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Forecasting the U.S. and Wisconsin Economies in 2020

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Abstract

This paper provides forecasts for the United States and Wisconsin economies in 2020. We use a mixed-frequency vector auto-regression model that has been previously applied to forecast the national economy, which we extend to also consider the state of Wisconsin. Our forecasts suggest that the long economic recovery will continue in 2020. We forecast that growth nationwide will accelerate slightly over the course of 2020, with real GDP growing around 2.5% for the year and the unemployment rate falling to about 3.3%. For the Wisconsin economy, we forecast that real GDP will grow by about 1.7% in 2020, roughly in the range of its recent performance, while the labor market will continue its recent cooling, with the unemployment rate increasing to 3.7% by the end of the year. The rising unemployment rate, coupled with a continued decline in the labor force (forecast to fall by about 1%) implies that employment growth in Wisconsin will turn negative in 2020. While there is a significant chance that growth may be slower than our median forecast, odds of a recession remain relatively low. The chance that real GDP will decline in two consecutive quarters is about 10% for the U.S. and 28% for Wisconsin. For both economies, our median forecasts for 2020 are within the range of values observed in the past few years, suggesting that, in the absence of significant shocks, both economies will continue on their trends with little chance of substantial economic downturn.

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1 Overview

This paper provides forecasts for the United States and Wisconsin economies in 2020. While increased recession fears arose in mid-2019, they abated by the end of the year as growth continued. Our forecasts suggest that the long economic recovery which began in the aftermath of the 2008 recession will continue in 2020. Overall, our forecasts suggest that the national economy will remain strong with growth gaining some steam over the course of the year. The Wisconsin economy will continue to grow at a slower pace, and the statewide labor market will continue its recent cooling. The manufacturing sector is likely to shrink both nationally and in Wisconsin. For both economies, our median forecasts for 2020 are within the range of values observed in the past few years, suggesting that, in the absence of significant shocks, both economies will continue on their trends with little chance of substantial economic downturn.

National Forecast

Our median forecasts suggest that the national economy will remain strong, and growth will even gain pace throughout 2020. Real GDP will grow by about 2.46%, fixed private investment will grow by about 4.19%, government consumption expenditures and gross investment will grow by about 2.51%, and personal consumption expenditures will grow by about 4.52%. The growth rate of government consumption expenditures and gross investment is slightly higher than the values observed in the past few years, while the growth rates of other variables are within the range of recently observed values.

As the economy grows, inflation, measured by the growth rate of price indices of personal consumption expenditures, will rise slightly from about 1.4% in 2019 to about 1.7% in 2020. The labor market will continue its record strength, with the unemployment rate falling from its already low values to record lows around 3.3% by the end of 2020, and the economy will add 2 million more nonfarm jobs. Consistent with the projections of the Federal Reserve policymakers themselves, we forecast the federal funds rate will essentially remain flat at its current value of about 1.55%. Longer-term interest rates will increase slightly and the stock market will continue to rise, but we do not expect it to repeat the rapid gains of 2019.

The growth, however, will not be evenly distributed across all sectors. In particular, we forecast that the manufacturing sector will see essentially no growth in output, and likely a slight loss of employment. Manufacturing slowed over the course of 2019, driven by a slowing global economy and increased trade frictions. While trade frictions have abated recently, this will likely not be enough to substantially boost growth overall in the sector.

There is a significant risk that the national economy may slow down, with the growth rate of real GDP dropping to about 1% and the unemployment rate rising to about 4%. However odds of a recession remain relatively low. In particular, the model forecasts that the chance that real GDP will drop in two consecutive quarters in 2020 is about 10%.

Wisconsin Forecast

For the Wisconsin economy, we forecast that real GDP will grow by about 1.74% in 2020, and personal income will increase by about 5.91%. Both of these are within the range of recent growth rates in the state. However the state labor market, which was historically tight in recent years before cooling off some in 2019 will see more cooling. Following the trend in the last few months, the unemployment rate will continue to rise to about 3.7% by the end of the year. Labor force issues remain a primary concern in the state, as the labor force in Wisconsin has grown very slowly over the past decade, and declined in recent months. We project the statewide civilian labor force to decline by about 1% in 2020, and with unemployment rising, employment growth is forecast to be negative. The housing market will remain strong, with the price index forecast to increase by about 6%.

The manufacturing sector, however, is likely to shrink. Similar to the national economy, manufacturing output in Wisconsin is forecast to remain more or less flat with a growth rate at around zero, and manufacturing employment is forecast to lose instead of adding a couple thousand jobs. Wisconsin remains more manufacturing-heavy than the nation as a whole, and the weakness in manufacturing will contribute to the cooling labor market in the state.

Like the national economy, there is also a significant risk that the Wisconsin economy will fare worse than the median forecasts: the real GDP may decline by over 1%, the unemployment rate may rise well above 4%, and there is a 28% chance that the real GDP will decline in two consecutive quarters in 2020. Because growth in Wisconsin is typically lower than nationwide, again largely due to lower labor force growth, smaller upheavals may push the state into negative territory.

