TELEFÓNICA DEUTSCHLAND

COMPANY REPORT

TELECOMMUNICATION

31 DECEMBER 2019

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Improvements in KPIs expected

Along with solid Q4 trends expected. CAPEX on the rise. Post 5G auction brings forth 4th market entrant.

- We begin the coverage of Telefónica Deutschland (TEF DE) with a **BUY** recommendation, given our FY20 price target of **EUR 3.98** per share
- TEF DE's shares are down -23.9% YTD (excl. dividend adjustments). However, following up on stable Q3 results we further expect TEF DE to have solid Q4 numbers in the books, due to a robust growth in the mobile business segment (2.42% Quarter-over-Quarter).
- Our estimates suggest a 3Y increase of 3.4% in total revenues; against the longstanding decline in sales figures, as we assume the postpaid segment to recover
- The 5G-related infrastructure spending prevails on us to raise our CAPEX estimates over the forecasting period to an average of 17.6% in relation to sales (i.e. C/S)
- In our recommendation, however, we expect 1&1 Drillisch to pursue its MNO-strategy, putting additional pressure on the Mobile Service Segment, especially in the low-to mid- price space.
- Following recent events (appliance of IFRS 16 and 5G spectrum auction aftermath), TEF DE's capital structure has changed substantially to a current D/E ratio of 60%, matching the company's current Net-Debt to OIBDA ratio to 2.6x from 0.8x YoY.

Company description

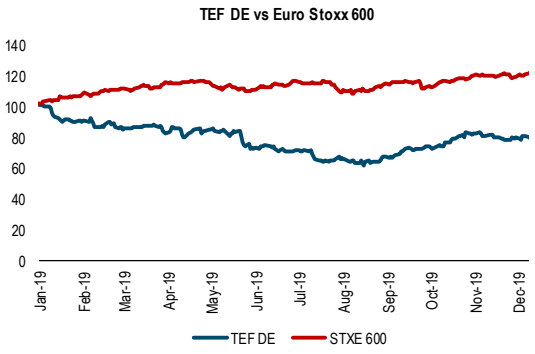
Telefónica Deutschland Holding AG is a listed (member of MDAX and TecDAX) telecommunications company that is headquartered in Munich, Germany. It is part of Telefónica Europe, a subsidiary of the Spanish firm Telefónica, S.A. TEF DE sells mobile and fixed-network lines to private- and business customers under its core brand name *O2* in Germany (next to other partner brands).

Recommendation:	**BUY**
Price Target FY20:	**3.98 €**
Price (as of 30-Dec-19)	**2.58 €**

Reuters: O2Dn.DE, Bloomberg: O2D:GR

52-week range (€)	2.13-3.39
Market Cap (€m)	7,775
Outstanding Shares (m)	2,975
Free Float (%)	27.8
Index	MDAX, TecDAX
Date-of-Price	31-Dec-19
Price Target End Date	31-Dec-20

Source: Bloomberg



Source: Data from Bloomberg; Own Chart

(Values in € millions)	2018	2019E	2020F
Revenues	7,319	7,334	7,408
Mobile Business Rev.	6,539	6,595	6,678
Fixed Line Rev.	767	735	726
Revenue Growth	0.3%	0.2%	1.0%
OIBDA (core)	1,807	1,820	1,883
Net Profit (core)	(195)	(200)	(62)
Change in Net CAPEX	(982)	(2,604)	(1,560)
NWC	(833)	(760)	(761)
Dividend Yield	8.58%	10.33%	5.1%

Source: Own Model, TEF DE reporting

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Company Overview

Covering all aspects of telecommunications' services, Telefónica Deutschland (TEF DE) is regarded as a fully integrated mobile network provider. By that, TEF DE has its own mobile service network but resells fixed-line capacity from Deutsche Telekom AG (DTE) and henceforth from Vodafone (due to the Unitymedia acquisition, explained later) as it does not own the required infrastructure. Consequently, TEF DE's Mobile Service Revenues (MSR henceforth) is its largest business segment contributing almost 90% of TEF DE's total revenues in 2019e[1] (cf. exhibit 1). In 2014, TEF DE advanced to the second largest mobile network operator in terms of customers in Germany after completing the acquisition of German mobile telecommunications operator E-Plus Group from De Koninklijke PTT Nederland N.V. (KPN). TEF DE is clearly positioned as the price leader in the German market which is paralleled by its mobile network coverage that generally lacks behind its two main competitors, DTE and Vodafone Germany (VODI), in terms of availability, speed and latency (Boyland, 2019). However, they aim to close the gap, offering better network quality while increasing its average annual revenues per user (ARPU)[2]. All its services are offered exclusively in Germany – future internationalization is not planned.

