

## SECTOR IN-DEPTH

27 September 2021

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## Auto Finance – Global

# Sector can manage surge of residual value risk as electric vehicles come on line

Accelerating sales of alternative fuel vehicles (AFVs)<sup>1</sup>, especially battery electric vehicles (BEVs), will shift portfolio compositions and credit fundamentals across auto-related sectors. Because of the high initial investment to develop and market AFVs, still high cost for batteries and retool for their broad production, it will [be some time before the segment generates adequate returns](#).<sup>2</sup> Adoption rates for AFVs will continue to vary by region: Japan and Europe lead the charge at 29% and 26% of new vehicle sales, respectively, compared with just 2% in the US and 5.4% in China. Early adoption, often with government support, provides both advantages and disadvantages, with first movers facing a steep learning curve to build, market and finance AFVs profitably.

**Lease portfolios will grow, with a rising proportion of AFV assets.** Auto finance captives will likely provide incentives to capture brand loyalty for AFVs and gain an edge in penetration rates. Lease portfolios will expand, with consumers preferring not to buy until the technology, supporting infrastructure and prices for used AFVs are more firmly established.

**Auto captives' residual value (RV) risk will rise because of price uncertainty in fast-changing markets.** Growth in leases will shorten auto captives' contractual portfolio maturities. Mostly in Europe because used car leases will frequently follow initial leases, captives will retain greater and more enduring RV risk. Shifts in government subsidy policies would also increase price volatility. Most auto captives already have sizable lease portfolios, but growth in AFV (or BEV) car leasing will increase their portfolio risk. Mitigants of this risk will differ regionally: in the US, a deep, transparent used car market will allow captives to monitor prices daily; in Europe, captives will benefit from increased participation in used car sales; and in Asia captives have limited lease exposure because used car markets have yet to develop.

**AFVs' rapidly evolving technology and adoption expose asset-backed securities (ABS) to collateral risk.** As shifting consumer preferences and regulatory incentives drive up AFVs' penetration in global markets, securitizations' exposure to vehicle-value risks will also rise. However, a variety of mitigants, some global and others region-specific, will help uphold performance even as pool composition shifts.

**Thin profit margins on AFVs will not compromise strong parent-captive relationships, but captives are taking measures to ease cost pressure.** Manufacturers will prioritize extensive investment to retool plant and produce AFVs at profitable scale. But the captives remain vital to sales of new vehicles, and we expect their parent manufacturers will continue to provide support. Still, some captives are widening their access to more affordable funding.<sup>3</sup>

## Sales of alternative fuel vehicles are accelerating, with implications across auto-related sectors

Accelerating sales of AFVs will shift portfolio compositions and credit fundamentals across auto-related sectors. Adoption rates for AFVs will continue to vary by region. In Europe, for example, new registrations have increased substantially across a number of national markets (Exhibit 1) and average about 26% of new vehicle sales in the EU. AFV sales are also especially strong in Japan, at about 29%, although the majority of the vehicles are hybrid electric vehicles. China and the US are later adopters, with AFVs comprising just 5.4% and 2% of new vehicles sales, respectively.

In Europe, the pronounced shift away from internal combustion engine (ICE) vehicles has been fueled by government-led purchase subsidies. And traditional auto manufacturers on the continent have made a concerted push into electric vehicles to avoid penalties for exceeding maximum carbon emission levels set for their newly registered fleets.

Similar forces to those in Europe will eventually drive greater AFV adoption more broadly across the globe. Late movers will lag in initial penetration rates for AFVs. At the same time, early adoption has both advantages and disadvantages, with first movers facing a steep learning curve on how to build, market and finance AFVs profitably.

Exhibit 1

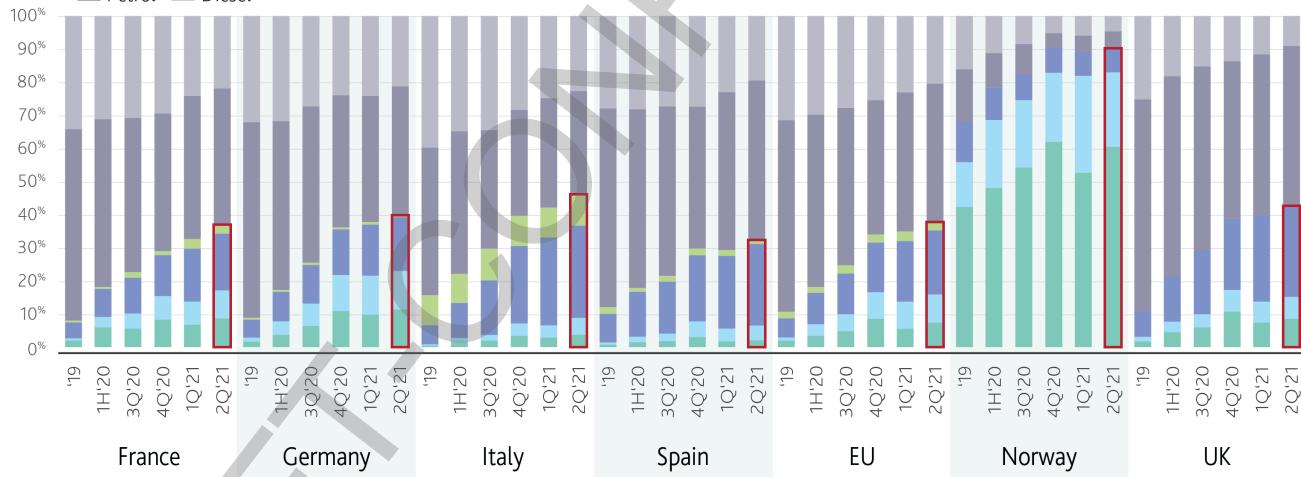
### The share of AFVs in new car registrations has risen significantly across Europe



#### SUPPLY / DEMAND

Higher share of new vehicle registered are electric – Europe and Japan are leading change.

