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Used-Vehicle Prices and Expected Loss Rates

Introduction

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» Recent vintages will see lower liquidation values relative to older vintages due to declining used-vehicle prices going forward. These vintage effects outweigh other characteristics such as FICO score at origination.

» Economic growth is slowing and the odds of recession are mounting; the impact of a recessionary shock will not be evenly distributed across borrowers.

» High FICO score borrowers will experience lower losses relative to mid- and low FICO score borrowers, all else equal, in both a baseline and recession scenario. However, the divergence is not uniform; low FICO score borrowers will be less impacted, on a relative basis, than high FICO score borrowers.

Used-Vehicle Prices and Expected Loss Rates

BY KYLE HILLMAN

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Auto market as of July

The auto credit market continues to be a strong point for retail lenders. Year-over-year balance gains have slowed this year, but growth is still significantly above 2018-2019 trends (see Chart 1). A combination of pent-up demand, low interest rates, and excess savings brought on by the pandemic supported purchases over the last two years. Further, the global semiconductor chip shortage sapped production and limited inventory, which pushed prices higher. Higher prices, for both new and Used-Vehicles, resulted in rising loan volumes, with the auto credit market growing by nearly 15% since 2020.

Performance has been robust despite strong growth. The same factors that supported auto demand also supported performance, with the added benefit that many lenders were willing to work with troubled borrowers in 2020 and 2021. However, as the economy normalizes, these guardrails have been removed and performance is beginning to return to pre-pandemic trends (see Chart 2).

Chart 1: Auto Market Expanding at Brisk Pace

Auto balances, % change yr ago
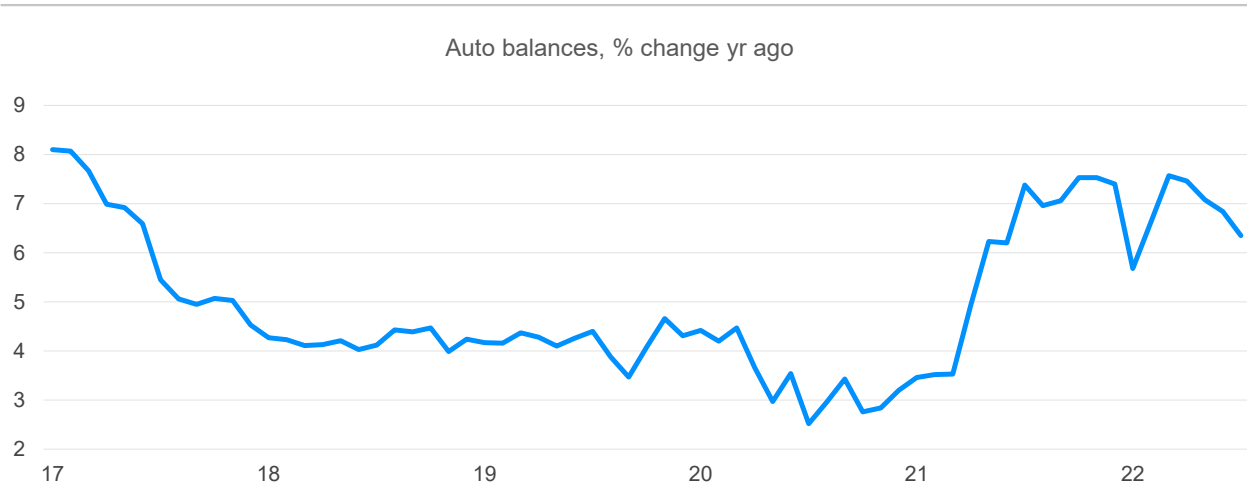
Sources: CreditForecast.com, Moody's Analytics

Chart 2: Performance Returning to Pre-Pandemic Trends

Auto 30-day dollar delinquency rate, %, by origination risk score
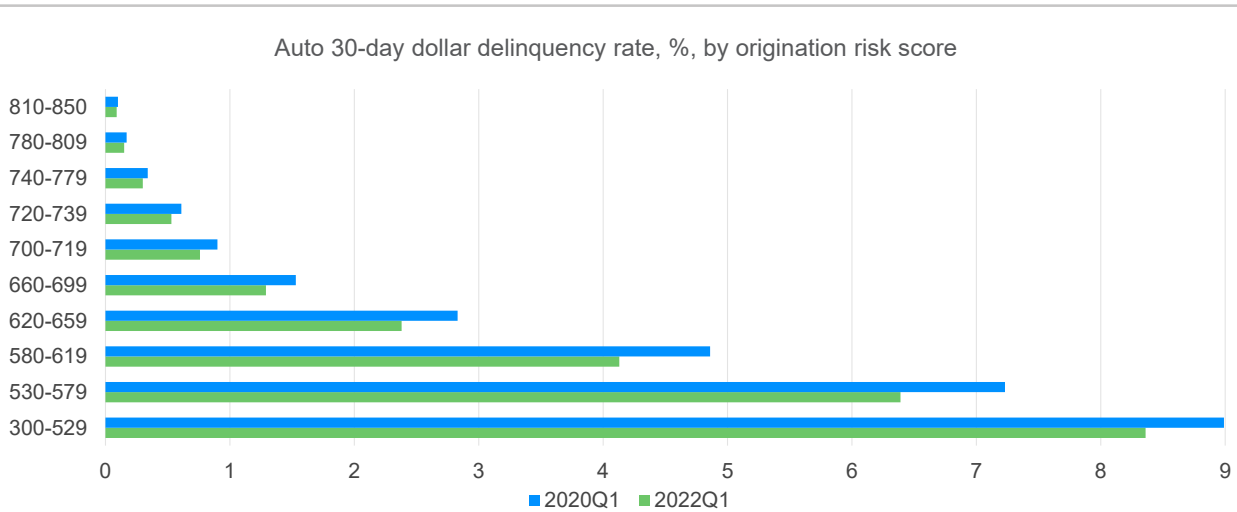
Sources: CreditForecast.com, Moody's Analytics

Balance growth is expected to cool, and default rates will move higher. Of note, used-vehicle prices, which have surged on supply-demand imbalances, will decline sharply through mid-decade (see Chart 3). The decline in prices will have an outsize and uneven impact on credit performance.

Measuring the risk – Base case

The Moody's Analytics Auto Portfolio Analyzer platform can quantify the impact on credit performance as the auto market normalizes. APA is a loan-level model that forecasts expected loss as the product of default, prepayment and severity rates. The expected loss forecasts are conditioned on individual loan characteristics such as the FICO score, the loan-to-value ratio, vehicle type, and origination date, as well as economic drivers, including the unemployment rate and used-vehicle prices.