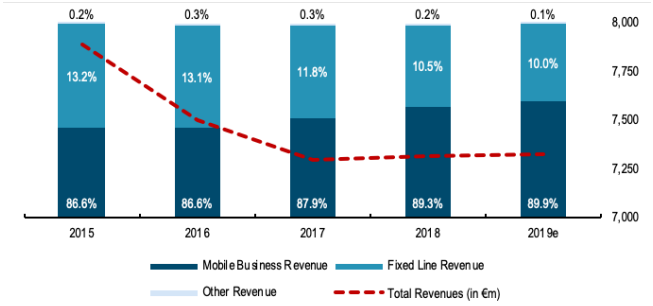

Exhibit 1: Sales Breakdown - Source: own research

Exhibit 2: Key Insights (Note that FTEs refers to Full time Employees/Equivalents and OIBDA to Operating Income Before Depreciation and Amortization) - Source: own research

Telefónica Deutschland's Key Segments

TEF DE mainly operates in two business segments: Mobile Business, which includes Mobile Service Revenues [Postpaid, Prepaid and Machine-to-Machine (M2M henceforth) and Handset Revenues] and Fixed Line Revenues[3]. Average data consumption and average annual revenues per user (ARPU henceforth) are amongst TEF DE's key revenue drivers. Whereby ARPUs are mainly actuated by the level of mobile data consumed.

[1] N.b.: If not otherwise stated, all 2019 numbers refer only to the numbers from the actual reported Q1-Q3 numbers. 2019e refers to the reported numbers of the first three quarters including our extrapolated numbers for Q4.
[2] Part of Digital4Growth Strategy: https://www.telefonica.de/investor-relations-en/publications/news-ir/financial-news/news/6096/dgap-news-telefonica-deutschland-launches-transformation-programme-digital4growth-at-capital-market-day.html
[3] Other Revenues are negligible as they relate to advertising and financial services and make up a marginal share of the total revenues (cf. exhibit 1).

- Mobile Service Revenues (MSR)

Despite the balanced number of accounts between prepaid and postpaid (20m vs. 22.5m in 2019e), MSR are predominantly driven by postpaid revenues (cf. Exhibit 3). In 2019e, postpaid ARPUs are expected to decline from EUR 178.20 (2018) to EUR 170.80 whereas postpaid account numbers increase by 6.6% year-over-year (YoY) to 22.5m connected accounts (cf. Forecast Assumptions). Prepaid revenues on the other hand account for ~ 28% of the total MSR and both its ARPUs and the number of prepaid customers have diminished in the past. As of 2019e, we see prepaid APRU at EUR 72.00 and the number of customers to be further reduced from 20.5m in 2018 to 20.0m in 2019e. This is mainly due to less customer demand for prepaid contracts resulting from European-wide introduced legitimization checks[4], and TEF DE's intention to move prepaid subscriber to postpaid where higher ARPUs can be realized. Still, we suppose the migrating trend will drag on for years and as the prepaid revenues will remain important for now, TEF DE even counteracts a too expeditious turn away from prepaid, e.g. with a recent campaign to reactivate churned- and inactive prepaid customers by pro-actively approaching them with attractive term contract offerings, as part of TEF DE's Digital4Growth strategy[5]. Ultimately, in our valuation we expect that the number of prepaid accounts will decline on average by 5.4% until 2025.