█ Battery electric vehicles   █ Plug-in hybrid electric vehicles   █ Hybrid electric vehicles   █ Alternatively-powered vehicles other than electric  
█ Petrol   █ Diesel



Battery electric vehicles also include fuel cell electric vehicles. Hybrid electric vehicles include mild-hybrid petrol and diesel engines. Alternatively-powered vehicles other than electric include natural gas, liquified petroleum gas and the E85 ethanol-petrol mix.

Source: European Automobile Manufacturers' Association (ACEA)

## Captives' lease portfolios will grow, with a rising proportion of AFV assets and shorter overall maturities

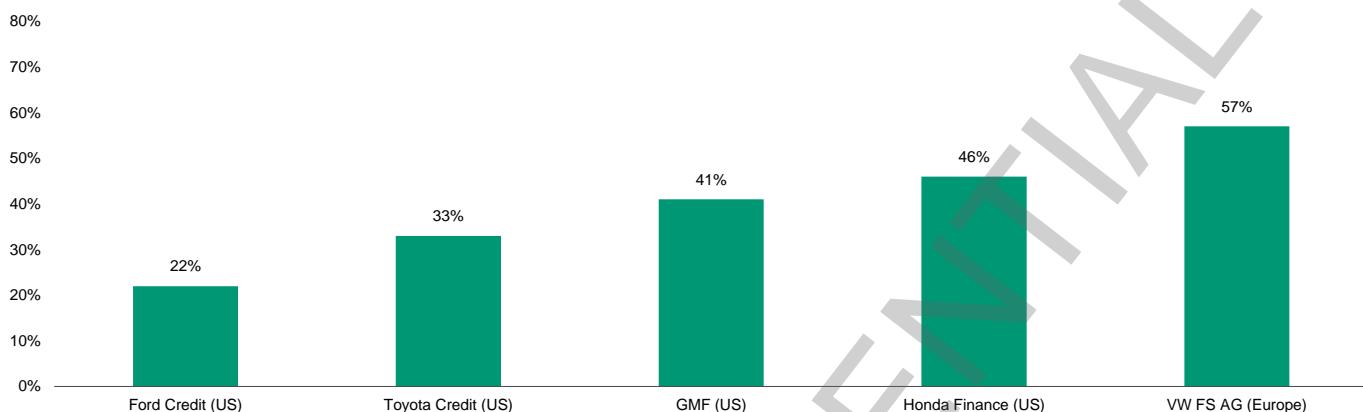
In Europe and the US particularly, captives play a vital role in the auto leasing market. On top of supporting sales for their auto manufacturing parents, they help build customer loyalty through lease renewals on same-brand vehicles. On average, leases account for about 35% of captives' total portfolio, but the amount varies substantially by company and region (Exhibit 2). As of 31 March 2021, leases ranged from a high of 57% of total assets at the Volkswagen Financial Services AG to a low of 21% at Ford Motor Credit Company LLC.

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## Exhibit 2

**Auto captives have sizable lease portfolios for new and used vehicles in the US and Europe**

% of leases in asset portfolios, as of 30 June 2021



This, and each subsequent graph depicts Moody's-rated captive auto finance companies in the order of smallest to largest lease portfolio.

The auto captive peer group includes Ford Motor Credit Company LLC (Ford Credit, Ba2 stable), Toyota Motor Credit (Toyota Credit, A1 stable), General Motors Financial Company, Inc. (GMF, Baa3 stable), American Honda Finance Corporation (Honda Finance, A3 stable), and Volkswagen Financial Services AG (VW FS AG, A3 stable).