Methodology

Our forecasts are based on a mixed-frequency vector auto-regression model with exogenous variables (MF-VARX). As with other VAR models used for forecasting, the MF-VARX model assumes that a variable in a given period depends on its lagged values as well as the current and lagged values of other variables. This dependence is estimated using historical data. Assuming the recent trends and relationships between economic variables at the national and state levels will continue, the estimated model is then used to forecast each variable forward. Changes in federal and state policy going forward thus only enter our forecasts to the extent that expectations of these changes are reflected in current variables. For example, expectations of future fiscal and monetary policies are priced into current financial indicators and investment decisions.

We use 18 variables for the national economy covering measures of overall economic activity, like GDP and investment, as well as measures of specific sectors like the labor market, the financial market, and the manufacturing sector. Our model for the Wisconsin economy includes 12 state-level variables with similar coverage as the national variables, which are also included and treated as exogenous to the state economy. We estimate the model for each economy using data available by January 10, 2020. With the estimated model, we forecast each variable forward to the end of 2020.

2 Model and Data

As discussed above, we use a mixed-frequency vector auto-regression model with exogenous variables (MF-VARX). A detailed description of the model can be found in Guo and Williams (2018), which uses the same model to forecast the U.S. and Wisconsin economies in 2018. Here we only describe the model briefly.

Traditional VAR models require all variables to be measured at the same frequency. For example, quarterly variables cannot be used directly in a model of monthly variables. To relax this restriction and utilize the information from variables of different frequencies for forecasting, Schorfheide and Song (2015) developed a mixed-frequency vector auto-regression (MF-VAR) model that treats a low frequency (e.g. quarterly) variable as evolving at the high frequency (e.g. monthly) but are only measured infrequently. Working with national variables only, Schorfheide and Song (2015) assume that all variables are endogenous and could affect each other. We use the same approach in our model for the national economy, but extend the original MF-VAR model to allow for exogenous variables at the national level in our model for the Wisconsin economy.

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Changes in federal and state policy going forward only enter our forecasts to the extent that expectations of these changes are reflected in current variables. For example, expectations of future fiscal and monetary policies are priced into current financial indicators and investment decisions.

Table below 1 lists the variables used in this paper. There are 18 variables for the national economy and 12 variables measuring the Wisconsin economy. For each economy, we use both measures of overall economic activity like GDP and investment and indicators for specific sectors like the labor market, the financial market, and the manufacturing sector. The variables are measured either monthly or quarterly. Most of the data are retrieved from the FRED database maintained by the Research division of the Federal Reserve Bank of St. Louis. The two exceptions are state tax collections obtained from the U.S. Census Bureau and state manufacturing employment obtained from the Quarterly Census of Employment and Wages (QCEW) of the Bureau of Labor Statistics (BLS). Another widely used source of state manufacturing employment is the Current Employment Statistics (CES), which was used in our prior forecasts for the last two years. We now use the QCEW data in light of a recent CROWE report by Williams (2019) who finds that the most recent CES data is inaccurate and significantly overstates the slowdown of manufacturing employment in states like Pennsylvania and Wisconsin. One drawback of this choice, however, is that the QCEW data is not as current as the CES.

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Table 1: Description of Variables

Variable (short name)	End	Series name in FRED
U.S.		
Real gross domestic product (gdp)	Q3	GDPC1
Fixed private investment (fpi)	Q3	FPI
Real government expenditures (gce)	Q3	GCEC1
Manufacturing real output index (outms)	Q3	OUTMS
Civilian unemployment rate (ur)	M12	UNRATE
Total nonfarm payroll employment (emp)	M12	PAYEMS
Manufacturing employment (manemp)	M12	MANEMP
Aggregate weekly hours index (hrs)	M12	AWHI
Average hourly earnings in private sector (wage)	M12	AHETPI
Average hourly earnings in manufacturing (manwage)	M12	CES3000000008
Personal consumption expenditures (pce)	M11	PCE
PCE price index (pcepi)	M11	PCEPI
PCE price index excluding food and energy (pcepilfe)	M11	PCEPILFE
Industrial production index (indpro)	M11	INDPRO
Effective federal funds rate (fedfunds)	M12	FEDFUNDS
10-year treasury bond yield (gs10)	M12	GS10
Moody's seasoned Baa corporate bond yield (baa)	M12	BAA
S&P 500 index (sp500)	M12	SP500
Wisconsin		
Real GDP (wigdp)	Q3	WIRQGSP
Manufacturing GDP (wimangdp)	Q3	WIMANRQGSP
Personal income (wipinc)	Q3	WIOTOT
All-transactions house price index (wihpi)	Q3	WISTHPI
Return on average assets for banks (wiroa)	Q3	WIROA
Tax collections (witax)	Q3	Census Bureau
Unemployment rate (wiur)	M11	WIUR
Civilian labor force (wilf)	M11	WILF
Nonfarm employment (wiemp)	M11	WINA
Manufacturing employment (wimanemp)	M6	WIMFG
Initial unemployment insurance claims (wiiclaims)	M12	WIICLAIMS
Average hourly earnings: manufacturing (wimanwage)	M11	SMU55000003000000008SA

Note. The second column (End) reports the last period (month: M or quarter: Q) when the data is available. Except for tax collections obtained from the U.S. Census Bureau and state manufacturing employed obtained from the Quarterly Census of Employment and Wages by the Bureau of Labor Statistics, all other variables are retrieved from the FRED database maintained by the Research division of the Federal Reserve Bank of St. Louis.