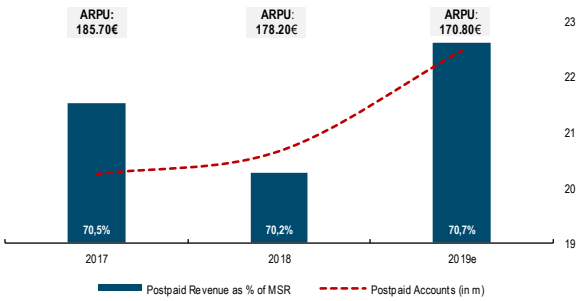

Exhibit 3: Sales Breakdown MSR - Source: own research

The M2M segment[6] on the other hand has been of minor importance so far (~ 1% of MSR in 2019e) but is projected to grow materially in the future (CAGR of ~13% until 2030e). Emerging technologies and use cases with regards to asset tracking, smart mobility (incl. fleet management and autonomous driving level 3 and higher) or smart manufacturing will foreseeably more than double TEF DE's M2M accounts from 1.1m connected accounts (reported Nov.19) to an expected 2.3m accounts over the next 6 years. Lighthouse projects, such as the entire provision and connection of a Daimler production facility with 5G in 2019, will commence the strong growth of this segment. Taking a lead as a capable business partner for large corporates will be a decisive factor of the further development. For now, we ascribe TEF DE a promising starting position

[4] https://netzpolitik.org/2017/interaktive-karte-registrierungspflicht-fuer-prepaid-sim-karten-in-europa-weit-verbreitet/#spendenleiste
[5] Cf. AR2018 page 42, Digital4Growth Transformation Strategy
[6] M2M = Machine-to-machine communication: automatic exchange of information between devices, where TEF DE offers managed connectivity through IoT SIM cards

compared to its two main competitors, DTE and VODI, as references with industrial SMEs and large corporates will be key for future B2B operations.

- Handset Revenues

Overall 2019e handset revenues stand out with a solid but declining growth compared to previous years (cf. Exhibit 4). Historically strong seasonal demand in Q4 (Christmas period) will have continued but is partially offset by smartphone users opting for mid-tier over premium-tier smartphones (Goasduff, 2019) which we incorporate by considering a slight drop in TEF DE's market penetration rate compared to previous Q4 values as its brand *O2* is only offering premium brands. In spite of the declining growth this year, handset revenues have experienced a strong growth (2017-2019e) with growth rates beyond 7% on average, crucially compensating for losses faced in the fixed line business.

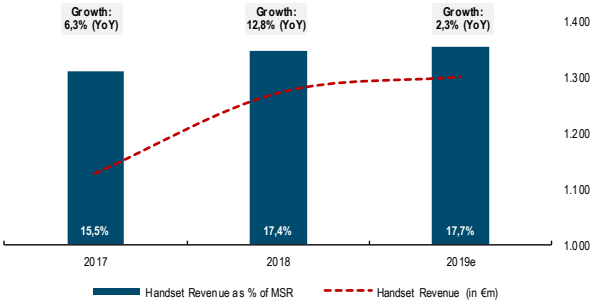

Exhibit 4: Handset Revenues - Source: own research

- Fixed Line Revenues

TEF DE's fixed line segment bundles all revenues obtained by providing landline and/or internet connections for German households and office buildings. For 5 consecutive years fixed line revenues have been falling. This was due to strong competition in the German market and the resulting price pressure (cf. Competitive Positioning). Such tough market environment is reflected in 2019e revenue figures for fixed line which declined by 4.2% YoY. However, we note there is a chance to hold up losses in ensuing years (cf. Forecast Revenues).

Accounting Analysis

Following recent events, TEF DE's capital structure has changed substantially to a current D/E ratio of 60% (up from 16% last FY). This is also reflected in TEF DE's current Net-Debt-to-OIBDA ratio which is expected to increase from 0.8x (2018) to 2.6x YoY[7] (cf. Exhibit 5). This large fluctuation in TEF DE's capital structure is mainly due to two reasons:

IFRS 16 Accounting Standard coming into effect: The new standard came into effect on 1 January 2019. In the course of that, the main effect for TEF DE has been the elimination of the off-balance sheet accounting regarding its

[7] Please Note: OIBDA means Operating Income Before Depreciation and Amortization

operating lease obligations. The implementation has only been executed this year and is hence not considered in previous financial statements. From 2019 on, TEF DE's leases are recognized on the balance sheet reflecting the right-of-use asset and the associated liabilities. It is important to acknowledge that off-balance sheet debt cannot be simply omitted since it would bias most of the financial ratios, including ROIC, ROE and operating CFs. In our valuation, henceforth we consider captions regarding right-of-use assets and the associated lease liabilities as on-balance sheet captions in accordance with IFRS16.

