

## TYCHOS SECTOR RISK REPORT

		2016	2017	2018	2019	2020 Q3
<b>Total Private Debt</b>	Debt to GDP	108%	109%	110%	113%	121%
	5 year % change	-2%	-1%	1%	6%	13%
	Billion Euro	€3,370	€3,552	€3,711	€3,899	€4,061
<b>Business Debt</b>	Debt to GDP	55%	56%	58%	59%	64%
	5 year % change	3%	5%	5%	11%	18%
	Billion Euro	€1,715	€1,840	€1,936	€2,041	€2,146
<b>Household Debt</b>	Debt to GDP	53%	52%	53%	54%	57%
	5 year % change	-7%	-6%	-4%	0%	7%
	Billion Euro	€1,655	€1,712	€1,776	€1,858	€1,915

## Areas of Concern

<b>Business Sectors</b>		2016	2017	2018	2019	2020 Q3
<b>Information Technology</b>	Loans to GDP	3.0%	3.0%	3.0%	4.0%	4.0%
	5 year % change	0%	1%	4%	14%	26%
	Billion Euro	€102	€107	€113	€127	€134

<b>Private Debt Lenders</b>		2016	2017	2018	2019	2020 Q3
<b>Foreign Loans</b>	Debt to GDP	11.4%	12.5%	14.0%	14.5%	15.3%
	5 year % change	19%	26%	25%	43%	42%
	Billion Euro	€355	€407	€470	€500	€512
<b>Other Financial Institutions</b>	Debt to GDP	6.9%	7.0%	7.6%	7.6%	8.1%
	5 year % change	12%	12%	14%	28%	38%
	Billion Euro	€216	€229	€256	€263	€272
<b>Corporate Bonds</b>	Debt to GDP	5.9%	6.5%	5.6%	6.2%	7.7%
	5 year % change	43%	35%	13%	20%	45%
	Billion Euro	€184	€211	€188	€214	€257

▲ High Concern  
▲ Concern  
▲ Low Concern  
▲ Current or recent crisis  
+ No Current Concern

n/a: Data Not Available

## Business Debt

Bank Loans by Industry		2016	2017	2018	2019	2020 Q3	
Commercial Real Estate	Debt to GDP	14.0%	14.0%	15.0%	16.0%	17.0%	⚠
	5 year % change	-8%	-7%	0%	8%	18%	⚠
	Billion Euro	€449	€469	€506	€536	€566	
Real Estate	Debt to GDP	12.0%	12.0%	13.0%	13.0%	14.0%	⚠
	5 year % change	-7%	-7%	-1%	7%	18%	⚠
	Billion Euro	€386	€401	€434	€458	€484	
Manufacturing	Loans to GDP	4.0%	4.0%	4.0%	4.0%	5.0%	+
	5 year % change	-20%	-16%	-9%	1%	10%	+
	Billion Euro	€125	€131	€139	€147	€157	
Wholesale and Retail	Loans to GDP	4.0%	4.0%	4.0%	4.0%	4.0%	+
	5 year % change	-11%	-11%	-6%	-3%	-3%	+
	Billion Euro	€128	€133	€139	€142	€136	
Information Technology	Loans to GDP	3.0%	3.0%	3.0%	4.0%	4.0%	⚠
	5 year % change	0%	1%	4%	14%	26%	⚠
	Billion Euro	€102	€107	€113	€127	€134	
Utilities	Loans to GDP	3.0%	3.0%	3.0%	3.0%	4.0%	+
	5 year % change	7%	2%	0%	1%	8%	+
	Billion Euro	€105	€113	€117	€119	€121	
Health Care	Loans to GDP	3.0%	2.0%	2.0%	2.0%	3.0%	+
	5 year % change	-12%	-15%	-14%	-8%	-2%	+
	Billion Euro	€78	€81	€82	€85	€85	
Construction	Loans to GDP	2.0%	2.0%	2.0%	2.0%	2.0%	⚠
	5 year % change	-10%	-5%	2%	9%	19%	⚠
	Billion Euro	€62	€67	€72	€77	€82	
Agriculture	Loans to GDP	2.0%	2.0%	2.0%	2.0%	2.0%	+
	5 year % change	2%	-5%	-3%	-4%	-1%	+
	Billion Euro	€51	€50	€53	€54	€56	
Transportation and Communication	Loans to GDP	2.0%	2.0%	2.0%	1.0%	2.0%	+
	5 year % change	-39%	-43%	-39%	-38%	-21%	+
	Billion Euro	€57	€52	€51	€50	€58	
Hotels and Restaurants	Loans to GDP	1.0%	1.0%	1.0%	1.0%	1.0%	⚠
	5 year % change	-8%	-7%	-3%	3%	15%	⚠
	Billion Euro	€23	€24	€25	€26	€28	
Other Services	Loans to GDP	3.0%	3.0%	3.0%	3.0%	3.0%	+
	5 year % change	-24%	-17%	-9%	3%	6%	+
	Billion Euro	€90	€97	€102	€107	€102	