We estimate the model for each economy using data available through January 10, 2020. By this date, most of the quarterly variables were available until the third quarter (Q3) of 2019, most of the monthly variables at the national level were available until December (M12) 2019, and most of the monthly variables at the state level were available until November (M11) 2019.

3 Forecast for the U.S. Economy

This section reports our forecasts for the U.S. economy in 2020. Overall, the model forecasts that the national economy will continue to grow roughly in line with its performance over the last few years: real GDP will grow by 2.46%, investment will grow by 4.19%, government expenditures will grow by 2.51%, and personal consumption expenditures will grow by 4.52%. All these values are close to what they were in the last couple of years.

As the economy grows, the labor market will remain strong. The unemployment rate will continue to drop to about 3.3% by the end of the year, the economy will add about 2 million new jobs, and the average hourly earnings will increase by about 3%. Inflation, measured by the growth rate of the price index of overall personal consumption expenditures, will rise slightly from about 1.4% in 2019 to about 1.7% in 2020. We forecast the effective federal funds rate will essentially remain flat at its current value of about 1.55%, but other measures of the interest rate and the stock market will increase slightly.

The growth, however, will not be evenly distributed across all sectors. In particular, we forecast that the manufacturing sector will see essentially no growth in output and likely a slight loss of employment.

There is a risk that the economy may slow down, with the growth rate of real GDP dropping to about 1% and the unemployment rate rising to about 4%. In particular, the model forecasts that the chance that the real GDP will drop in two consecutive quarters in 2020 is about 10%.

The rest of this section discusses these forecasts in detail.

3.1 Output, Investment and Expenditures

Table 2 reports the median forecasts of year-over-year growth rates of real GDP (GDP), fixed private investment (FPI), real government consumption expenditures and gross investment (GCE), and personal consumption expenditures (PCE). Relative to 2018Q4, we forecast that real GDP in 2019Q4 will grow by about 2.28%. This growth rate will increase slightly over the course of 2020: starting from 2.29% in the first quarter, it will rise above 2.4% in the next three quarters and reach about 2.46% by the end of the year.

Table 2: Year-Over-Year Growth Rates of Selected Variables for the U.S.

Quarter	GDP	FPI	GCE	PCE
2019Q4	2.28	2.21	2.70	4.31
2020Q1	2.29	2.63	2.55	5.30
2020Q2	2.43	3.66	1.94	4.70
2020Q3	2.41	4.38	2.19	4.61
2020Q4	2.46	4.19	2.51	4.52

The slight rise in the growth of real GDP is accompanied by a similar increase in the growth of fixed private investment. Specifically, we forecast that investment will grow by

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about 2.21% in 2019Q4 relative to 2018Q4. Starting from 2.63% in 2020Q1, this growth rate will rise above 3.5% in the next three quarters and reach about 4.19% by the end of the year. The model also forecasts that the growth rate of government expenditures will be more or less flat at around 2.5%, and the growth rate of personal consumption expenditures will be roughly flat at around 4.5%.

While the median forecasts are useful, they are not informative of the potential risks that the economy may face. For this, we plot the 67% forecast intervals as the shaded areas in Figure 1. The black curve shows the historical values and our median forecasts. The red vertical line indicates December 2019, the last month when actual data is available (although not for all variables).