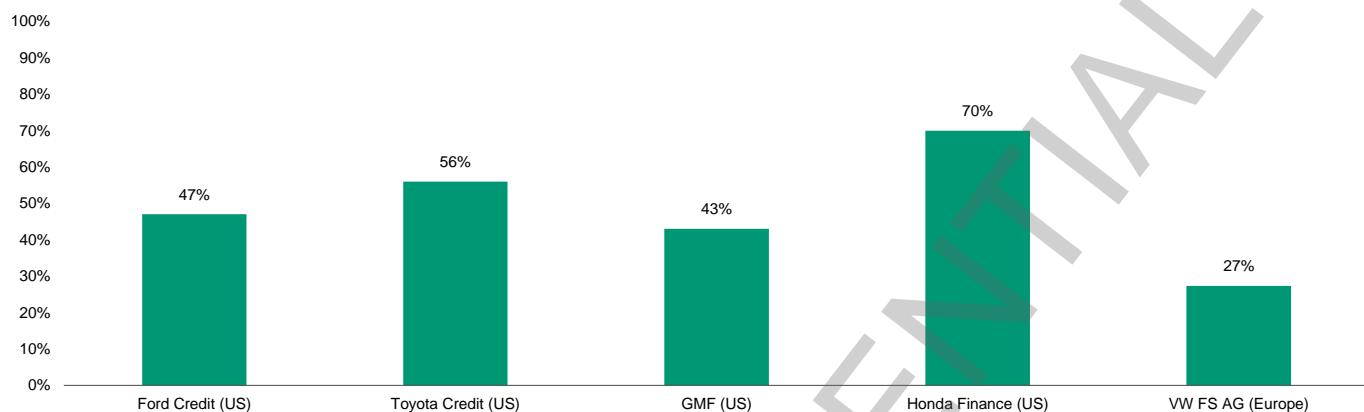
*Source: Company filings*

Auto captives will likely grow their lease portfolios, at least temporarily, to support the wider rollout of AFVs to consumers who are reluctant to purchase vehicles of unproven useability and value. Buyers may be wary of vehicles quickly becoming obsolete, or lacking sufficient range and supporting infrastructure. AFV penetration rates will rise as captives provide incentives to help build brand loyalty for new technology vehicles and stabilize their residual values.

In Europe, where in some regions the roll-out of AFVs is becoming more pronounced, Volkswagen AG (Volkswagen, A3 stable), for example, substantially increased its AFV penetration leasing rate, particularly in the lease portfolio at VW FS AG, as new AFVs came to market in Europe since the second half of 2020. Current leasing penetration rates in Volkswagen's core European markets (e.g., Germany, UK, Sweden) have already exceeded 50%, compared with a global penetration rate of 28% (Exhibit 3), which is however distorted by China, where the auto leasing market is underdeveloped. But the company expects its global penetration rate for new AFVs, and particularly for BEVs, will also reach 50% by 2025, as AFV adoption picks up in other regions. This also reflects Volkswagen's aspiration to produce around 20% of global battery electric vehicles (BEVs) by 2025, as well as to extend its share of the used car value chain.

The US auto finance captives have high average penetration rates for new ICE vehicles sold (Exhibit 3), but they and manufacturers are still working through the best approach to finance AFVs, especially BEVs, because the market is much less developed. Market growth is coming, however. General Motors announced in January of 2021 its commitment to produce all electric vehicles by 2035. Ford Motors is now selling an electric version of its best selling F-150 truck, with 77% of sales coming from new Ford customers. The Mustang Mach-E also captured a number two share position in the US among all EV SUVs. For now most Ford customers use cash or financing from other sources to purchase electric vehicles. But we expect that GMF will rely more on leases because of its customers' historical purchasing preferences. Initiatives to provide AFV financing alternatives will accelerate in the US in the next 18 months, in part because of the recent Biden administration commitment that half of vehicles sold in the US will be electric by 2030.

## Exhibit 3

**Captives' ICE penetration rate is high in the US and Europe**  
Penetration rate at 30 June 2021

Ford Credit penetration rate represents retail financing and operating lease share of new Ford and Lincoln brand sales; GMF - penetration rate of GM's retail sales; Toyota Credit - Represents the percentage of total domestic TMNA sales of new Toyota and Lexus vehicles financed by Toyota Motor; Honda Finance - new auto and motorcycles financed with either retail loans or leases. VW FS' penetration rate represents the penetration rate of new vehicles.

Source: Company filings

The European and US auto finance captives typically have longer portfolio durations for loans than leases. Contractual tenors will tend to shorten as they grow lease portfolios to support wider AFV rollout, but the captives will effectively retain longer exposure to these vehicles' residual values because of growing demand for retail leases on used AFVs (or BEVs/PHEVs.) Interestingly, in the still maturing Chinese auto captive sector, the situation is reversed, with portfolio durations already fairly short and auto loans subject to a five-year maximum tenor, a regulatory constraint that does not apply to leases. As a result, the contract tenors of auto leases can be longer than those of auto loans for the same vehicle type and captive.

### Residual value risk will rise because of price uncertainty in a fast-changing auto market

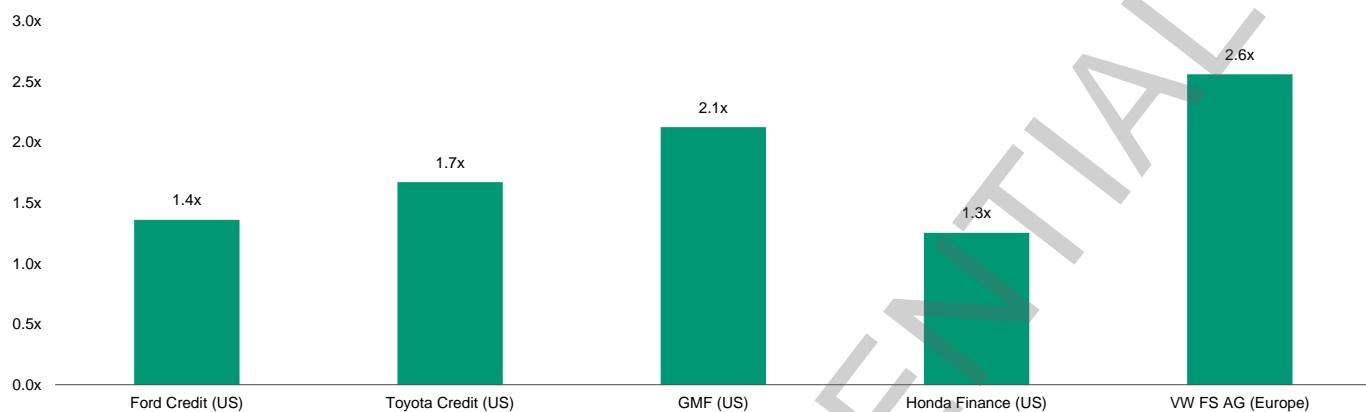
As lease portfolios grow and the proportion of AFV leases increases, residual value (RV) risk will rise.<sup>4</sup> If used car prices decline more than forecast, the auto finance captives will begin to suffer increased losses on their lease portfolios. Whether these losses have a material credit implication will depend on the size of the lease portfolio relative to the captives' equity bases. For the largest public auto captives, residual value to equity ranges from 1.3x to 2.6x and is 1.8x on average (Exhibit 4) at 31 March 2021. The higher the residual value to equity ratio is, the faster used car price movements will erode captives' capital.