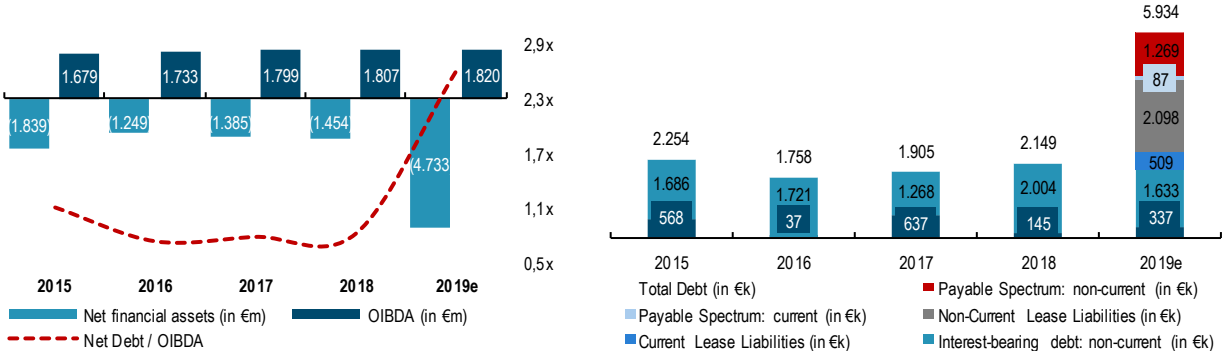

Exhibit 5: Net Debt Development & Net Debt Breakdown - Source: own research

For a better forecast we also included the off-balance sheet operating lease obligations between 2015 and 2018 as shown in exhibit 6.

Off-balance sheet obligations	2015	2016	2017	2018	On-balance sheet operating lease	2019 (Q1-Q3)
Obligation from operating leases	**2,494**	**2,792**	**2,779**	**2,579**		**2,547**
In % of Revenues	*32%*	*37%*	*38%*	*35%*		*35%*
Less than 1 year	513	535	554	475	**Current Lease Liabilities**	470
in % of non-current obligations	*26%*	*24%*	*25%*	*23%*		*23%*
1 to 5 years	1,164	1,265	1,451	1,240	**Non-Current Lease Liabilities**	2,077
Over 5 years	817	992	774	864		
in % of Revenues	*25%*	*30%*	*30%*	*29%*		*28%*

Exhibit 6: Lease Breakdown - Source: own research

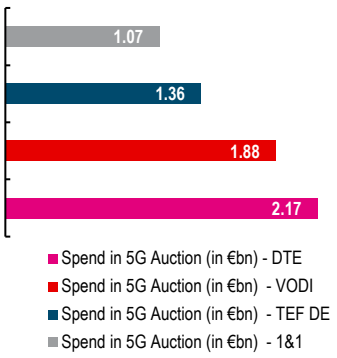

Exhibit 7: Spectrum Auction - Source: own research, Bundesnetzagentur

As mentioned at the beginning of this chapter this change had a notable impact on net debt, increasing it to €2.6bn in 2019e. Moreover, we link the newly implemented right of use assets to revenues since the operating leases predominantly relate to leases for roof locations for the construction of antennas, leased lines (e.g. dark fiber), as well as shops and office buildings. The direct impact of antennas, leased lines and shops on mobile traffic volume and hence sales is pivotal for this affiliation.

5G Spectrum Auction: The 2019 frequency auction impacts TEF DE's valuation in two aspects: (1) A new market entrant – 1&1 Drillisch AG – took part in the auction. The increased number of auction participants led to higher prices during the bidding process, causing investments in frequency licenses to be higher than

originally expected (cf. Exhibit 7). As TEF DE had to spend EUR 1.4bn to gain its expected spectrum rights[8], its leverage was further increased by 0.68x OIBDA to the mentioned total of 2.6x. This led Fitch Ratings to revise the outlook on TEF DE from positive to stable (Fitch, 2019). (2) TEF DE will from now on be confronted with an additional competitor in an already saturated market (cf. Competitive Positioning).