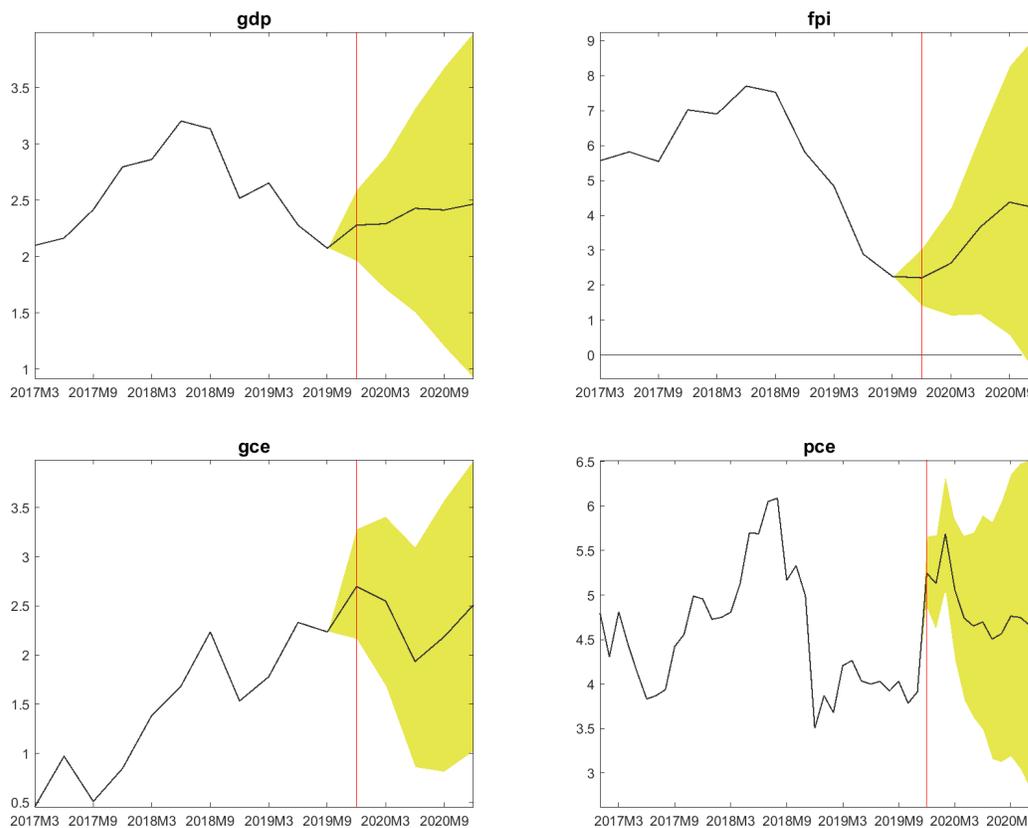


Figure 1: Year-over-year growth rates of real GDP (gdp), fixed private investment (fpi), real government consumption expenditures and gross investment (gce) and personal consumption expenditures (pce) in the U.S. The red vertical line indicates December 2019. The black curve reports the actual values when available and median forecasts otherwise. The yellow shaded area reports the 67% forecast intervals.

The model suggests the economy does face some risk: the growth rate of real GDP may drop to about 1% by the end of 2020, investment may shrink, and the growth rates of both government and personal consumption expenditures may only be half as large as the respective median forecasts. However, the chance of a recession is relatively low. One common definition of a recession is that real GDP declines in two consecutive quarters.

According to this definition, the model forecasts that the probability of a recession in 2020 is about 10%.

Figure 1 also shows that our median forecasts for 2019Q4 and 2020 are within the range of values observed in the past few years, suggesting the economy will follow its recent trend and continue to grow at a moderate rate.

3.2 Inflation

Figure 2 reports our inflation forecasts. We use two measures of inflation: the year-over-year growth rate of the price index of overall personal consumption expenditures (pcepi) and the year-over-year growth rate of the price index of personal consumption expenditures excluding food and energy (pcepilfe). Inflation has remained subdued throughout the recovery and expansion, and we project that trend to continue. With the economy continuing to grow, we forecast that the overall inflation will rise from about 1.4% in 2019 to about 1.8% in 2020, while the inflation excluding food and energy will stay at about 1.6%.

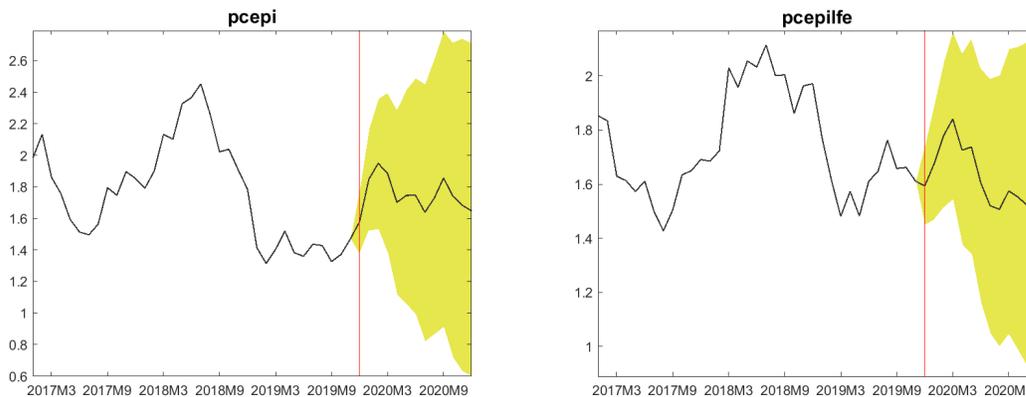


Figure 2: Year-over-year growth rates of price indices for personal consumption expenditures in the U.S: overall (pcepi) and excluding food and energy (pcepilfe). The red vertical line indicates December, 2019. The black curve reports the actual values when available and median forecasts otherwise. The yellow shaded area reports the 67% forecast intervals.

3.3 Labor Market

Figure 3 below reports our forecasts for the labor market. The first panel (ur) shows that the unemployment rate will continue to decline and reach about 3.3% by the end of the year. The second panel (emp), which reports the year-over-year change in the number of nonfarm employees, suggests the economy will add slightly more than 2 million nonfarm jobs, which is comparable to what we have seen in the last few years.

Finally, the last panel (wage) shows that the average hourly earnings in the private sector will continue to increase, rising from \$23.79 in 2019M12 to about \$24.55 in 2020M12. This represents a 3.2% increase, comparable with recent experience since 2018 but slight stronger growth than before that, when earnings growth was averaged around 2.5%.