VW FS AG is the most exposed to a decline in used car prices and, taken in isolation, a price drop of 35% (if the residual value to equity is 2.6x, then the division of the equity of \$100, for example, by that multiple will result in 35%) would erode its equity base. At the other extreme, and again taken in isolation, Honda Finance would suffer an erosion of its equity base only if prices drop more than 75%. The auto finance captives periodically (often quarterly) update the car value assumptions that underpin their loan and lease impairment and depreciation rate calculations. So in actuality it will take a substantial, sudden and permanent shift in the used car market before losses from residual value risk materially impair the captives' equity. We believe that this treatment will remain the same for AFVs.

The short duration of used car price declines in the U.S. historically is an important credit consideration because the drop in a vehicle's value must be assessed as permanent before it impacts economic capital and it is booked as an impairment charge that reduces capital. So even though US used car values dropped 18% over three months at the outset of the pandemic, the auto captives did not report any impairment charges. Similarly, during the financial crisis, Ford Motor Credit took a pretax impairment charge of \$2.1 billion to its lease portfolio but reversed it in subsequent quarters as used car prices began to recover. We are yet to determine the duration of price fluctuations and market participants' behavior when greater number of AFVs is rolled out in the U.S.

## Exhibit 4

**Used car prices will have to decline substantially for the captives to experience erosion in equity**  
**Residual value to equity at 31 December 2020**



Source: Company's filings, Moody's calculations

The methods that captives employ to manage residual value risk will vary, in particular according to the depth, predictability and price drivers of regional used car markets (as detailed in "Appendix: new and used car market structure in major regions"). However, a few general factors can help mitigate residual value risk. Foremost is a deep used car market with more predictable price performance through a range of economic cycles. Also important is a captive's experience managing vehicle financing through the life cycle, as well as the ability of its parent to provide support, if needed.

In the US prices have historically been fairly steady and price discovery benefits from the input of many market participants. US used car prices declined for only a short period following the last two recessions – by 18% following the COVID-19 outbreak and 14% following the 2007-08 financial crisis. And in the more recent case of the pandemic-induced downturn, US used car prices have since done quite well, increasing 27% year to date through August 2021. Accordingly, we believe that US captives will be less involved in managing the fleet of used BEVs, instead relying on greater monitoring of used car prices to estimate residual values with greater precision, thus avoiding losses.

In contrast, VW FS AG, the captive of Volkswagen, has recently articulated plans to involve its captive operations more intensely in vehicle distribution. VW also acquired a majority stake in the car rental service Europcar, which will additionally ensure the distribution and life cycle management of its own AFVs. By substantially increasing the number of used cars it finances or leases, it intends to help develop a more robust used car market for AFVs which further increases the residual value risk. For example, it will increase control over used car values via its heycar distribution platform<sup>5</sup> and Auto-Abo car subscription service. On this front, Volkswagen has substantial experience, benefiting from previous experience dealing with shifts in technology and consumer preference during the [diesel crisis](#).

Residual value volatility for AFVs will also arise from shifts in governmental subsidies, or their eventual withdrawal, as well as technological advances that give price advantages to newer cars over earlier models. So far, in Germany, where electric vehicles are becoming more commonplace, 52% of dealers surveyed by Autovista's local subsidiary DAT in June 2021 said they could only sell used BEVs at a substantial discount and 31% said they did not sell used BEVs at all.

Government subsidies also increase price volatility and residual value risk for captive lessors, as used ICE and AFV cars compete with subsidized new cars. But the amount and effect of subsidies is not the same across regions. In the US, for example, most manufacturers have already taken full advantage of as much as \$7,500 in federal tax credits for AFVs, so unless more tax credits are forthcoming, the incremental impact on AFV price volatility will be minimal. In Europe, however, extensive new [government-led purchase subsidies](#) have been implemented in most countries and will affect residual value risk for AFVs once sizable amounts of European lease contracts begin to expire in 2023.

It is also unclear how prices for ICE vehicles will hold up as the rollout of electric vehicles intensifies. The EU's climate-related legislation "Fit for 55", announced this July, will prohibit new ICE vehicles from 2035 onward and introduce even stricter limits on car pollution

for companies and individuals, which will likely begin to depress ICE vehicle prices. And on 5 August, the Biden administration made a commitment that half of vehicles sold in the US will be electric by 2030.

We expect that parent companies would step in to provide support well before severe residual value disruptions impede the auto captives' operations and impair their financial strength. Several of the support agreements between the auto captives and their parent manufacturers provide guidance on the leverage level at which the parent will at latest inject additional capital, if needed, which acts as a ceiling on their leverage. Notably, a captive's leverage is primarily governed by the self-liquidating nature of its asset base: as buyers make car payments, the outstanding balance of the asset pool declines, as does the captive's debt obligation. However, should captives report substantial provisions for losses and significant impairment charges, their parents might have to inject capital to mitigate increased leverage.