- Key Financial Ratios

Due to both the changes in accounting standards as well as the 5G spectrum auction, TEF DE's financial leverage ratios impaired distinctly. Although TEF DE's short-term liquidity proofs to be quite stable (cf. Exhibit 8), we examined if cost of debt might rise in the following as a compensation for the higher financial risk entailed in the company's balance sheet. However, we reckon that TEF DE is nonetheless able to hold its current BBB rating in the mid-term whilst taking into account that comparables, such as Tele2 and Telia from Sweden with similarly increased Net-Debt-to-EBITDA values (2.4x and 2.5x, respectively) after their national spectrum auctions in Sweden (which took place almost 1 year earlier) kept their ratings. Also, Fitch announced earlier that a downgrade would be following a continuous net leverage (net-debt-to-EBITDA) exceeding 3.25x[9]. We therefore proceed this valuation from the assumption that the increased debt ratios will not have an impact on TEF DE's cost of debt (cf. Cost of Capital). But with the addition that the development of the net debt will be thoroughly scrutinized in future valuations.

Financial Ratios	2017a	2018a	2019e
Liquidity Ratios			
Current Ratio	0.7x	0.7x	0.9x
Quick Ratio	0.6x	0.7x	0.9x
Cash Ratio	0.2x	0.2x	0.4x
Financial Leverage			
Net Debt / OIBDA	0.8x	0.8x	2.6x
Interest Coverage Ratio	46.1x	41.1x	13.8x
Debt / Equity	23.0%	28.4%	60.9%

Exhibit 8: Financial Ratios - Source: own research

Shareholder Structure

Telefónica Germany Holdings Limited currently holds 69.2% of TEF DE, whereas 27.8% of its shares are free floating and the remaining 3% belongs to KPN. Telefónica Germany is a 100% wholly-owned subsidiary of Telefónica S.A. Ascribed to its ownership structure TEF DE has paid out a high dividend subsequent to the E-Plus acquisition – insufficiently covered by earnings, especially in times of financial losses (cf. exhibit 9). Accordingly, necessary future investments will continue to be withhold in favor of maintaining such unsustainable dividend policy. With regards to potential positive NPV investments, this strategy may end up destroying value in the future (cf. Valuation). In its recent strategy update (December 2019), TEF DE's management announced to cut dividend payouts for FY 2019 to EUR 0.17 from EUR 0.27 in FY 2018[10]. We believe that this dividend cut is more sustainable but

Dividend Policy	2015a	2016a	2017a	2018a
Earnings (in €m)	(376)	(203)	(377)	(227)
Divdend per share (in €)	0.24	0.25	0.26	0.27

Exhibit 9: Historic Dividends - Source: own research

[8] https://www.sueddeutsche.de/wirtschaft/5g-lizenz-versteigerung-ergebnis-1.4394410
[9] Quote Fitch: "A downgrade may result from a material weakening in the company's current financial profile, including FFO adjusted net leverage consistently expected to exceed 3.25x" (source: Fitch, 2019)
[10] https://boerse.ard.de/aktien/telefonica-deutschland-kuerzt-dividende100.html

may not be sufficient (especially in view of its net financial debt currently and a probable avoidance of using new debt for dividend payout), and thus project that further dividend cuts to EUR 0.13 by 2025e can be expected (cf. Valuation). This is still in line with a targeted "high pay-out ratio" (AR2018, p.46) as it is equaling a payout ratio of 70% which again is in the range of what TEF DE's peers pay out. Moreover, this payout ratio gives TEF DE enough room for reinvestments, not raising additional debt and assuming a 30% reinvestment ratio, targeting a mid-term growth rate of 1.5% (after earnings normalize again) while targeting a 5% ROIC [cf. valuation model] (Koller et al., 2005). Higher investment obligations (cf. CAPEX scenarios) will additionally put pressure on lowering the payout ratio.