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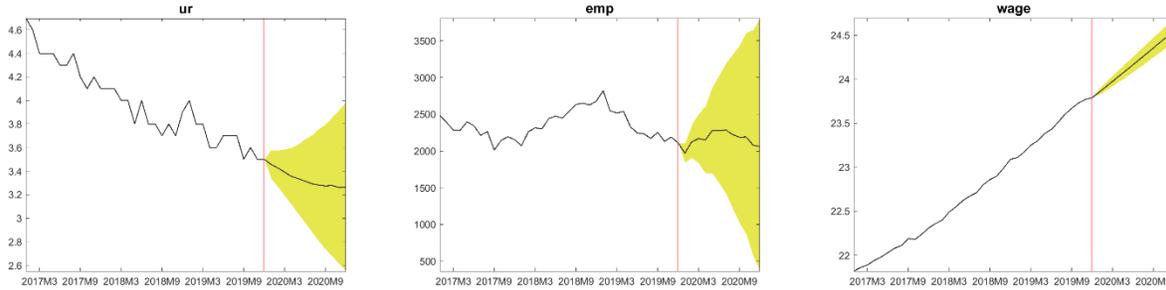


Figure 3: Labor market indicators in the U.S: the unemployment rate (ur), year-over-year growth of nonfarm employment in thousands (emp), and average hourly earnings of production and nonsupervisory employees in dollars (wage). The red vertical line indicates December, 2019. The black curve reports the actual values when available and median forecasts otherwise. The yellow shaded area reports the 67% forecast intervals.

The 67% forecast intervals shown by the yellow-shaded areas again suggest that the labor market may fare worse than implied by the median forecasts: the unemployment rate may rise to about 4%, and the economy may add much fewer nonfarm jobs.

3.4 Financial Market

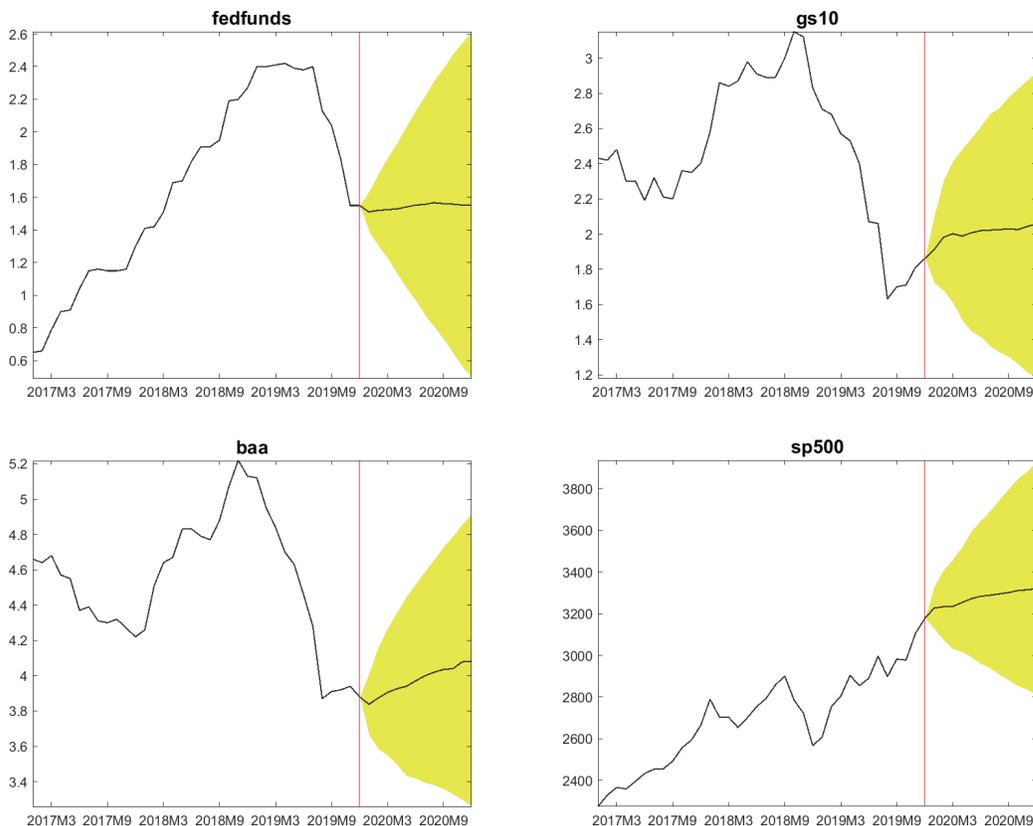


Figure 4: Financial market indicators in the U.S: effective federal funds rate (fedfunds), 10-year treasury constant maturity rate (gs10), Moody's seasoned Baa corporate bond yield (baa), and S&P 500 index (sp500). The red vertical line indicates December, 2019. The black curve reports the actual values when available and median forecasts otherwise. The yellow shaded area reports the 67% forecast intervals.

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Figure 4 plots our forecasts for the financial market. The model forecasts that the effective federal funds rate (fedfunds) will essentially remain flat at its current level of about 1.55%. This is in line with the current projections from policymakers at the Federal Reserve, who are forecasting no changes in rates during 2020.