Chart 3: Auto Prices Will Come Back to Earth

CPI – Used Cars and Trucks, 1982-1984=100
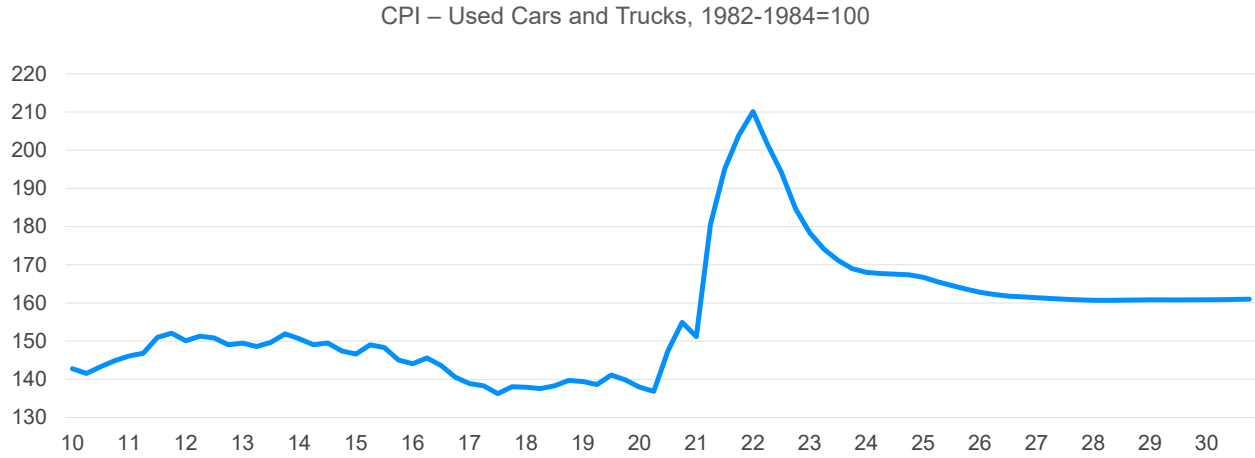
Sources: BLS, Moody's Analytics

Several what-if analyses were run. First, a sample loan with the following characteristics was constructed (see Table 1).

Table 1: Base Loan Profile

Origination date	New/ used	Vehicle type	Lender type	Interest rate	Term in mo	Original amount	Current amount	Age	FICO	Loan to value	Payment to income
3/28/2018	New	Car	Bank	4.7	84	40,554.82	35,290.43	0	728	105	7

Source: Moody's Analytics

Forecasts were run over an 84-month horizon, capturing the loan's full life cycle. Two scenarios were used: the Moody's Analytics baseline and S4[1] scenarios, both from the June 2022 forecast vintage.[2] A June 30 snapshot date was used. The base loan is sensitive to the economic forecasts, with the expected loss rate nearly doubling under the recession scenario (see Table 2).

Table 2: Base Loan Performance Across Scenarios

Scenario	Expected loss	Prepayment	Default	Severity
Baseline	0.11%	75.28%	1.09%	10.40%
S4	0.22%	71.88%	1.74%	12.63%

Source: Moody's Analytics

Interaction of FICO scores, economic forecasts and expected loss

The loss rate for the base loan nearly doubled given the economic shock; however, the impact on loss rates varies across the credit score distribution during an economic downturn. To analyze this, the origination

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1   Moody's Analytics economic scenarios are probability weighted with the baseline at the 50th percentile and the S4–a severe recession scenario–at the 96th percentile. Forecasts are produced for U.S., state and metropolitan statistical area-specific time series.

2   Forecast narratives and summary tables can be found in the appendix.

FICO score of the base loan was replaced with a low score (620), a middle score (720), and a high score (800). Again, forecasts were run over an 84-month horizon from June 30, 2022 under the baseline and S4 scenarios (see Table 3).

Table 3: FICO Segment Performance Across Scenarios

Scenario	FICO group	Expected loss	Prepayment	Default	Severity
	Low FICO	0.86%	74.31%	3.75%	23.01%
Baseline	Mid-FICO	0.14%	75.17%	1.26%	11.53%
	High FICO	0.01%	75.44%	0.34%	1.53%
	Low FICO	1.41%	68.88%	5.60%	25.15%
S4	Mid-FICO	0.27%	71.73%	1.99%	13.75%
	High FICO	0.02%	73.02%	0.55%	3.25%

Source: Moody's Analytics

Unsurprisingly, loss rates under the baseline and S4 scenario rank order with FICO scores; the low FICO segment has the highest loss rate, followed by the mid-FICO and then high FICO segments. However, the economic shock does not have a uniform impact on performance. The expected loss rate for the high FICO borrowers under the S4 scenario is more than three times larger than under the baseline scenario. For the low and mid-FICO segments, the ratio of S4 to baseline expected losses is less than two. This is consistent with trends observed in consumer credit data. Even during periods of strong labor market growth, low and mid-FICO borrowers experience bouts of joblessness, and as a result their credit performance has a weaker connection with their employment status. In contrast, high FICO borrowers tend to be more sensitive to the labor market, which explains the larger move in expected loss rates under a recessionary scenario. APA captures this dynamic by interacting FICO scores and economic variables.

Origination dates matter

The strong runup in vehicle prices has distorted the auto credit market in recent years. Historically, prices for used cars steadily fall over the life of the vehicle as depreciation and the introduction of new models reduce their value. However, a dearth of inventory over the last two years has flipped this dynamic, with used cars selling at or near their original purchase price. From a credit perspective, this impacts severity rates; when returned or repossessed collateral fetches a higher price, the proceeds from liquidation may offset the defaulted balance, erasing any loss and occasionally resulting in a profit. However, used-vehicle prices are expected to fall in the coming quarters as higher interest rates cool demand and supply-chain constraints ease.

To analyze this dynamic, the origination date for the base loan—March 28, 2018—was replaced with January 1 for each year from 2018 to 2022. Forecasts were run over an 84-month horizon under the baseline and S4 scenarios with an as-of date of June 30 (see Table 4).

There is significant variation in outcomes within and across scenarios. All of the characteristics for these loans—FICO, LTV, balance, term—are identical to the base loan, save the origination date. Given that, expected loss forecasts are substantially higher for more recent vintages. Some of the variance is because of seasoning dynamics; newly originated loans have a higher risk profile vis-à-vis older loans. However, the impact from seasoning will mainly be reflected in default-rate forecasts, which rank order by loan age within and across the baseline and S4 scenarios. Used-vehicle prices also drive default rates, but the effect is less pronounced relative to other model factors.

Table 4: Vintage Segment Performance Across Scenarios

Scenario	Vintage	Expected loss	Prepayment	Default	Severity
Baseline	2018	0.11%	73.97%	1.04%	10.42%
	2019	0.17%	79.40%	1.56%	10.89%
	2020	0.22%	82.80%	2.07%	10.48%
	2021	0.31%	84.38%	2.34%	13.36%
	2022	0.88%	76.30%	4.36%	20.21%
S4	2018	0.21%	70.40%	1.66%	12.69%
	2019	0.30%	76.59%	2.36%	12.88%
	2020	0.38%	80.10%	3.07%	12.27%
	2021	0.55%	81.40%	3.74%	14.84%
	2022	1.34%	73.60%	6.18%	21.62%

Source: Moody's Analytics

The variation in severity rate forecasts is caused by the impact of the used-vehicle price projections. APA's severity model uses vehicle price forecasts based on their change since origination. This transformation captures changes in collateral equity over the timeframe during which a loan is active and changes in collateral value if a loan enters default and is liquidated. Based on the current exercise, severity rates are lowest for older vintages, as the collateral originated in 2018-2020 benefited from the strong runup in vehicle prices between 2020 and 2022. Even as vehicle prices decline in the forecast, the price gains for these older vintages have already been "baked in." In contrast, the more recent vintages, 2021 and 2022, have had less exposure to recent price gains. This is less pronounced for the loan originated in 2021, as it benefited from the last 18 months of price increase. However, the impact is substantial for the loan originated in 2022. The dynamic is clear when comparing the change in used-vehicle prices since origination projections across vintages (see Chart 4).