Telecommunications Sector in Germany

Nowadays, the core driver of the German telecommunications market is the transmission of data-based communication. Generated data volume is increasing rapidly in Germany (cf. Exhibit 10). In the fixed line network (broadband/cable), the volume has tripled from 16 billion GB in 2015 to 44 billion GB in 2018[11], while in mobile communications it has almost quadrupled, from 575 million GB in 2015 to 1.9 billion GB in 2018[12]. Key for future success will hence be the sustainable monetization of the ever-increasing customer demand for data.

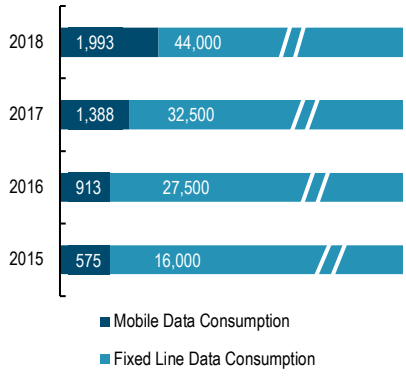

Exhibit 10: Data Consumption in Germany - Source: own research, vatm, Bundesnetzagentur

Competitive Environment

With DTE, VODI and TEF DE, there are currently three mobile network operators (MNOs) on the mobile communications market, which divide the market among themselves. In addition, there are smaller providers without nationwide network infrastructure (i.e. mobile virtual network operators), such as 1&1 Drillisch AG (1&1) or Mobilcom-Debitel. As mentioned, however, 1&1 has acquired network licenses in the latest spectrum auction and will likely enter the market as an independent mobile communications (MNO) provider from 2022 onwards, which we believe will pressure market shares (cf. Competitive Positioning). Competition is also intense in the fixed line segment. Established telecommunications companies are competing with cable network operators and city network operators who rely on regulated wholesale products (cf. Competitive Positioning). In the German telecommunication market, revenues in 2019e will stagnate at around EUR 57.6 bn (cf. Exhibit 11). A strong increase in data usage is mainly responsible for revenues not to decrease more due to ongoing price- and competitive pressure. Moreover, voice and SMS services are increasingly being replaced by free services (e.g. WhatsApp). Networked products such as

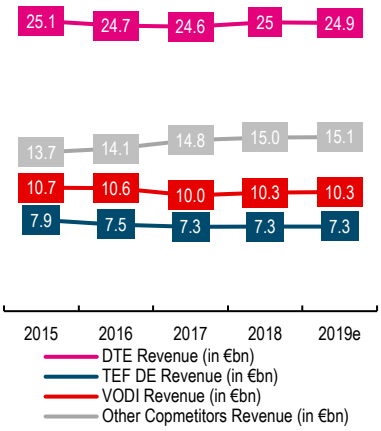

Exhibit 11: Telecommunications Provider in Germany - Source: own research, Bundesnetzagentur

[11] https://www.vatm.de/wp-content/uploads/2019/10/VATM_TK-Marktstudie_2019_091019.pdf
[12] https://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Allgemeines/Bundesnetzagentur/Publikationen/Berichte/2019/JB2018.pdf?__blob=publicationFile&v=5

smartphones and tablets, but also networked watches or other IoT devices are becoming more popular. This increases the demand for high mobile broadband speeds and large data volumes in the tariff portfolios of German telecommunication providers. The main issue here is that German MNOs face the challenge of monetizing this development to increase their revenues again.

Examining this development, we identify two implications. First, future demand for handsets and similar products will increase. Second, we believe that mobile contracts will only be driven by data packages which additionally let prepaid customers move to postpaid accounts. This in mind, TEF DE has started to encourage its prepaid customers to switch to the postpaid segment and to expand its hardware portfolio[13]. We therefore argue, that TEF DE's number of the more lucrative postpaid accounts (i.e. postpaid ARPU of EUR 170.80 vs. prepaid ARPU of EUR 72.00 in 2019e) will increase by roughly 8m over the forecasting horizon, which will offset TEF DE's loss of prepaid accounts (cf. Exhibit 12). Moreover, also because of an improved hardware portfolio, we believe that TEF DE will manage to almost keep its level of units sold throughout the forecasting horizon at roughly 2.6m units per year, despite a projected loss in market share from 14.4% in 2019e to 12.4% in 2030e (cf. Competitive Positioning). Still, ever increasing demand for data usage requires high levels of investment to upgrade next generation network infrastructures. We believe increasing CAPEX spending associated with mobile coverage improvements (incl. 5G rollout), rigid requirements imposed by the "Bundesnetzagentur" (cf. CAPEX scenario analysis), and continuing pressure by 1&1, show that future infrastructure investments will be essential to sustain current market shares across all segments.