With the economy forecast to continue to grow, other indicators will rise slightly. In particular, the 10-year treasury yield, shown in the second panel (gs10), will rise from 1.86% in 2019M12 to about 2.06% in 2020M12, and the Moody's seasoned Baa corporate bond yield (baa) will increase from 3.88% in 2019M12 to about 4.06% in 2020M12. However the increases will still leave all measures of interest rates well below the levels reached in 2019 during the Fed's tightening cycle. The stock market, as represented by the S&P 500 index in the last panel (sp500), will also rise slightly during the same period, although at a less rapid rate of roughly 5% growth as compared to the 23% gains in 2019.

3.5 Manufacturing Sector

Figure 5 plots our forecasts for the manufacturing sector. The first panel (outms) shows the year-over-year growth rate of manufacturing output. Manufacturing output slowed substantially over the course of 2019 and turned negative at the end of the year. We forecast that manufacturing output will essentially remain flat during 2020. As the growth rate of manufacturing output is lower than that of real GDP, we forecast that the manufacturing sector will continue to shrink in relative size.

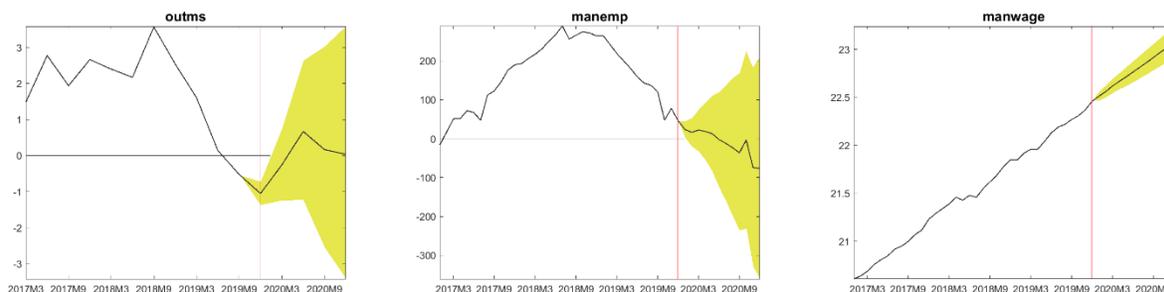


Figure 5: Indicators for the manufacturing sector in the U.S: year-over-year growth rate of real output (outms), year-over-year growth of employment in thousands (manemp), and average hourly earnings of production and nonsupervisory employees in dollars (manwage). The red vertical line indicates December, 2019. The black curve reports the actual values when available and median forecasts otherwise. The yellow shaded area reports the 67% forecast intervals

The second panel (manemp) shows the year-over-year change in manufacturing employment. The growth of manufacturing employment has been decelerating for over a year: the sector added about 46 thousand jobs between 2018M12 and 2019M12, much lower than the 264 thousand jobs added in the previous year. The model forecasts that this deceleration will continue in 2020, and the economy will start to lose a few thousand manufacturing jobs instead of adding them.

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The average hourly earnings of production and nonsupervisory employees in manufacturing (manwage) will rise slightly from \$22.46 in 2019M12 to about \$23.07 in 2020M12. This 2.7% wage increase for the manufacturing sector is lower than the 3.2% wage increase forecast for the overall economy, and it is also slightly lower than the corresponding wage increase of the sector in the past few years. For example, the December-to-December increases were 2.96%, 2.92% and 2.79% over the previous three years. This is consistent with the overall softness in the manufacturing sector.

Overall, the model forecasts that the manufacturing sector will not grow as fast as the overall economy, and the forecast intervals suggest a nontrivial chance that the sector will shrink in absolute terms as well as relative to the overall economy.

4 Forecast for the Wisconsin Economy

This section reports our forecasts for the Wisconsin economy in 2020. Overall, the model forecasts that the state economy will grow at a slower pace than the national economy. This will continue a recent trend of slower growth, largely driven by lower labor force growth, in the state than nationwide. Wisconsin real GDP will grow by about 1.74% in 2020, and personal income will increase by about 5.91%. As in the nation as a whole, growth will accelerate over the course of the year. Labor markets in the state will continue to cool. After previously falling to historically low levels, unemployment has risen in the last few months, the unemployment rate will continue to rise to about 3.7% by the end of the year. With the civilian labor force forecast to decline by about 1% in 2020, the employment growth is forecast to be negative. The housing market will remain strong, with the price index forecast to increase by about 6%. The manufacturing sector, however, is likely to shrink. Similar to the national economy, manufacturing output in Wisconsin is forecast to remain more or less flat with a growth rate at around zero, and manufacturing employment is forecast to lose instead of adding a couple thousand jobs.

Like the national economy, there is also a risk that the Wisconsin economy will fare worse than the median forecasts: the real GDP may decline by over 1%, the unemployment rate may rise well above 4%, and there is a 28% chance that the real GDP will decline in two consecutive quarters in 2020. Since growth rates are lower on average in the state, there is a larger chance of growth turning negative.

The rest of this section discusses the forecasts in detail.

4.1 Output and Income

Table 3 and Figure 6 report our forecasts of the year-over-year growth rates of real GDP (wigdp) and personal income (wipinc) in Wisconsin.