Chart 4: Collateral Values Dependent on Origination Date

CPI – Used Cars and Trucks, monthly change since origination, by vintage
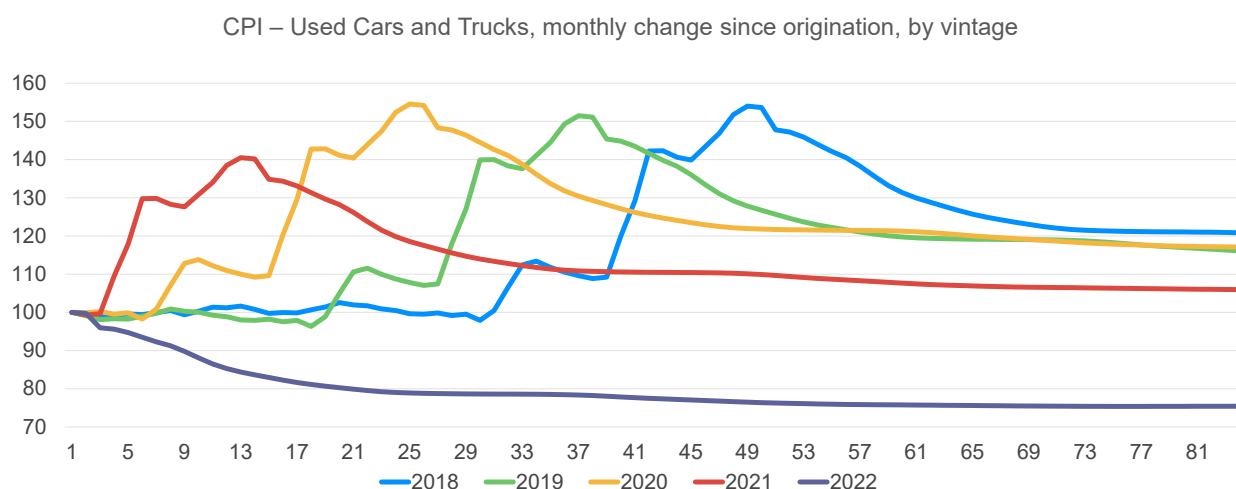
Sources: BLS, Moody's Analytics

This finding is relevant to credit risk managers. Even if a lender's underwriting criteria have not changed, loans originated in 2022 and beyond are riskier relative to loans originated in prior years. The risk is higher irrespective of the borrower characteristics and hinges on the used-vehicle price forecast. Collateral values

are expected to sharply decline through mid-decade, which will reduce liquidation proceeds on defaulted loans and push net loss rates higher.

There is also insight to be gained when comparing the vintage impact to the FICO impact from the prior section. The below matrix compares the projected expected-loss rates based on low, mid- and high FICO loans originated on January 1 for each year from 2018 to 2022 under the baseline scenario using an as-of date of June 30, 2022 (see Table 5).

Table 5: Expected Loss Rates - FICO by Vintage Comparison

Vintage	Low FICO (620)	Mid-FICO (720)	High FICO (800)
2018	0.83%	0.14%	0.00%
2019	1.19%	0.21%	0.01%
2020	1.46%	0.27%	0.02%
2021	1.90%	0.38%	0.04%
2022	4.15%	1.05%	0.18%

Source: Moody's Analytics

From an expected-loss forecasting perspective, an 800 FICO score loan originated in 2022 is nearly as risky as a 720 FICO score loan originated in 2019. Looking at the middle of the FICO score distribution, a 720 FICO score loan originated in 2022 has roughly the same expected-loss profile as a 620 FICO score loan originated in 2019. Of note, high-FICO loans originated prior to 2022 have marginal expected-loss projections. Some of the impact can be attributed to default rates across the different loans (see Table 6).

But much of the divergence is because of the variation in severity rates based on the origination date (see Table 7).

Table 6: Default Rates - FICO by Vintage Comparison

Vintage	Low FICO (620)	Mid-FICO (720)	High FICO (800)
2018	3.58%	1.19%	0.32%
2019	5.19%	1.79%	0.49%
2020	6.71%	2.37%	0.66%
2021	7.79%	2.67%	0.74%
2022	13.38%	4.96%	1.42%

Source: Moody's Analytics

Table 7: Severity Rates - FICO by Vintage Comparison

Vintage	Low FICO (620)	Mid-FICO (720)	High FICO (800)
2018	23.16%	11.56%	1.47%
2019	22.86%	11.95%	2.19%
2020	21.79%	11.47%	2.37%
2021	24.32%	14.28%	5.26%
2022	31.05%	21.10%	12.50%

Source: Moody's Analytics

Looking at the table above, the severity rate for an 800 FICO score loan originated in 2022 is more than a full percentage point higher than that of a loan originated in 2020 with a FICO score of 720. This divergence—a newly originated high FICO loan having the same expected loss profile as an older mid-FICO loan—underscores the additional dimensions of risk that exist in auto lenders' portfolios. From an under-

writing standpoint, the high FICO loan should have the lowest expected-loss figure, but by accounting for the projected decline in collateral values, APA highlights that older mid- and even low FICO loans have expected-loss projections comparable with newly minted high and mid-FICO loans.

What if prices are sticky?

A counter to the above analysis would be: Since consumer demand for vehicles remains strong despite the runup in prices over the last two years, what if this is the new equilibrium price level? To test the assumption that vehicle prices do not decline after they reach a higher price point, a custom economic scenario was run through APA. This scenario is identical to the baseline scenario, but used-vehicle prices are expected to stay at their current peak throughout the forecast horizon (see Chart 5).

Forecasts were run over an 84-month horizon using a June 30, 2022 snapshot date. First, loss rates for the base loan are significantly lower under the flat vehicle-price scenario (see Table 8).

Chart 5: What If Auto Prices Stay Elevated?