\* Commercial Real Estate industry includes Real Estate and Construction loans

⚠ High Concern   ⚠ Concern   ⚠ Low Concern   ⚠ Current or recent crisis   + No Current Concern

n/a: Data Not Available

## Business Debt

Corporate Debt by Industry		2016	2017	2018	2019	2020 Q3	
Consumer Discretionary	Debt to GDP	13.1%	12.9%	14.2%	15.4%	16.1%	
	5 year % change	21%	13%	30%	33%	25%	
	Billion euro	€410	€419	€479	€531	€540	⚠
	Default Rate	n/a	n/a	n/a	n/a	n/a	
Communication Services	Debt to GDP	3.2%	2.8%	2.8%	3.3%	5.2%	
	5 year % change	26%	15%	8%	17%	67%	⚠
	Billion euro	€99	€91	€94	€114	€175	
	Default Rate	n/a	n/a	n/a	n/a	n/a	
Industrials	Debt to GDP	2.9%	3.0%	3.3%	3.7%	4.6%	
	5 year % change	19%	17%	40%	66%	70%	⚠
	Billion euro	€92	€97	€112	€129	€155	
	Default Rate	n/a	n/a	n/a	n/a	n/a	
Health Care	Debt to GDP	2.3%	2.2%	2.7%	3.1%	3.3%	
	5 year % change	41%	45%	82%	55%	37%	⚠
	Billion euro	€72	€72	€91	€108	€110	
	Default Rate	n/a	n/a	n/a	n/a	n/a	
Utilities	Debt to GDP	2.4%	2.2%	1.7%	2.3%	2.5%	
	5 year % change	-17%	-12%	-48%	-25%	-10%	+
	Billion euro	€75	€72	€57	€79	€82	
	Default Rate	n/a	n/a	n/a	n/a	n/a	
Materials	Debt to GDP	1.8%	1.7%	1.7%	1.8%	2.1%	
	5 year % change	4%	-8%	-10%	3%	24%	⚠
	Billion euro	€56	€56	€56	€61	€70	
	Default Rate	n/a	n/a	n/a	n/a	n/a	
Consumer Staples	Debt to GDP	0.6%	0.6%	0.7%	0.9%	1.1%	
	5 year % change	-12%	-6%	44%	43%	87%	⚠
	Billion euro	€17	€20	€23	€32	€35	
	Default Rate	n/a	n/a	n/a	n/a	n/a	
Information Technology	Debt to GDP	0.4%	0.4%	0.6%	0.6%	0.8%	
	5 year % change	32%	23%	90%	29%	81%	⚠
	Billion euro	€14	€13	€19	€22	€28	
	Default Rate	n/a	n/a	n/a	n/a	n/a	
Energy	Debt to GDP	0.3%	0.3%	0.3%	0.3%	n/a	
	5 year % change	333%	105%	132%	118%	n/a	⚠
	Billion euro	€10	€10	€11	€10	n/a	
	Default Rate	n/a	n/a	n/a	n/a	n/a	
Memo: Automobiles and Components	Debt to GDP	12.7%	12.6%	13.8%	14.8%	15.2%	
	5 year % change	22%	15%	30%	32%	22%	⚠
	Billion euro	€397	€410	€464	€512	510	
	Default Rate	n/a	n/a	n/a	n/a	n/a	

\* Sector aggregates are based on limited data availability

## Household Debt

Household Debt, by Type		2016	2017	2018	2019	2020 Q3	
Mortgage Debt	Debt to GDP	36.0%	36.0%	37.0%	38.0%	41.0%	
	5 year % change	-1%	-1%	1%	5%	13%	⚠
	Billion Euro	€1,126	€1,175	€1,231	€1,301	€1,362	
Consumer Credit	Debt to GDP	5.9%	5.9%	5.8%	5.8%	6.0%	
	5 year % change	-15%	-11%	-7%	-1%	1%	+
	Billion Euro	€184	€192	€196	€202	€200	
Other	Debt to GDP	11.0%	10.6%	10.4%	10.3%	10.5%	
	5 year % change	-17%	-19%	-18%	-13%	-9%	+
	Billion Euro	€345	€345	€348	€355	€353	