Ford Credit and GMF both have provisions in their support agreements stating that if leverage rises above 11.5x, the parent company will inject capital. The US captives of the Japanese manufacturers do not have explicit leverage targets at which the parent will inject capital, but their leverage is generally lower than that of GMF and Ford Credit, so they are less likely to need capital injections. Similarly, VW has no specific provisions for when the parent would step in, but VW FS AG benefits from a profit and loss agreement with the parent that obliges VW to absorb any net losses. Volkswagen can also draw on its financial strength to help mitigate risks for its captive subsidiaries and dealerships and protect its franchise, as it did in bearing the financial consequences of the diesel crisis.

### **AFVs' rapidly evolving technology and adoption expose ABS to collateral risk**

As shifting consumer preferences and regulatory incentives drive up AFVs' penetration in global markets, securitizations' exposure to vehicle-value risks will also rise. However, a variety of mitigants, some global and others region-specific, will help uphold performance.

### **Unexpectedly large depreciation and obsolescence of AFVs and ICE vehicles will spur risk for deals**

For lease ABS, if vehicles sharply lose value and realizations lag captives' expectations, loss risks would rise. For loan ABS, vehicle value risk manifests through low recovery values on defaulted contracts. A short track record for used AFV sales and the used car market's evolving supply/demand dynamics lower the predictability of used vehicle values. As future regulations encourage AFV purchases, for example, values for used ICE vehicles will likely weaken.

AFV technology that rapidly evolves will, in turn, quickly depreciate the existing deal collateral. For example, improvements to batteries will likely lessen the value of used AFVs with older technology. On the other hand, as charging stations become increasingly prevalent, an acceleration of AFV purchases will increase the likelihood that values on used ICE vehicles drop, reflecting the potential for eventual obsolescence.

The nature and extent of risk will shift over the tenor of a deal and depend on pool composition. If technology rapidly evolves at some point during a transaction's life, prices for certain used AFVs will weaken thereafter, posing risk to exposed deals. In addition, once an auto market hits an inflection point and AFVs dominate new vehicle sales, both the desirability of ICE vehicles and their value will decline, spurring risk for pools with a large share of these vehicles. Rising AFV penetration will reflect consumers' personal preferences and regulations that stipulate minimum AFV adoption which discourages the use of ICE vehicles and support related infrastructure, among other factors.

### **AFV purchases will rise rapidly in coming years, expanding ABS exposure to related risk**

The share of ABS pools made up by AFVs and therefore deals' exposure to related risk will grow in coming years as the vehicles' penetration of auto markets expands. ABS exposure will continue to vary by region, with ownership rates in Europe and Japan leading those in the US and China.<sup>6</sup>

We expect rising AFV purchases across regions:

- » **Europe:** New AFV registrations will nearly double to around 40%-45% by 2025, and dominate the market by the end of the decade, with 70%-75% of new sales.
- » **Japan:** About one-third of car sales are AFVs and new registrations will climb to over 40% by the mid-2020s. By 2030, two-thirds of all new cars sold will be AFVs.
- » **US:** AFV sales will exceed 10% of new registrations by the mid-2020s, and by 2030, around 1 of every 3 cars sold will be an AFV.

- » **China:** New energy vehicles (NEVs) — encompassing pure BEVs, PHEVs, and fuel-cell vehicles — reached 5.4% of total auto sales last year. The Chinese government set a goal for NEV unit sales to reach about 20% of auto sales in 2025.

#### **Pools' short tenors, transaction structures, strong obligors mitigate risk**

Across regions, certain mitigants will support deal performance longer than others, aiding both existing and future securitizations. For example, even after the market reaches that vehicle-purchase inflection point, pools' short weighted average lives will continue to allow only a narrow window of exposure to purchase volatility. In addition, for fully-amortizing loan transactions, monthly loan amortization will protect collateral performance.

By contrast, certain mitigants will likely aid only existing deals. Available credit enhancement levels will typically protect performance for senior tranches, even if serious stress weakened RVs. Also, while credit quality for obligors underlying loans financing AFVs is currently high, it will decline as AFVs become more broadly accepted and then purchased by a wider variety of borrowers.

Furthermore, the low share of AFVs in certain pools will marginalize related risk only for those deals. AFVs typically account for less than 5% of US pools and exposure is also low for most of the Chinese transactions. Exposure in Europe's loan pools is low, at less than 5%, but higher for lease deals, ranging from 10%-15% on average. Elsewhere, the AFV share is about 30% among loan deals sponsored by Japanese captives that we rate.