CPI – Used Cars and Trucks, 1982-1984=100
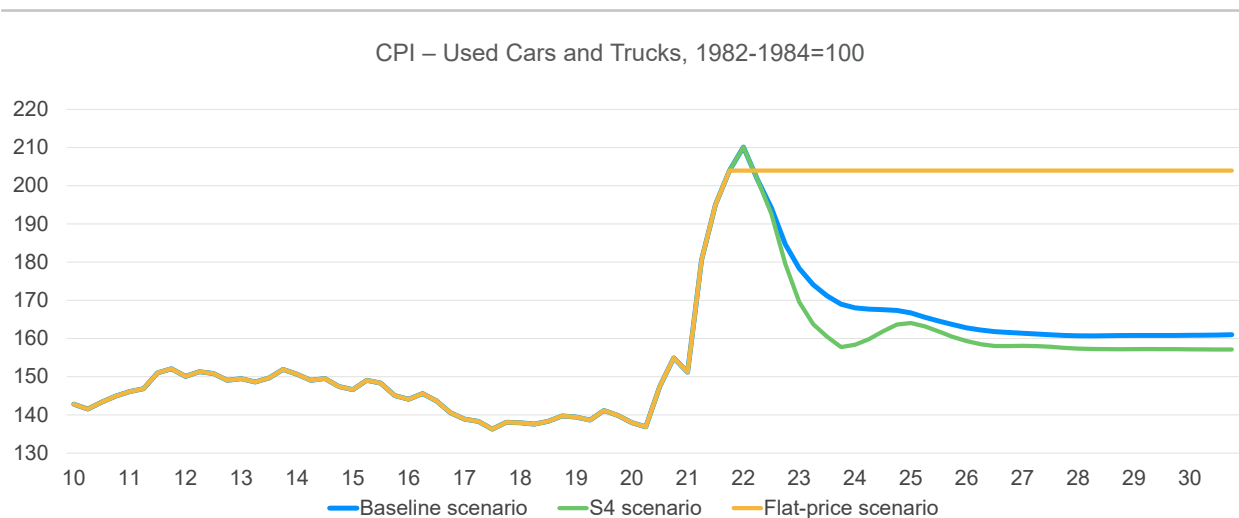
Sources: BLS, Moody's Analytics

Table 8: Base Loan Performance Across Scenarios

Scenario	Expected loss	Prepayment	Default	Severity
Baseline	0.11%	75.28%	1.09%	10.40%
S4	0.22%	71.88%	1.74%	12.63%
Flat vehicle prices	0.03%	78.80%	0.88%	3.34%

Source: Moody's Analytics

This is not surprising given the expectation for falling vehicle prices in both the baseline and S4 scenarios. Next, the same three scenarios were run over an 84-month horizon with a June 30, 2022 snapshot date using the low, mid- and high FICO segments (see Table 9).

Losses are modest under the flat scenario as the runup in vehicle prices is sustained. Of note, default rates decline across FICO segments when moving from the baseline scenario to the flat vehicle-price scenario,

Table 9: FICO Segment Performance Across Scenarios

Scenario	FICO group	Expected loss	Prepayment	Default	Severity
	Low-FICO	0.86%	74.31%	3.75%	23.01%
Baseline	Mid-FICO	0.14%	75.17%	1.26%	11.53%
	High-FICO	0.01%	75.44%	0.34%	1.53%
	Low-FICO	1.41%	68.88%	5.60%	25.15%
S4	Mid-FICO	0.27%	71.73%	1.99%	13.75%
	High-FICO	0.02%	73.02%	0.55%	3.25%
	Low-FICO	0.49%	77.99%	3.03%	16.01%
Flat vehicle prices	Mid-FICO	0.05%	78.70%	1.01%	4.47%
	High-FICO	0.00%	78.92%	0.27%	0.00%

Source: Moody's Analytics

but severity rates drop even further, highlighting the impact of changing collateral values in determining expected losses. Case in point, the high FICO group under the flat vehicle-price scenario does not experience any losses; the severity rate is zero, suggesting that any returned or repossessed collateral is liquidated at a level that is at or above the default balance.

Finally, the vintage-specific forecast results based on an 84-month horizon and June 30, 2022 as-of date are compared (see Table 10).

Table 10: Vintage Segment Performance Across Scenarios

Scenario	Vintage	Expected loss	Prepayment	Default	Severity
	2018	0.11%	73.97%	1.04%	10.42%
	2019	0.17%	79.40%	1.56%	10.89%
Baseline	2020	0.22%	82.80%	2.07%	10.48%
	2021	0.31%	84.38%	2.34%	13.36%
	2022	0.88%	76.30%	4.36%	20.21%
S4	2018	0.21%	70.40%	1.66%	12.69%
	2019	0.30%	76.59%	2.36%	12.88%
	2020	0.38%	80.10%	3.07%	12.27%
	2021	0.55%	81.40%	3.74%	14.84%
	2022	1.34%	73.60%	6.18%	21.62%
Flat vehicle prices	2018	0.03%	77.49%	0.84%	3.37%
	2019	0.05%	82.92%	1.24%	3.96%
	2020	0.06%	86.30%	1.61%	3.75%
	2021	0.14%	87.56%	1.84%	7.74%
	2022	0.59%	76.68%	3.72%	15.88%

Source: Moody's Analytics

Again, loss rates are uniformly lower under the flat vehicle-price scenario, because of the sharp decline in severity rates, particularly for the vintages originated between 2018 and 2021. This analysis highlights the sensitivity of expected-loss rates to the used-vehicle price forecast.

Conclusion

After an unprecedented runup from 2020 to mid-2022, vehicle price gains are poised to slow and ultimately reverse in the coming years. This decline will have a significant impact on the auto credit market. Liquidated collateral has sold well above historical expectations in recent years, but this trend is set to reverse, and severity rates will climb higher as a result. However, not all lenders will be impacted in a similar manner; older portfolios, with a larger share of loans originated prior to 2021, will experience lower losses going forward. In contrast, newer loans, even loans with high credit scores, will prove more

vulnerable, as falling collateral values push up default rates and pull down liquidation proceeds. The Moody's Analytics APA platform can serve as a useful tool in identifying these pockets of risk across multiple economic scenarios.

U.S. Macroeconomic Outlook Scenarios

June 2022

Baseline Forecast

This scenario is the baseline forecast of Moody's Analytics. Since it is a baseline, by definition the probability that the economy will perform better than this projection is equal to 50%, the same as the probability that it will perform worse.

Key assumptions

» There are many scenarios on how the Russian invasion of Ukraine will unfold, each darker than the next, but the most likely scenario is that Russian troops will go no farther than Ukraine and any disruptions to oil, natural gas and other commodity markets will ultimately prove temporary. If so, the impact of the Russian invasion on the U.S. economy will also be limited. However, there are significant downside risks.

» Our assumption is that the oil-supply disruption from Russia's invasion of Ukraine will be between 2 million and 3 million barrels per day. The anticipated loss in Russian supply will be largely offset by increasing OPEC and non-OPEC output, demand destruction due to higher prices, and the easing of sanctions on Iran and Venezuela.

» Rising case numbers resulted in an increase in the projected total of confirmed COVID-19 cases in the U.S. to 97 million, compared with 88.5 million in the May baseline.

» The baseline forecast no longer assumes Democrats pass a $560 billion package that was going to be solely focused on clean-energy tax credits and climate resilience investments.

» We assume a full-employment economy is one with a 3.5% unemployment rate, around a 62.5% labor force participation rate, and a prime-age employment-to-population ratio at or north of 80%. All of these conditions will be met this summer.

» The effective fed funds rate is now forecast to average 2.1% in the fourth quarter of this year, compared with 0.9% in the March baseline. The terminal fed funds rate, or where rates peak this cycle, is 2.75%. The Federal Reserve is expected to start cutting rates in 2024, as it will need to return the fed funds rate to its long-run equilibrium rate, which we estimate to be 2.5%, close to the central bank's estimate of 2.4%.