⚠ High Concern   ⚠ Concern   ⚠ Low Concern   ⚠ Current or recent crisis   + No Current Concern

n/a: Data Not Available

## Private Debt by Lender/Holder

Private Debt Lenders		2016	2017	2018	2019	2020 Q3	
Commercial and Savings Banks	Debt to GDP	46.0%	46.0%	48.0%	49.0%	52.0%	
	5 year % change	-5%	-3%	5%	9%	16%	⚠
	Billion Euro	€1,437	€1,512	€1,617	€1,700	€1,755	
Mortgage and Land Banks	Debt to GDP	14.0%	13.0%	12.0%	13.0%	13.0%	
	5 year % change	-32%	-29%	-26%	-20%	-12%	+
	Billion Euro	€433	€436	€416	€433	€443	
Credit Institutions	Debt to GDP	17.0%	17.0%	17.0%	18.0%	19.0%	
	5 year % change	1%	0%	2%	5%	11%	+
	Billion Euro	€517	€546	€577	€611	€639	
Foreign Loans	Debt to GDP	11.4%	12.5%	14.0%	14.5%	15.3%	
	5 year % change	19%	26%	25%	43%	42%	⚠
	Billion Euro	€355	€407	€470	€500	€512	
Other Financial Institutions	Debt to GDP	6.9%	7.0%	7.6%	7.6%	8.1%	
	5 year % change	12%	12%	14%	28%	38%	⚠
	Billion Euro	€216	€229	€256	€263	€272	
Corporate Bonds	Debt to GDP	5.9%	6.5%	5.6%	6.2%	7.7%	
	5 year % change	43%	35%	13%	20%	45%	⚠
	Billion Euro	€184	€211	€188	€214	€257	

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n/a: Data Not Available

## Portfolio Loans &amp; Investment (Total Economy) - Germany into Foreign Countries

Debt Security Investment		2015	2016	2017	2018	2019	
Germany Holdings of Foreign Debt Securities	to GDP	58.0%	57.0%	61.0%	55.0%	60.0%	
	5 year % change	9%	23%	7%	-6%	9%	+
	Billion Euro	€1,761	€1,779	€1,975	€1,823	€2,066	
France	to GDP	8.0%	8.0%	9.0%	8.0%	9.0%	+
	5 year % change	21%	18%	-2%	-10%	6%	+
	Billion Euro	€255	€252	€285	€266	€307	
United States	to GDP	6.0%	7.0%	7.0%	6.0%	7.0%	!
	5 year % change	34%	79%	72%	40%	52%	!
	Billion Euro	€184	€213	€232	€202	€238	
Netherlands	to GDP	6.0%	6.0%	6.0%	6.0%	7.0%	+
	5 year % change	-5%	0%	-10%	-11%	11%	+
	Billion Euro	€182	€185	€204	€202	€230	
Equity and Investment Fund Shares		2015	2016	2017	2018	2019	
Germany Holdings of Foreign Equity and Investment Fund Shares	to GDP	28.0%	29.0%	35.0%	29.0%	37.0%	!
	5 year % change	30%	68%	66%	18%	55%	!
	Billion Euro	€858	€912	€1,140	€970	€1,288	
Luxembourg	to GDP	13.0%	13.0%	16.0%	13.0%	16.0%	!
	5 year % change	14%	47%	47%	12%	40%	!
	Billion Euro	€394	€415	€510	€433	€538	
United States	to GDP	3.0%	4.0%	4.0%	4.0%	5.0%	!
	5 year % change	106%	130%	105%	38%	76%	!
	Billion Euro	€105	€116	€138	€126	€181	
Ireland	to GDP	2.0%	2.0%	3.0%	3.0%	4.0%	!
	5 year % change	157%	211%	177%	100%	162%	!
	Billion Euro	€60	€72	€97	€94	€143	
Loans		2015	2016	2017	2018	2019	
Germany Holding of Foreign Loans	to GDP	33.7%	33.2%	32.8%	33.4%	34.1%	+
	5 year % change	0%	1%	-3%	1%	4%	+
	Billion Euro	€1,020	€1,041	€1,065	€1,116	€1,170	
Germany Holding of Foreign Loans: Short Term	to GDP	12.5%	11.8%	11.8%	11.7%	12.7%	+
	5 year % change	0%	-1%	-1%	-1%	4%	+
	Billion Euro	€379	€371	€383	€392	€437	
Germany Holding of Foreign Loans: Long Term	to GDP	21.2%	21.4%	21.0%	21.6%	21.3%	+
	5 year % change	0%	2%	-4%	2%	3%	+
	Billion Euro	€641	€671	€682	€724	€733	