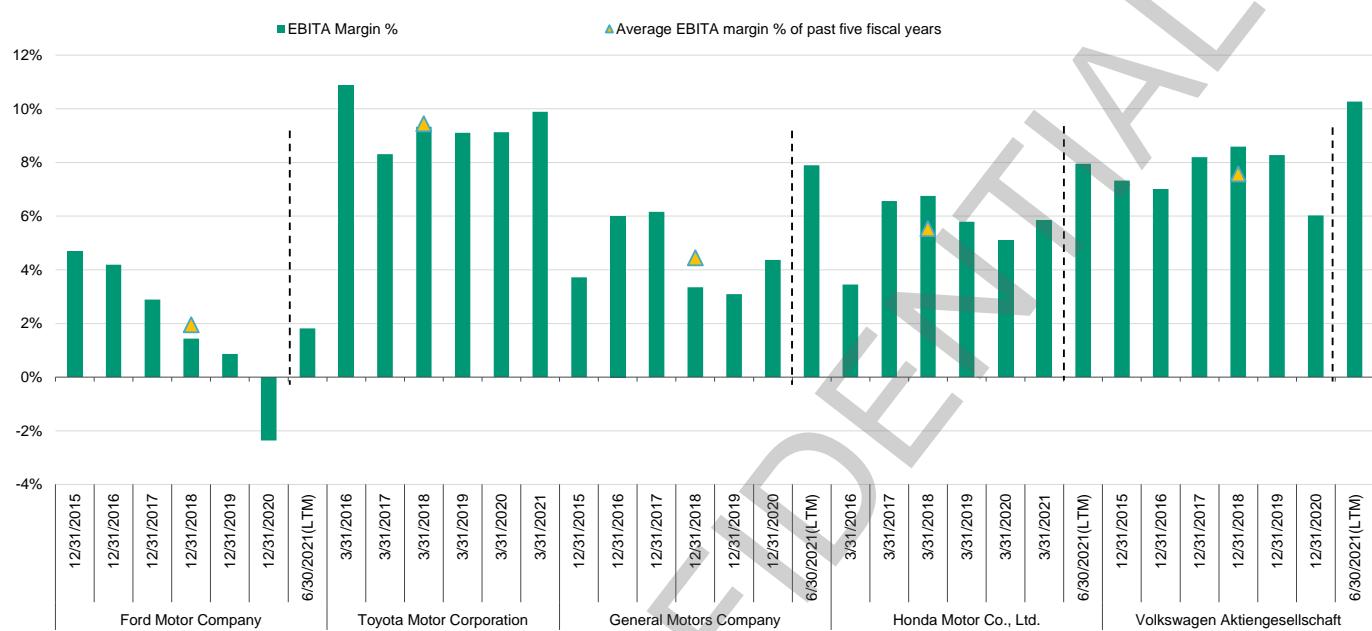
In addition, certain region-specific mitigants help support existing deals' performance. For example, in Europe's lease ABS, the few pools with high AFV shares have all been non-captive portfolios so far and benefit from a high diversity of model types and of manufacturers, minimizing deals' exposure to problems tied to any single auto type or sponsor. Also, captives typically repurchase vehicles or guarantee the contractual residual value for vehicles returned by the lessee. Within the US, only Tesla's transaction is fully backed by AFVs. Decline in values on vehicles underlying Tesla's transaction pose little risk given the higher residual value haircuts relative to other issuers. Meanwhile, in Japan's lease ABS, outstanding deals typically exclude the residual value portion of the underlying assets, thereby avoiding exposure to residual value risk.

#### **Thin profit margins on AFVs will not compromise strong parent-captive relationships, but captives are taking measures to ease cost pressure**

The wider rollout of AFVs, particularly BEVs, will put pressure on already thin profit margins at auto companies (Exhibit 6). But we do not expect tighter profit margins to hinder parent manufacturers' ability or willingness to support captives, because they are vital to ensuring consumer loyalty to their product lines.

## Exhibit 5

**Increased rollout of AFVs will put pressure on already thin margins of auto manufacturers**  
**Auto manufacturers' operating margins at 30 June 2021**



1) Fiscal years as of auto manufacturer's reported fiscal years. 2) Toyota Motor Corporation's data as of 31 March 2021.

Source:

The ability of captives to compete with other auto finance providers rests largely on incentives provided by their parents, which primarily include special-rate financing and cash rebates. These incentives vary by year depending on the need to promote new products, the market and the type of new product.

Providing incentives constraints auto manufacturers' operating profit, and when margins are particularly tight they may be motivated to curtail the type and amount of support they provide.

However, there is no tangible evidence that manufacturers are scaling back support, recognizing the vital role of their captive finance arms in maintaining a competitive edge in a highly competitive market.

#### Captives are widening their funding access and affordability to help stave off cost and profit pressure

Several captives are seeking to diversify their financing options to help preserve historical profitability as well as reduce the likelihood of severe disruption in the event of financial distress. This has included expanded securitization programs or new revolving securitization facilities, such as the \$6.5 billion 364-day revolving securitization facility that Toyota credit set up in July 2020.

General Motors Financial is seeking a bank charter in hopes of accessing a lower cost base of deposit funding. And Renault S.A. and BMW AG are among the automotive companies that have already set up captive banks like [RCI Banque](#) (RCI, Baa2 stable) and [BMW Bank of North America](#) (BMW Bank, A3 stable) to finance the purchase of their cars. Ford has also made strides in building its banking franchise through [FCE Bank plc](#) (FCE Bank, Baa3 stable) in Europe, where the deposit base has grown substantially to about 20% of overall funding.

VW FS AG relies heavily on wholesale funding, particularly after the deconsolidation of the deposit-rich VW Bank in 2017. However, it maintains diversified funding sources, including capital markets funding, asset-backed securities programmes in the EU and US markets, intragroup funding, and has access to a multibillion euro committed standby facility from its parent.

## Appendix: new and used car market structure in major regions

### United States

In the US car purchases are financed with amortizing loans with a term ranging from 24 to 85 months. Consumers also can choose to finance their vehicles by leasing them for an average tenor of three years under a contract that limits the amount of mileage that may be put on the vehicle without penalty. Toyota Credit and Honda Finance offer lease contracts that range from 24 to 60 months. Ford Credit's highest placement volume of leases was at 36 months at 31 March 2021. The US leasing market is dominated by the captives because this is the most expensive financing option for a lender and entails management of collateral at lease expiration, making it an unattractive business for banks.