Relative to 2018Q4, we forecast that the real GDP in 2019Q4 will grow slightly by 0.39%. This growth rate will rise above 1% in 2020 and reach about 1.74% by the end of the year. Although this is a relative acceleration, growth will remain relatively low and below levels experienced in 2018. We also forecast that personal income in Wisconsin will grow by about 5-6% in 2020, similar to the growth in the last few years.

Table 3: Year-Over-Year Growth Rates of GDP and Personal Income for Wisconsin.

Quarter	GDP	Personal Income
2019Q4	0.39	5.85
2020Q1	0.96	3.99
2020Q2	1.70	5.12
2020Q3	1.24	6.52
2020Q4	1.74	5.91

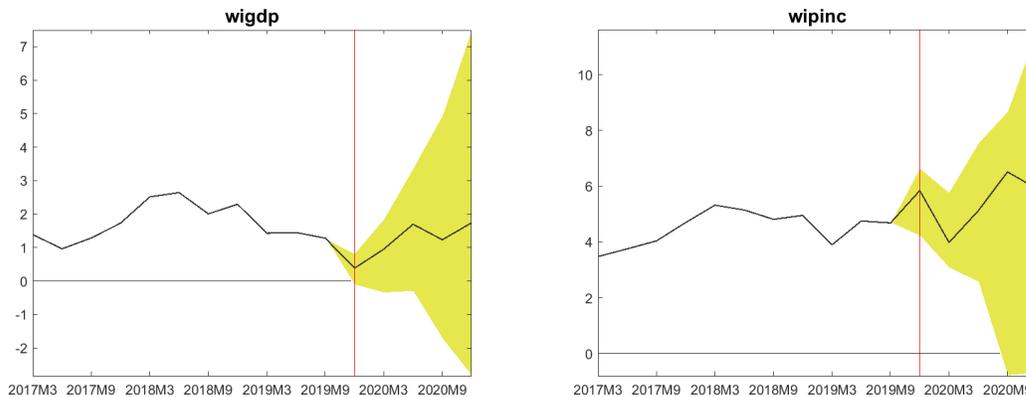


Figure 6: Year-over-year growth rates of real GDP (wigdp) and personal income (wipinc) for Wisconsin. The red vertical line indicates December, 2019. The black curve reports the actual values when available and median forecasts otherwise. The yellow shaded area reports the 67% forecast intervals.

Overall, our forecasts suggest that the Wisconsin economy will continue its slow growth observed in the past few years. However, there is a chance that the economy will slow down, and real GDP may decline by more than 1%. Moreover, the probability that real GDP will decline in two consecutive quarters in 2020 is about 28%, which is much higher than the national value of 10% because Wisconsin growth starts from a lower level.

4.2 Labor Market

Figure 7 below plots our forecasts for the Wisconsin labor market. The first panel (wiur) shows the unemployment rate. After several years of decline since the end of the Great Recession and a historically low value of 2.8% in 2019M4 and 2019M5, unemployment finally started to increase in 2019M6 and reached 3.3% in 2019M11. The model forecasts that the unemployment rate will continue to increase and reach 3.7% by the end of 2020.

The second panel (wilf) shows that the civilian labor force will continue its recent decline into 2020 and the state may lose up to 1% of its labor force. Both the rising unemployment rate and the shrinking labor force imply the employment will decline. As shown in the last panel (wiemp), the growth rate of nonfarm employment in Wisconsin has been positive but small and declining lately. Following this trend, the model forecasts a negative growth rate in 2020, where the state could lose up to 1% of its nonfarm employment.

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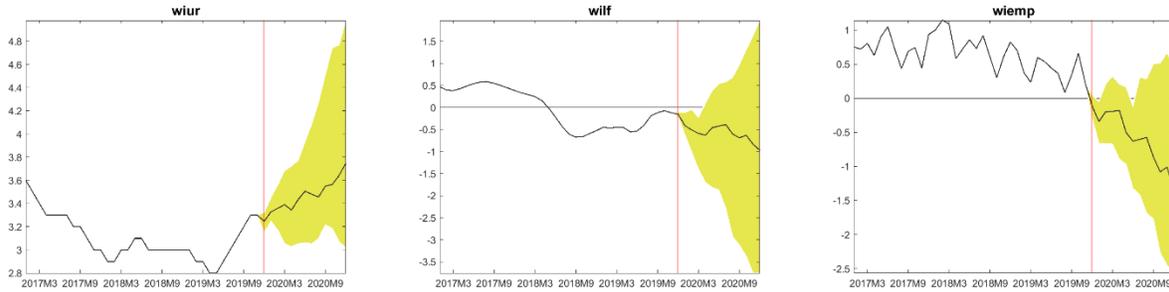


Figure 7: Labor market indicators in Wisconsin: the unemployment rate (wiur) and year-over-year growth rate of the civilian labor force (wilf) and nonfarm employment (wiemp). The red vertical line indicates December, 2019. The black curve reports the actual values when available and median forecasts otherwise. The yellow shaded area reports the 67% forecast intervals.