\* Total Economy includes Financial, Non-Financial and General Government sectors

! High Concern    ! Concern    ! Low Concern    ! Current or recent crisis    + No Current Concern

n/a: Data Not Available

## Portfolio Loans &amp; Investment (Total Economy) - Foreign Countries into Germany

Debt Security Investment		2015	2016	2017	2018	2019	
Foreign Holdings of Germany's Debt Securities	to GDP	60.0%	54.0%	53.0%	47.0%	49.0%	
	5 year % change	-9%	-8%	-20%	-21%	-10%	+
	Billion Euro	€1,804	€1,703	€1,728	€1,580	€1,687	
Netherlands	to GDP	6.0%	6.0%	6.0%	5.0%	5.0%	+
	5 year % change	20%	0%	-17%	-18%	-14%	+
	Billion Euro	€187	€176	€186	€171	€180	
Luxembourg	to GDP	5.0%	4.0%	5.0%	4.0%	5.0%	+
	5 year % change	-25%	-28%	-24%	-19%	10%	+
	Billion Euro	€141	€131	€148	€147	€171	
France	to GDP	4.0%	4.0%	3.0%	3.0%	3.0%	+
	5 year % change	-46%	-33%	-35%	-30%	-18%	+
	Billion Euro	€124	€112	€101	€92	€111	
Equity and Investment Fund Shares		2015	2016	2017	2018	2019	
Foreign Holdings of Germany's Equity and Investment Fund Shares	to GDP	29.0%	28.0%	34.0%	25.0%	30.0%	
	5 year % change	35%	79%	59%	-1%	31%	!
	Billion Euro	€875	€883	€1,100	€845	€1,039	
United States	to GDP	8.0%	8.0%	11.0%	8.0%	10.0%	!
	5 year % change	38%	82%	69%	-4%	41%	!
	Billion Euro	€255	€265	€354	€259	€341	
Luxembourg	to GDP	5.0%	5.0%	5.0%	4.0%	5.0%	!
	5 year % change	21%	53%	57%	15%	45%	!
	Billion Euro	€147	€143	€177	€150	€175	
France	to GDP	3.0%	3.0%	3.0%	2.0%	2.0%	!
	5 year % change	6%	44%	21%	-24%	0%	!
	Billion Euro	€84	€80	€95	€66	€79	

\* Total Economy includes Financial, Non-Financial and General Government sectors

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n/a: Data Not Available

## Derivative Activity

OTC Derivative Activity by Contract Type		2016	2017	2018	2019	2020 Q2	
Interest Rate	to GDP	965%	1155%	987%	960%	1070%	
	5 Year % Change	-47%	-26%	-34%	-26%	-1%	+
	Billion Euro	30,198	37,683	33,160	33,167	36,167	
Foreign Exchange	to GDP	141%	138%	134%	133%	130%	
	5 Year % Change	-30%	-27%	-20%	-26%	-23%	+
	Billion Euro	4,419	4,496	4,496	4,607	4,384	
Credit Derivatives	to GDP	44%	48%	22%	19%	26%	
	5 Year % Change	-55%	-28%	-64%	-61%	-43%	+
	Billion Euro	1,362	1,577	735	642	893	
Index and Stock-related	to GDP	16%	14%	11%	5%	4%	
	5 Year % Change	-28%	-34%	-35%	-70%	-82%	+
	Billion Euro	506	450	386	186	129	
Commodity contracts	to GDP	1%	1%	1%	1%	1%	
	5 Year % Change	-89%	-88%	-83%	-49%	-39%	+
	Billion Euro	29	19	22	26	23	
Total Notional	to GDP	1167%	1355%	1154%	1118%	1231%	
	5 Year % Change	-46%	-26%	-34%	-27%	-6%	+
	Billion Euro	36,514	44,225	38,799	38,628	41,596	

▲ High Concern  
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n/a: Data Not Available