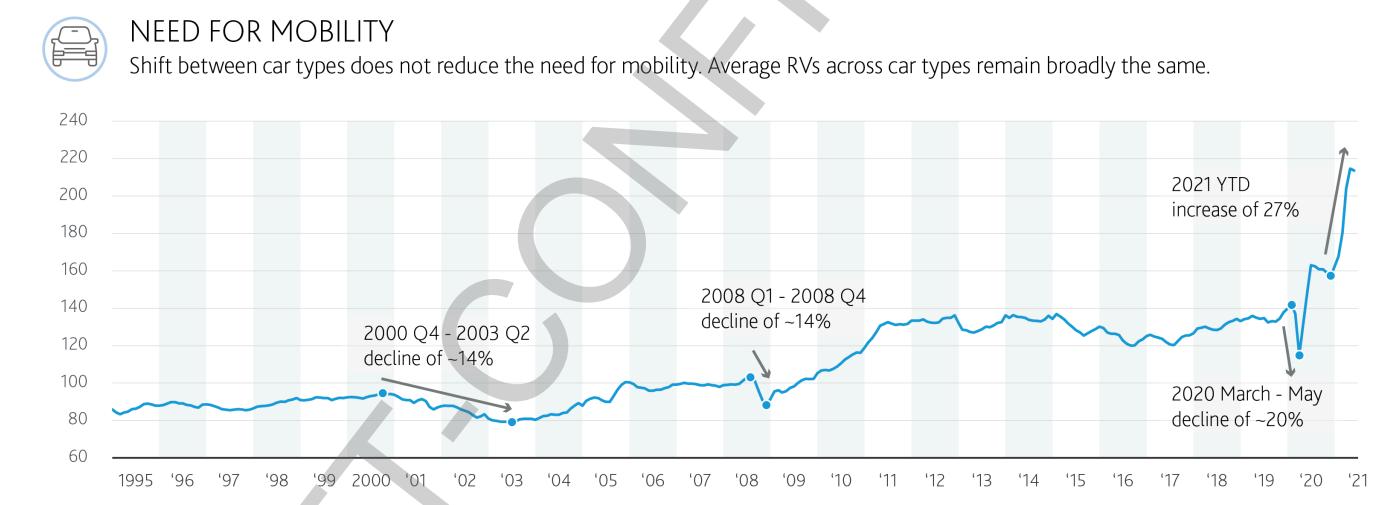
In the US the federal government provides about \$7,500 in federal tax credits to support increased AFV purchases, but leading carmakers have surpassed the 200,000 per manufacturer limit on availability of such credits. However, AFVs adoption will get a new boost from the 5 August announcement that the Biden administration has called for \$174 billion in government spending for AFVs, including \$100 million in electric vehicles purchase credits.

The used car market is deep, with the seasonally adjusted annual rate of cars sold at 41 million in May 2021<sup>2</sup>, and has shown a fair amount of stability through a range of economic cycles, with only temporary drops following recessions (Exhibit 5).

Exhibit 6

### Used cars prices continue a steady rise despite temporary drops in recessions

Used car prices through the recession of 2008 and the COVID-19 pandemic



Source: Moody's analytics

### Europe

In Germany and the UK, most auto sales are financed with Personal Contract Purchases (PCPs), balloon loans and closed-end leases, exposing finance companies and dealers to residual value risk.

In Germany, balloon loans are a highly popular financing product, in most cases entitling the driver to return the car at contract maturity, as in the case of all closed-end leases. Balloon loans can be structured in different ways, but customarily the driver can choose between returning the car to the dealer or refinancing or paying off the outstanding balance. German car dealers assume a significant amount of residual value risk. Nevertheless, we believe automakers would be motivated to step in to counteract used car price declines in a downside scenario to protect brand image and used car values for future financing contracts.

PCPs are widely used in the UK. The agreements are characterized by fairly low monthly payments for the life of the contract, and at maturity the customer has the option to make a balloon payment or return the vehicle to the finance company.

Similarly in the French market, the "lease-to-own" (location avec option d'achat, or LOA) product offers the client the option to either acquire the car at a pre-agreed price when the lease expires or return it to the finance company. In the latter case, additional costs for the driver arise when the vehicle exceeds the agreed mileage or when it is in a worse physical state through wear and tear.

In Germany, an economic stimulus package launched in 2020 doubled AFV sales incentives for vehicles with a net list price of up to €40,000 to €6,000 per vehicle until December 2025. The program also increased tax incentives for users of corporate AFVs priced at up to €60,000, up from the previous cap of €40,000. These subsidies have been accompanied by an intensified push by traditional auto manufacturers into electrified vehicles in their quest to [avoid penalties for exceeding maximum carbon emission levels](#) for their newly registered fleets. The automakers' push included the launch of new electrified models, such as Volkswagen's ID.3 and ID.4, BMW's i3, Renault's Zoe and Clio TCe X-tronic.

### China

In China, loan and lease penetration rates have been on the rise. Auto loans and leases are subject to different regulations in China. For instance, loans are subject to a maximum loan-to-value ratio, but not leases. Hence vehicle purchasers can finance a larger principal amount through a lease than a loan for the same vehicle.

Because of the different regulatory frameworks, automakers such as Daimler and BMW set up separate auto loan captives and leasing captives. The loan captives have a longer operating history and, thus, larger portfolios than their leasing counterparts. Auto loan ABS portfolios are also larger than lease ABS portfolios, and some captives have only issued auto loan ABS thus far.