» The 10-year U.S. Treasury yield is expected to steadily increase over the next few years, reaching 4% by mid-decade.

Key risks

» Russia's invasion of Ukraine causes global oil prices to increase more than anticipated, pushing gasoline prices past $5 per gallon. This, along with the invasion, has a greater impact on confidence and financial market conditions than anticipated.

» The combination of Russia's invasion of Ukraine and China's zero-tolerance COVID-19 policy magnifies the supply-chain issues. The longer the global supply-chain issues persist, the more upside risk there is to near-term U.S. inflation.

» A wage-price spiral sets in, ushering in a new inflation regime where inflation is persistently higher than that seen pre-pandemic.

» Removing monetary policy accommodation is not going to go smoothly. The Fed announced the runoff of its balance sheet beginning on June 1. The initial runoff pace is $47.5 billion per month, but after three months it will increase to $95 billion. That will not be a gradual increase; rather it will be a sudden increase in September. It is unclear how rate hikes and quantitative tightening will interact with each other, which makes the odds of a policy error uncomfortably high. The Fed may also need to use its balance sheet more aggressively to get the tightening in financial market conditions needed to slow the economy.

» Labor-supply constraints are more binding than anticipated, slowing job growth and boosting wages along with inflation.

» On the upside, the demographic tailwind is more powerful for the housing market as more millennials enter their prime first-time homebuying years.

» A large savings cushion provides a bigger-than-expected boost to consumer spending.

Epidemiological assumptions
» 97 million confirmed cases.

» New infections peaked in January 2022.

» 1.11% confirmed case fatality rate.

» 1.41% hospitalization rate (% of active cases at peak).

» 0.24% ICU use rate (% of active cases at peak).

» Infections abate in August 2022.

There were some tweaks to the U.S. baseline forecast in June, but the changes were smaller than in prior months. The new baseline forecast factors in the recent tightening in financial market conditions, increase in energy prices, and new data on first-quarter GDP.

Fiscal assumptions
The federal budget deficit will fall from 12.4% of GDP in fiscal 2021 to 4.4% this year and 3.8% next year. This improvement largely reflects the end of federal pandemic relief and a stronger economy. In the June baseline, the effective personal tax rate was adjusted higher in the near to medium term. The U.S. Treasury Department enjoyed a better-than-expected windfall of individual income taxes in April thanks to soaring asset prices and widening participation in equity markets in 2021. Nevertheless, this is coming at the expense of personal savings. A higher tax bill has led to a faster decumulation of excess personal savings than previously thought.

In its second estimate of first-quarter GDP, the Bureau of Economic Analysis revised personal current taxes to reflect the stronger-than-anticipated filing season and lower refunds, which shaved a full percentage point off

the savings rate in the first three months of the year. As a result, excess savings are shrinking at an accelerating rate, though they remain above $2.5 trillion. Because of incoming data and fiscal changes to the forecast, the savings rate will average 1.1 and 0.7 percentage point lower in 2022 and 2023, respectively, compared with the May baseline.

COVID-19 assumptions

Changes to our epidemiological assumptions were noticeable, but the economic implications are modest as each wave of COVID-19 has a diminishing effect on the economy. Total confirmed COVID-19 cases in the U.S. will be 97 million, compared with 88.5 million in May. The seven-day moving average of daily confirmed cases has been steadily rising since the May baseline and is now 122,000, more than double that in the May baseline forecast.

We are sticking with the concept of "effective immunity," which is a rolling number of infections plus vaccinations to account for the fact that immunity is not permanent. The forecast still assumes that COVID-19 will be endemic and seasonal.

Energy price assumptions

The European Union's sixth set of economic sanctions against Russia will create the biggest disruption to the global oil market since the Yom Kippur War in 1973. Though a strong vote of confidence for Ukraine, the move will stoke inflation, raise consumer energy bills, and complicate global central banks' task of raising interest rates without tipping their respective economies into recession.

The baseline forecast now has West Texas Intermediate crude oil prices peaking higher than in the prior baseline forecast. However, the timing has not changed and the forecast assumes oil prices peak this quarter, averaging $107 per barrel. However, the broad contours of the forecast have not changed and the June baseline still has oil prices steadily declining in the second half of this year and throughout next year, approaching $65 per barrel in late 2024.

Nudging GDP lower

Real GDP is expected to increase 2.7% this year on an annual average basis, compared with 2.8% in the prior baseline. We have cut our forecast for U.S. real GDP growth this year by a total of 80 basis points over the past few months. We nudged the forecast for GDP growth in 2023 down from 2.7% to 2.6%. The economy is still expected to grow above its potential, which is likely between 2% and 2.5%.

Revisions to first-quarter GDP now show that it declined 1.5% at an annualized rate, compared with a 1.4% decline in the advance estimate. This revision is a small factor in the revision to GDP growth this year. The weakness in the first quarter was concentrated in net exports and inventories.

Net exports were an enormous weight on first-quarter GDP. Trade has been a consistent weight on GDP growth as demand for consumer goods has been robust. The U.S. consumer is buying a ton of goods and the majority of these are imported. But neither inventories nor trade is a fundamental determinant of where the economy is headed.

Declines in GDP during economic expansions have happened before. The three contractions in GDP occurring between the global financial crisis and the COVID-19 pandemic occurred because of some combination of a

widened trade deficit and the quarterly oscillations of the inventory build. Consumption, the largest component of GDP, did not contract in those instances, nor did it in the first quarter of 2022. Consumption, particularly on services, accelerated in the quarter.

Our baseline forecast for real GDP growth this year is close to the Bloomberg consensus of 2.6%. The forecast for next year is 0.6 percentage point stronger than the Bloomberg consensus of 2%.

Business investment and housing

Incoming data over the past few weeks point toward slightly weaker growth in U.S. real business investment in the second quarter. Still, growth will be solid. The fundamentals include still-supportive financial market conditions. Moreover, after-tax corporate profits as a share of nominal GDP are still elevated, though the ratio has declined some in recent quarters. Another favorable development for business investment is that the rate of new-business formations has risen recently, tempering concerns that the pandemic could have scarring impacts on entrepreneurship.

We have real business equipment spending rising 6.5% this year, compared with 7% in the May baseline. The forecast is for real business equipment spending to increase 5.2% in 2023, compared with 3.9% in the prior baseline.

There was a downward revision to housing starts, as supply constraints and higher mortgage rates have started to have an effect. Housing starts are expected to be 1.77 million, compared with 1.83 million in the prior baseline. Housing starts are expected to total 1.86 million next year, down from 1.89 million in the prior baseline.

There are only so many homes that can be built each year because of labor-supply constraints and a lack of buildable lots. Some of the labor-supply issues will ease as the pandemic winds down, but the reduction in immigration is particularly problematic for homebuilders' ability to find workers. We cut the forecasts for new- and existing-home sales this year. They are expected to total 6.59 million, lighter than the 6.86 million in the prior forecast. We also cut the forecast for total home sales next year. New-home sales account for about 10% of total home sales.