## Largest Individual Lenders

Individual Lenders		2016	2017	2018	2019	2020 Q3	
Deutsche Bank	Loans to GDP	13.2%	12.4%	12%	12.6%	n/a	
	5 year % change	-15%	-15%	-11%	-10%	n/a	+
	Billion Euro	€414	€406	€405	€434	n/a	
	Charge-off Rate	n/a	n/a	n/a	n/a	n/a	
KfW (State-Owned)	Loans to GDP	4.4%	3.9%	3.8%	3.7%	n/a	
	5 year % change	-1%	-9%	-8%	-8%	n/a	+
	Billion Euro	€137	€128	€127	€129	n/a	
	Charge-off Rate	n/a	n/a	n/a	n/a	n/a	
DZ Bank	Loans to GDP	6.2%	5.9%	5.7%	5.9%	n/a	
	5 year % change	20%	22%	16%	23%	n/a	!
	Billion Euro	€195	€192	€192	€204	n/a	
	Charge-off Rate	n/a	n/a	n/a	n/a	n/a	
Commerzbank	Loans to GDP	7.2%	7.4%	7.4%	7.6%	8%	
	5 year % change	-36%	-29%	-18%	-7%	4%	+
	Billion Euro	€226	€242	€249	€261	€271	
	Charge-off Rate	n/a	n/a	n/a	n/a	n/a	

 High Concern
  Concern
  Low Concern
  Current or recent crisis
  No Current Concern

n/a: Data Not Available



## Real Estate

Total Debt		2016	2017	2018	2019	2020 Q3
Mortgage Debt	Debt to GDP	36.0%	36.0%	37.0%	38.0%	41.0%
	5 year % change	-1%	-1%	1%	5%	13%
	Billion Euro	€1,126	€1,175	€1,231	€1,301	€1,362



Quarterly Residential Housing Summary		Jun-2019	Sep-2019	Dec-2019	Mar-2020	Jun-2020	Sep-2020
Total Housing Units Approved for Construction	Volume	36,918	38,360	34,331	33,632	38,872	40,758
	Annual Change	-1.5%	2.8%	3.8%	3.4%	5.3%	6.3%
Total Housing Units Construction Started	Volume	5,044	5,172	4,947	5,097	5,421	5,565
	Annual Change	4.3%	6.8%	7.4%	10.9%	7.5%	7.6%
Residential Property Price Index	Index (2015=100)	127.8	129.6	132.7	133.5	135.8	139.7
	Annual Change	6.0%	5.3%	6.5%	7.1%	6.3%	7.8%

▲ High Concern  
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n/a: Data Not Available

## Additional Data








Public Debt		2016	2017	2018	2019	2020 Q3
Total General Government Debt	Debt to GDP	69.0%	65.0%	62.0%	60.0%	70.0%
	5 Year % Change	-13%	-20%	-21%	-21%	-4%
	Billion Euro	€2,172	€2,122	€2,074	€2,057	€2,345
Total Federal Government Debt	Debt to GDP	44.0%	41.0%	39.0%	38.0%	46.0%
	5 Year % Change	-13%	-18%	-20%	-21%	0%
	Billion Euro	€1,365	€1,350	€1,323	€1,299	€1,536
Total State and Local Government Debt	Debt to GDP	26.0%	24.0%	23.0%	22.0%	25.0%
	5 Year % Change	-14%	-22%	-23%	-21%	-11%
	Billion Euro	€819	€789	€767	€774	€824

Supplementary Data		2016	2017	2018	2019	2020 Q3
Nominal GDP	Billion Euro	€3,129	€3,263	€3,361	€3,455	€3,351
	Annual % Change	3.5%	4.3%	3.0%	2.8%	-2.4%
Real GDP	Billion 2015 Euros	€3,088	€3,177	€3,219	€3,238	€3,097
	Annual % Change	2.1%	2.9%	1.3%	0.6%	-4.2%
Consumer Price Index (Inflation)	CPI (2015=100)	101.20	102.70	104.40	106.00	105.80
	Inflation Rate	1.6%	1.5%	1.7%	1.5%	-0.4%
Unemployment	Person (Thousands)	2,628	2,440	2,261	2,281	2,892
	Unemployment Rate	6.0%	5.5%	5.0%	5.0%	6.3%
Current Account Balance	Billion Euros	€264	€254	€251	€250	€229
	to GDP	8.4%	7.8%	7.5%	7.2%	6.8%

▲ High Concern  
 ▲ Concern  
 ▲ Low Concern  
 ▲ Current or recent crisis  
 + No Current Concern

n/a: Data Not Available

## Explanatory Notes

Color Code	Cell Description
	5 Year % Change > 40%
	5 Year % Change > 40%
	Debt to GDP < 1.5% (immaterial)
	5 Year % Change > 20% < 40%
	Debt to GDP < 1.5% (immaterial)
	5 Year % Change > 13% < 20%
	Debt to GDP < 1.5% (immaterial)
	Residual Risk Period

 High Concern
  Concern
  Low Concern
  Current or recent crisis
  No Current Concern

n/a: Data Not Available

## Sources

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