Auto loans or leases in China are typically fully amortizing and for the purchase of new vehicles, since the used vehicle market is still developing. Consumers also have a general preference for new vehicles, and concern about the condition of used vehicles is one factor constraining growth of the used vehicle market.

Selective captives offer loans or leases with a balloon payment on the contract maturity date to purchase the vehicle, or leases with residual value, but these are not common.

Government policies in China encourage automakers to produce AFVs and consumers to buy them. The Chinese government's definition of AFVs includes pure electric vehicles (BEVs), plug-in hybrid vehicles and fuel-cell vehicles, and government policy encourages automakers to increase production of fuel-efficient ICE vehicles and AFVs to avoid regulatory expenses. The government also provides consumer subsidies to purchase AFVs, though these have been narrowed over the past few years and will continue to narrow in 2021.<sup>8</sup>

### Japan

In Japan, most sales of new vehicles are financed with fully amortizing loans with equal monthly payments or balloon payment auto loans, and Japanese captives mainly offer balloon payment loans to capture consumers' brand loyalty.

Balloon loans can be structured in different ways, but customarily the driver can choose to return the car to Japanese captives through dealers at a pre-agreed resale price that the captive guarantees at maturity. This typically exposes the Japanese captives to residual value risk.

The government subsidizes the purchase price for new electric vehicles. In 2021, the subsidy was up to JPY 800,000 (about \$7,300) for BEVs set with battery chargers and up to JPY 400,000 (about \$3,600) for plug-in hybrid vehicles. The subsidies apply to vehicles purchased by individual consumers and enterprises for commercial use.

Exhibit 7

## Moody's-rated auto captive companies across regions / markets

Finance - captives	Abbreviation	Issuer / Senior unsecured rating	Outlook	Net loans and leases (\$, in billions)
<b>North America:</b>				
Toyota Credit Canada Inc.	Toyota Canada	A1	STA	12
Toyota Motor Credit Corporation	Toyota Credit	A1	STA	116
American Honda Finance Corporation	Honda Finance	A3	STA	76
BMW Bank of North America	BMW Bank	A3	STA	9
Hyundai Capital America	HCA	Baa1	STA	44
Hyundai Capital Canada, Inc.	Hyundai Capital Canada	Baa1	STA	3
General Motors Financial Company, Inc.	GMF	Baa3	STA	101
Nissan Canada, Inc.	Nissan Canada	Baa3	NEG	6
Nissan Motor Acceptance Corporation	NMAC	Baa3	NEG	44
Ford Motor Credit Company LLC	Ford Credit	Ba2	STA	118
<b>Europe:</b>				
Volkswagen Bank GmbH	VW Bank	A1	STA	60
PSA Banque France	PSA	A3	STA	17
Volkswagen Financial Services AG	VW FS AG	A3	STA	114
RCI Banque	RCI	Baa2	NEG	57
FCE Bank plc	FCE Bank	Baa3	STA	15
<b>Asia:</b>				
Honda Finance Co., Ltd	Honda Finance	A3	STA	11
Toyota Finance Corporation	Toyota Finance	A1	STA	17
Hyundai Capital Services, Inc.	HCS	Baa1	STA	27
Astra Sedaya Finance (P.T.)	ASF	Baa2	STA	2
Federal International Finance (P.T.)	FIF	Baa2	STA	2
Adira Dinamika Multi Finance (P.T.)	Adira	Baa2	STA	2

1) Honda Finance, Ford Credit, GMF, HCA, Toyota Credit, BMW Bank, Honda Finance, Toyota Finance, HCS, ASF, FIF, and Adira as of 30 June 2021; Toyota Canada, Hyundai Capital Canada, NMAC, Honda Finance, and Toyota Finance as of 31 March 2021; PSA, VW FS AG, and FCE Bank plc data as of 31 December 2020; Nissan Canada data as of 31 March 2020.

Source: Moody's Investors Service, company reports

## Moody's related publications

- » [Transformational shifts in production and consumer demand pose elevated social risk](#), 8 July 2021
- » [Loan-to-value ratios will rise as new energy vehicle sales grow, a credit negative](#), 7 April 2021
- » [Automakers' move to alternative fuels will hurt returns; updated forecasts show faster adoption](#), 25 March 2021

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## Endnotes

- 1 Alternative fuel vehicles (AFVs) include battery electric vehicles (BEVs), plug-in hybrid electric vehicles, hybrid electric vehicles and alternatively-powered electric vehicles
- 2 see "[Automakers' move to alternative fuels will hurt returns; updated forecasts show faster adoption](#)", March 2021.
- 3 For example, General Motors Financial is seeking a bank charter to help diversify its funding options and Toyota Credit has expanded its asset-backed conduit program, though this was partly in response to disruption of the commercial paper market during the COVID-19 pandemic.
- 4 Residual value exposure is defined as net investments in leases less the present value of minimum future lease payments. The residual value (value of the used car) risk exists because the buyer returns the vehicle at the end of the contract term, leaving the lender exposed to its future market value.
- 5 The heycar used car distribution platform includes finance, leasing insurance and service offers and provides a guarantee for used cars
- 6 See [Automotive – Global: Automakers' move to alternative fuels will hurt returns; updated forecasts show faster adoption](#), 25 March 2021.
- 7 Estimate is provided by Cox Automotive
- 8 The subsidies apply to passenger vehicles purchased by individual consumers for noncommercial use.

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