The 67% forecast intervals represented by the shaded areas suggest that the risks faced by the Wisconsin labor market may be much more severe than implied by the median forecasts. In particular, the unemployment may rise well above 4% and the economy may lose more than 1% of its labor force and nonfarm jobs. However, there is also a chance that the labor market may fare better: with the unemployment rate staying at around 3% and the nonfarm employment increasing by about 0.5% as it did in the last few years.

4.3 Housing and Banking Markets

Figure 8 reports our forecasts for the Wisconsin housing and banking markets. The model forecasts that these markets will stay strong: the all-transactions housing price index (wihpi) will rise by about 5-6% as it did in the past few years, and the return on average assets for banks will be about 1.3%, higher than the values observed in the last few years.

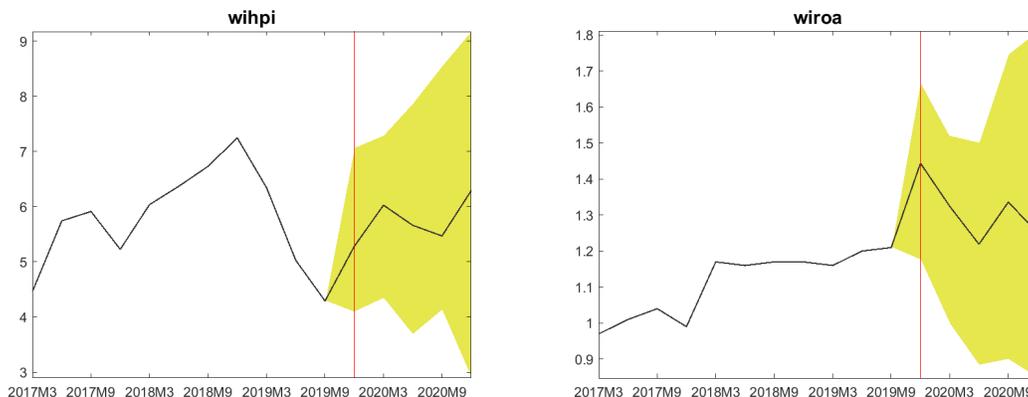


Figure 8: Year-over-year growth rate of house price index (wihpi) and the return on average assets for banks (wiroa) in Wisconsin. The red vertical line indicates December, 2019. The black curve reports the actual values when available and median forecasts otherwise. The yellow shaded area reports the 67% forecast intervals.

4.4 Manufacturing Sector

Figure 9 reports our forecasts for the Wisconsin manufacturing sector. The growth rate of output, reported in the first panel (wimangdp), is forecast to be around zero, lower than the values observed in the past few years but consistent with the lower national

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forecast discussed previously. Manufacturing employment (*wimanemp*) is forecast to shrink as it did in 2016, and the sector may lose a couple thousand jobs. Since Wisconsin remains more manufacturing-heavy than the nation as a whole, the softness in the manufacturing sector has a larger influence on the overall state economy. However even though manufacturing employment will fall, the overall labor market will remain relatively tight and improvements in productivity will continue. Thus average hourly earnings of production employees in manufacturing (*wimanwage*) is forecast to grow by about 5%, as it did in the past few months.

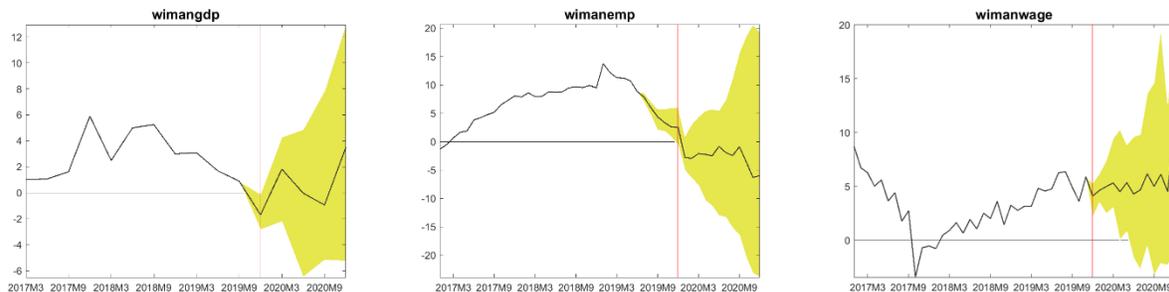


Figure 9: Indicators of the manufacturing sector in Wisconsin: year-over-year growth rate of real output (*wimangdp*), year-over-year growth of employment in thousands (*wimanemp*), and year-over-year growth rate of average hourly earnings of production employees (*wimanwage*). The red vertical line indicates December, 2019. The black curve reports the actual values when available and median forecasts otherwise. The yellow shaded area reports the 67% forecast intervals.

5 Conclusion

Overall, our forecasts suggest that the national economy will remain strong while the Wisconsin economy will continue to grow at a slower pace, and the manufacturing sector is likely to shrink both nationally and in Wisconsin. For both economies, our median forecasts for 2020 represent slightly faster output growth but are within the range of values observed in the past few years, suggesting that, in the absence of significant shocks, both economies will continue on their trends with little chance of substantial economic downturn.

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