There were minor tweaks to the forecast for the FHFA All-Transactions House Price Index this year and next. The June baseline has it rising 11.3% this year, compared with 12.2% in the prior baseline. The forecast for 2023 and 2024 continues to expect little house price appreciation.

Labor market

The U.S. labor market remains strong even as job growth is moderating. The current trend pace of job growth is between 400,000 and 450,000 per month, but this is not sustainable and needs to fall to around 150,000 per month later this year or the Fed's attempt to engineer a soft landing will become increasingly difficult.

Nonfarm employment rose by 390,000, on net, in May, better than either we or the consensus anticipated. The gain leaves nonfarm employment 822,000 below its pre-pandemic peak. This should be recouped over the next few months. However, excluding leisure and hospitality, employment is already above its pre-pandemic peak. Of course, this does not account for the jobs that would have been created if the pandemic did not occur, which is around 5 million.

We have job growth averaging 373,000 per month this year, nearly identical to the gain in the May baseline forecast. Job growth is expected to moderate next year and in 2024. The unemployment rate is expected to average around 3.3% in the fourth quarter of this year before gradually rising over the next couple of years as the effect of tighter monetary policy starts to be felt.

We assume a full-employment economy is one with a 3.5% unemployment rate, around a 62.5% labor force participation rate, and a prime-age employment-to-population ratio a little north of 80%. All of these conditions will be met this summer.

Monetary policy

The minutes from the May meeting of the Federal Open Market Committee signal that the central bank wants to aggressively hike rates at the next couple of meetings to allow officials the potential to pause and assess the effects of policy firming on the economy, inflation and financial markets. This would improve the odds that the Fed engineers a soft landing. Previously, it appeared the Fed was going to hike until something broke, either inflation or the economy. The minutes were lighter on the inflation discussion than in March. On the balance sheet, a number of officials supported eventually selling mortgage-backed securities. The immediate market reaction to the minutes was fairly tame, potentially because there were no big surprises and we did not make any changes to our near-term forecast for the fed funds rate.

The Fed has begun its quantitative tightening campaign. If the Fed sticks with its current plan, its balance sheet will decline by about $520 billion this year. This may sound like a lot, but the balance sheet will still be massive, around 37% of nominal GDP. It was less than 20% of nominal GDP before the pandemic.

The 10-year Treasury yield has bounced around recently but we did not make any changes to the baseline forecast. The 10-year Treasury yield will average 3.14% in the final three months of 2022. We still have the 10-year Treasury yield averaging 3.25% in the fourth quarter of next year, identical to the May baseline. The June baseline forecast incorporates the recent swing in equity prices, which is the reason for the revision to the forecast. Equity prices are expected to bottom in the first quarter of next year and will resume rising in the second quarter.

U.S. MACRO BASELINE SCENARIO —FORECAST SUMMARY—June 2022										
	Units	22Q1	22Q2	22Q3	22Q4	23Q1	23Q2	23Q3	23Q4	24Q1
Gross Domestic Product	bcw$	19,731.1	19,857.9	20,032.7	20,166.8	20,280.9	20,398.6	20,529.3	20,672.4	20,829.1
Change	%AR	-1.5	2.6	3.6	2.7	2.3	2.3	2.6	2.8	3.1
Federal Budget	$ bil	-290.5	-82.7	-341.0	-260.4	-296.7	-135.0	-298.3	-373.8	-282.8
Total Employment	mil	150.4	151.7	152.5	153.1	153.6	154.1	154.5	154.9	155.3
Change	%AR	4.7	3.6	2.0	1.7	1.4	1.2	1.1	0.9	1.1
Unemployment Rate	%	3.8	3.6	3.4	3.3	3.4	3.4	3.5	3.5	3.6
Light Vehicle Sales	mil, SAAR	14.1	14.1	15.1	15.6	16.1	16.5	16.8	17.1	17.7
Residential Housing Starts	mil, SAAR	1.7	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9
Median Existing-Home Price	$ ths	383.2	395.4	395.6	397.7	397.8	396.5	395.8	396.3	397.2
Change	%YA	15.7	13.8	11.6	8.7	3.8	0.3	0.0	-0.4	-0.1
Consumer Price Index	%AR	9.2	7.9	3.8	3.0	2.3	2.2	1.9	2.1	2.3
Federal Funds Rate	%	0.1	0.6	1.6	2.1	2.5	2.7	2.7	2.7	2.6
Treasury Yield: 10-Yr Bond	%	2.0	2.9	3.0	3.1	3.2	3.2	3.2	3.3	3.3
Baa Corp. - 10-Yr Treasury	DIFF	2.0	2.2	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Corporate Profits With IVA & CCA	$ bil	2,870.1	2,804.1	2,855.7	2,897.7	2,933.0	2,999.7	3,035.5	3,068.1	3,105.9
Change	%YA	12.5	-0.5	-2.1	-1.3	2.2	7.0	6.3	5.9	5.9
S&P 500	1941=10	4,467.0	4,278.6	4,264.2	4,245.7	4,228.6	4,232.8	4,259.8	4,273.8	4,285.6
Change	%YA	15.6	2.3	-3.5	-7.7	-5.3	-1.1	-0.1	0.7	1.3
CRE Price Index	index	359.4	369.2	376.0	382.7	389.6	394.6	398.6	402.9	407.2
NCREIF Property Index: Rate of Return	%, NSA	5.3	3.9	4.7	3.7	2.9	2.5	2.2	2.3	2.6
C&I Loans Outstanding	$ bil	2,495.8	2,583.1	2,662.8	2,751.6	2,821.7	2,875.1	2,914.8	2,947.9	2,985.8
BAA spread	%	2.0	2.2	2.6	2.6	2.6	2.6	2.6	2.6	2.6

