift_id_farm_inv	employment dummy for farm inventories
dum_shift_us_farm_corp	employment dummy for corporat farm income
ffr	federal funds rate
gdp_farm	GDP from the US farm sector
gdpr	real US GDP
hhaf	household financial assets
hhao	other household assets
ip321	industrial production index for wood products
ip322	industrial production index for paper manufacturing
ip334	industrial production index for semi-conductor industry
ip335	industrial production index for electrical equipment
jpc	personal consumption expenditure inflation

lfpr	US labor force participation rate
mf_farm_pi_af	Moody's farm personal income from all products
mf_farm_pi_lp	Moody's farm personal income from livestock
mf_gdp_farm	Moody's farm GDP
mf_idp_sf	Moody's Idaho single-family permits
mf_idp_mf	Moody's Idaho multi-family permits
mf_ppi_farm	Moody's producer price index for farm products
mf_ppi_food_feed	Moody's producer price index for farm foods and feeds
mf_ppi_metals	Moody's producer price index for metals
mf_us_mwr22	Moody's monthly wage rates in mining
mf_us_mwr23	Moody's monthly wage rates in construction
mf_us_mwr42	Moody's monthly wage rates in wholesale trade
mf_us_mwr44_45	Moody's monthly wage rates in retail trade
mf_us_mwr53	Moody's monthly wage rates in real-estate
mf_us_mwr54	Moody's monthly wage rates in professional services
mf_us_mwr56	Moody's monthly wage rates in administration
mf_us_mwr61	Moody's monthly wage rates in private education
mf_us_mwr62	Moody's monthly wage rates in healthcare
mf_us_mwr71	Moody's monthly wage rates in hospitality
mf_us_mwr72	Moody's monthly wage rates in arts
mf_us_mwr81	Moody's monthly wage rates in other services
mf_us_mwrndmf	Moody's monthly wage rates in nondurable manufacturing
mf_us_mwrtw	Moody's monthly wage rates in transportation and warehousing
mf_us_mwrgvsl	Moody's monthly wage rates in state and local government
minwage	Moody's forecast for the minimum wage
month	1–12
pmms	average 30-year mortgage rates
productivity	Moody's index for productivity
trend	an increment increasing by 1 each month
u3_nsa	the US U-3 unemployment rate, not seasonally adjusted
us_crop	US crop income
us_dairy	US dairy income
us_div_int	US dividends, interest, and rent income
us_e1133	US employment in wood products
us_e22	US utilities employment
us_e23	US construction employment
us_e42	US wholesale trade employment
us_e44_45	US retail trade employment
us_e52	US finance employment
us_e53	US real-estate employment
us_e56	US management employment

us_e61	US private education employment
us_e62	US healthcare employment
us_edmf	US durable manufacturing employment
us_egvf	US federal government employment
us_egvsl	State and local government employment across the US
us_endmf	US non-durable manufacturing employment
us_etw	US employment in transportation and warehousing
us_farm_chem	US farm expenditures on chemicals
us_farm_gvt	government transfers to US farms
us_feed	US expenditures on farm feeds
us_nonfarm_prop_mf	Moody's forecast of US nonfarm proprietors' incomes
us_pop_tot	US population
us_rent	US income from rent
us_seed	US farm expenses for seed
us_si	US social insurance
us_supp	US supplementary income
us_transfer	federal transfer payments
us_wb_tot	total wages in the US