	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026
Gross Domestic Product	bcw$	18,606.8	19,032.7	18,384.7	19,427.3	19,947.1	20,470.3	21,038.5	21,568.3	22,133.6
Change	%AR	2.9	2.3	-3.4	5.7	2.7	2.6	2.8	2.5	2.6
Federal Budget	$ bil	-873.0	-1,022.0	-3,348.2	-2,577.0	-974.6	-1,103.7	-1,005.9	-1,324.5	-1,366.4
Total Employment	mil	148.9	150.9	142.1	146.1	151.9	154.3	155.7	156.3	156.8
Change	%AR	1.6	1.3	-5.8	2.8	4.0	1.6	0.9	0.4	0.3
Unemployment Rate	%	3.9	3.7	8.1	5.4	3.5	3.5	3.6	3.8	4.0
Light Vehicle Sales	mil, SAAR	17.2	17.0	14.5	15.0	14.7	16.7	17.9	18.0	17.8
Residential Housing Starts	mil, SAAR	1.2	1.3	1.4	1.6	1.8	1.9	1.9	1.8	1.7
Median Existing-Home Price	$ ths	259.5	272.3	298.6	349.8	393.0	396.6	397.9	397.4	399.0
Change	%YA	4.8	4.9	9.7	17.2	12.4	0.9	0.3	-0.1	0.4
Consumer Price Index	%AR	2.4	1.8	1.2	4.7	7.2	2.9	2.2	2.3	2.3
Federal Funds Rate	%	1.8	2.2	0.4	0.1	1.1	2.7	2.5	2.5	2.5
Treasury Yield: 10-Yr Bond	%	2.9	2.1	0.9	1.4	2.8	3.2	3.4	3.7	4.0
Baa Corp. - 10-Yr Treasury	DIFF	1.9	2.2	2.7	1.9	2.3	2.6	2.6	2.5	2.5
Corporate Profits With IVA & CCA	$ bil	2,304.9	2,367.8	2,243.8	2,805.8	2,856.9	3,009.1	3,153.2	3,301.3	3,434.9
Change	%YA	8.3	2.7	-5.2	25.0	1.8	5.3	4.8	4.7	4.0
S&P 500	1941=10	2,744.7	2,912.5	3,218.5	4,266.8	4,313.9	4,248.7	4,310.9	4,504.6	4,722.7
Change	%YA	12.1	6.1	10.5	32.6	1.1	-1.5	1.5	4.5	4.8
CRE Price Index	index	275.7	297.0	312.3	351.1	382.7	402.9	421.2	441.1	461.7
NCREIF Property Index: Rate of Return	%, NSA	1.6	1.6	0.4	4.2	4.4	2.5	2.7	2.4	2.0
C&I Loans Outstanding	$ bil	2,210.9	2,352.1	2,712.8	2,496.2	2,623.3	2,889.9	3,038.7	3,185.1	3,343.0
BAA spread	%	1.9	2.2	2.7	1.9	2.3	2.6	2.6	2.5	2.5

S4: Alternative Scenario 4 – Downside – 96th Percentile

In this scenario, there is a 96% probability that the economy will perform better, broadly speaking, and a 4% probability that it will perform worse.

Key assumptions/risks

» The Russian invasion of Ukraine worsens dramatically and worries rise that the invasion would expand beyond Ukraine. In response, import bans and self-sanctioning of Russian oil purchases increase the loss of oil on the global market to 5.2 million barrels per day, well above the 4.6 million barrels per day assumed to be lost in the baseline. This causes oil prices to rise above $160 a barrel by the end of 2022, increasing inflation substantially. Higher gasoline prices cut into disposable income that would otherwise be available for other spending.

» The worsening invasion causes the stock market to collapse.

» Supply-chain issues also worsen, with increased shortages of many goods, also boosting inflation. Additionally, risks increase that the supply of neon, used in the production of semiconductors, will decline substantially because much of the world's supply comes from Ukraine. Further, Russia is the source of a large proportion of the pig iron consumed in the U.S., which is used in a range of products, including motor vehicles. The supply-chain shortages weaken manufacturing.

» Worsening economic conditions in Europe hurt U.S. exports and also corporate earnings from European subsidiaries.

» New cases, hospitalizations and deaths from COVID-19 rise significantly once again, slowing spending on air travel, retail and hotels.

» The U.S. economy falls into a deep recession, and unemployment begins to increase, in the third quarter of 2022. The downturn lasts for more than a year and begins to subside when the invasion begins to resolve.

» The economy does not return to full employment until 2031.

Epidemiological assumptions

» 278 million confirmed cases.

» New infections peak in July 2022.

» 0.81% cumulative confirmed case fatality rate.

» 1.41% hospitalization rate (% of active cases at peak).

» 0.24% ICU use rate (% of active cases at peak).

» Infections abate in November 2022.

Monetary policy assumptions

- » Increases in the fed funds rate are higher than in the baseline during the remainder of 2022 and the first quarter of 2023, as the Fed works to address the accelerating inflation despite the recession. However, by mid-2023, as the recession deepens, the Fed shifts gears and starts to lower the fed funds rate to support the economy.

- » The 10-year Treasury declines because of the flight to quality amid the decline in the stock market and the contracting economy. However, the worsening inflation outlook prevents a deeper decline. The yield curve inverts during the fourth quarter of 2022 and the first quarter of 2023.

Fiscal policy assumptions

- » Disagreements in Congress prevent any additional fiscal support package beyond the American Rescue Plan Act passed in March 2021 and the $572 billion Infrastructure Investment and Jobs Act, which was passed in November 2021.

The downside 4% scenario "S4: Alternative Scenario 4 – Downside – 96th Percentile" begins with the Russian invasion of Ukraine worsening dramatically and worries rising that the invasion would expand beyond Ukraine. In response, import bans of Russian oil purchases increase the loss of oil on the global market to 5.2 million barrels per day, well above the 4.6 million barrels per day assumed to be lost in the baseline. As a result, oil prices rise more sharply than in the baseline, to more than $160 per barrel for Brent, and inflation increases substantially. Higher gasoline prices cut deeply into disposable income that would otherwise be available for other spending. The stock market collapses.

Supply-chain conditions also erode, with increased shortages of many goods, also boosting inflation. Additionally, the risks grow that the supply of neon, used in the production of semiconductors, will decline substantially because much of the world's supply comes from Ukraine. Further, Russia is the source of a large proportion of the pig iron consumed in the U.S., which is used in a range of products, including motor vehicles. The supply-chain shortages weaken manufacturing. Further, new cases, hospitallizat-ions and deaths from COVID-19 rise significantly once again, slowing spending on air travel, retail and hotels.

The U.S. economy falls into a deep recession, and unemployment begins to increase, in the third quarter of 2022.

Because of the accelerating inflation, the Fed chooses to raise the fed funds rate, and the increases are higher than in the baseline during the remainder of 2022 through mid-2023. However, by the end of 2022, as the recession deepens and inflation starts to decelerate, the Fed shifts gears and starts to lower the fed funds rate to support the economy. The 10-year Treasury declines as the flight to quality amid the decline in the stock market and the contracting economy more than offset the worsening inflation outlook. As a result, the yield curve inverts during the fourth quarter of 2022 and the first quarter of 2023.

The economies across Europe contract for similar reasons. Populism in Europe accelerates, once again putting the euro zone's existence at risk. This contributes to the economic and financial stress faced by heavily indebted nations, especially Italy. The declines in Europe lower corporate earnings of foreign subsidiaries of U.S. companies, contributing to the decline in the stock market, and also reduce U.S. exports to Europe, deepening the U.S. recession.

The downturn lasts for more than a year and begins to subside when the invasion begins to resolve. The unemployment rate reaches a peak of 9% by early 2024. Unit auto sales drop to the low-11 million range by mid-2023, compared with more than 16 million in the baseline. Rising joblessness causes house prices to drop cumulatively by more than 18% from the second quarter of 2022 through mid-2023. Disagreements in Congress prevent stimulus measures to stem the downturn. The economy does not return to full employment until 2031.

The changes in real GDP on an annual average basis are 1.3% in 2022 and -2.9% in 2023, compared with 2.7% and 2.6%, respectively, in the baseline. Reduced business investment lowers productivity so that the level of real GDP remains below the baseline indefinitely.

	Units	22Q1	22Q2	22Q3	22Q4	23Q1	23Q2	23Q3	23Q4	24Q1

U.S. MACRO S4 SCENARIO —FORECAST SUMMARY—June 2022

	Units	22Q1	22Q2	22Q3	22Q4	23Q1	23Q2	23Q3	23Q4	24Q1
Gross Domestic Product	bcw$	19,731.1	19,857.9	19,698.7	19,450.1	19,144.8	19,101.8	19,063.4	19,119.6	19,197.9
Change	%AR	*-1.5*	*2.6*	*-3.2*	*-5.0*	*-6.1*	*-0.9*	*-0.8*	*1.2*	*1.6*
Federal Budget	$ bil	-290.5	-82.7	-375.6	-352.0	-418.0	-263.7	-446.4	-537.6	-451.5
Total Employment	mil	150.4	151.7	147.7	145.7	144.5	143.7	143.1	142.8	142.9
Change	%AR	*4.7*	*3.6*	*-10.0*	*-5.3*	*-3.4*	*-2.2*	*-1.7*	*-0.8*	*0.2*
Unemployment Rate	%	3.8	3.6	5.9	7.0	7.7	8.2	8.6	8.9	9.0
Light Vehicle Sales	mil, SAAR	14.1	14.1	14.6	13.7	12.8	12.4	11.0	11.0	11.4
Residential Housing Starts	mil, SAAR	1.7	1.8	1.5	1.2	1.2	1.1	0.9	0.9	0.9
Median Existing-Home Price	$ ths	383.2	395.4	363.5	346.6	331.4	320.8	318.2	324.9	329.1
Change	%YA	*15.7*	*13.8*	*2.5*	*-5.2*	*-13.5*	*-18.9*	*-12.5*	*-6.3*	*-0.7*
Consumer Price Index	%AR	9.2	7.9	5.9	5.7	2.4	2.0	1.3	1.4	1.5
Federal Funds Rate	%	0.1	0.6	2.0	2.8	3.1	2.4	1.9	1.3	0.9
Treasury Yield: 10-Yr Bond	%	2.0	2.9	2.2	2.1	2.1	2.0	2.1	2.1	2.1
Baa Corp. - 10-Yr Treasury	DIFF	2.0	2.2	3.6	4.8	4.2	3.6	3.5	3.2	3.0
Corporate Profits With IVA & CCA	$ bil	2,870.1	2,804.1	2,423.0	2,220.3	2,045.6	1,953.4	1,927.4	1,952.1	2,013.8
Change	%YA	*12.5*	*-0.5*	*-16.9*	*-24.4*	*-28.7*	*-30.3*	*-20.5*	*-12.1*	*-1.6*
S&P 500	1941=10	4,467.0	4,278.6	3,543.7	2,851.4	2,670.1	2,473.8	2,416.4	2,461.3	2,484.4
Change	%YA	*15.6*	*2.3*	*-19.8*	*-38.0*	*-40.2*	*-42.2*	*-31.8*	*-13.7*	*-7.0*
CRE Price Index	index	359.4	369.2	368.9	355.1	334.6	315.4	293.0	282.8	279.1
NCREIF Property Index: Rate of Return	%, NSA	5.3	3.9	1.7	-2.9	-1.4	-0.8	-0.7	0.7	1.7
C&I Loans Outstanding	$ bil	2,495.8	2,583.1	2,408.4	2,376.3	2,337.2	2,340.1	2,350.7	2,357.8	2,365.2
BAA spread	%	2.0	2.2	3.6	4.8	4.2	3.6	3.5	3.2	3.0

	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026
Gross Domestic Product	bcw$	18,606.8	19,032.7	18,384.7	19,427.3	19,684.5	19,107.4	19,339.9	20,056.9	20,784.2
Change	%AR	*2.9*	*2.3*	*-3.4*	*5.7*	*1.3*	*-2.9*	*1.2*	*3.7*	*3.6*
Federal Budget	$ bil	-873.0	-1,022.0	-3,348.2	-2,577.0	-1,100.8	-1,665.7	-1,665.9	-1,865.5	-1,733.8
Total Employment	mil	148.9	150.9	142.1	146.1	148.9	143.5	143.3	145.9	148.2
Change	%AR	*1.6*	*1.3*	*-5.8*	*2.8*	*1.9*	*-3.6*	*-0.1*	*1.8*	*1.6*
Unemployment Rate	%	3.9	3.7	8.1	5.4	5.1	8.4	8.9	7.7	6.8
Light Vehicle Sales	mil, SAAR	17.2	17.0	14.5	15.0	14.2	11.8	12.9	15.3	15.9
Residential Housing Starts	mil, SAAR	1.2	1.3	1.4	1.6	1.5	1.0	0.9	1.1	1.2
Median Existing-Home Price	$ ths	259.5	272.3	298.6	349.8	372.2	323.8	332.9	337.3	337.6
Change	%YA	*4.8*	*4.9*	*9.7*	*17.2*	*6.4*	*-13.0*	*2.8*	*1.3*	*0.1*
Consumer Price Index	%AR	2.4	1.8	1.2	4.7	7.7	3.5	1.6	2.0	2.1
Federal Funds Rate	%	1.8	2.2	0.4	0.1	1.4	2.2	0.5	0.1	0.3
Treasury Yield: 10-Yr Bond	%	2.9	2.1	0.9	1.4	2.3	2.1	2.2	2.8	3.6
Baa Corp. - 10-Yr Treasury	DIFF	1.9	2.2	2.7	1.9	3.2	3.6	2.8	2.5	2.4
Corporate Profits With IVA & CCA	$ bil	2,304.9	2,367.8	2,243.8	2,805.8	2,579.4	1,969.6	2,083.4	2,247.1	2,442.8
Change	%YA	*8.3*	*2.7*	*-5.2*	*25.0*	*-8.1*	*-23.6*	*5.8*	*7.9*	*8.7*
S&P 500	1941=10	2,744.7	2,912.5	3,218.5	4,266.8	3,785.2	2,505.4	2,535.6	2,776.2	3,074.1
Change	%YA	*12.1*	*6.1*	*10.5*	*32.6*	*-11.3*	*-33.8*	*1.2*	*9.5*	*10.7*
CRE Price Index	index	275.7	297.0	312.3	351.1	355.1	282.8	284.8	325.9	373.7
NCREIF Property Index: Rate of Return	%, NSA	1.6	1.6	0.4	4.2	2.0	-0.6	2.2	2.8	2.5
C&I Loans Outstanding	$ bil	2,210.9	2,352.1	2,712.8	2,496.2	2,465.9	2,346.5	2,394.1	2,522.2	2,658.0
BAA spread	%	1.9	2.2	2.7	1.9	3.2	3.6	2.8	2.5	2.4

About the Author

Kyle Hillman is an economist with the Business Analytics group of Moody's Analytics in West Chester PA. Kyle works on consumer credit modeling and analysis with CreditForecast.com, has built stress-testing models of consumer loan performance for various consulting projects, and contributes commentary pieces covering trends in multiple credit markets. He also has experience working on the U.S. macroeconomic forecast and alternative scenario teams. After graduating from Saint Joseph's University with a bachelor's degree in economics and philosophy, Kyle received his master's degree in economics from Temple University.

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