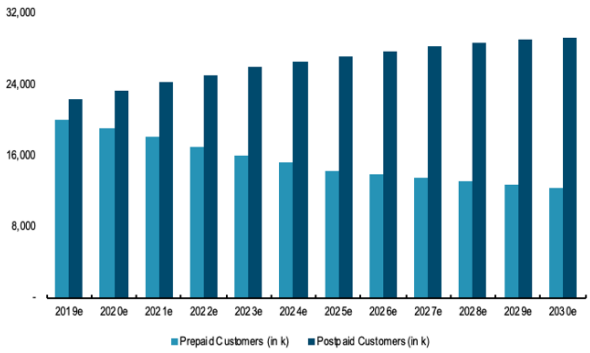

Exhibit 12: Postpaid and Prepaid Customer Development - Source: own research

Metrics (as of 2018)*	TEF DE	DTE	1&1	VODI
*in €bn unless otherwise stated				
Total Revenue	7.32	24.9	3.66	10.96
Total Customers	46.4m	76.4m	13.5m	29.5m
thereof Postpaid	20.2m	25.4m	9.2m	18.2m
thereof Prepaid	21.9m	18.8m	n/a	11.4m
thereof Fixed Line	2.0m	18.6m	n/a	7.6m
thereof Broadband Internet Access	2.3m	13.6m	4.3m	6.9m
EBITDA Margin	24.7%	93.7%	19.7%	37.4%
CAPEX/Sales	0.13x	0.17x	0.04x	n/a

Exhibit 13 : Competitive Landscape - Source: own research

Competitive Strategy

Now that the integration of E-Plus is complete, TEF DE is placing customer value at the heart of its corporate strategy to reduce churn rates and to increase ARPUs through up- and cross-selling across all segments. In this valuation, we break

[13] https://www.telefonica.de/news-telefonica-deutschland/pressemitteilung/news/6329/jetzt-das-xiaomi-mi9-und-mi9-se-sichern-o2-nimmt-als-erster-netzbetreiber-xiaomi-ins-portfolio-auf.html

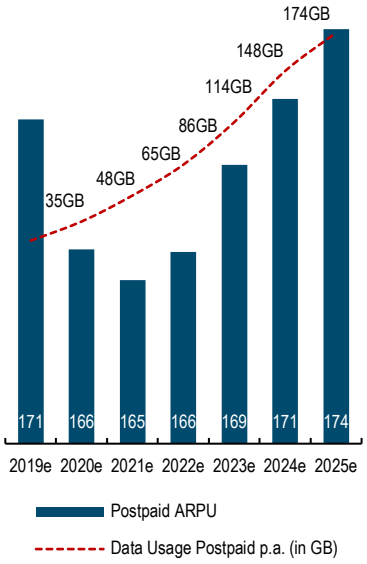

Exhibit 14: Postpaid ARPU & Data Consumption Development - Source: own research

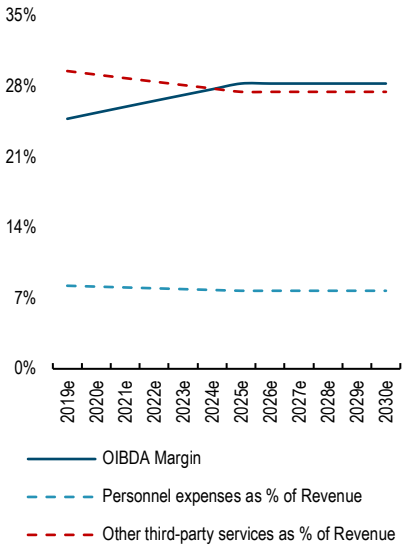

Exhibit 15: Enhancement of Operational Performance - Source: own research

down ARPUs into the "implied"[14] price per GB and mobile data usage (cf. Valuation)[15]. This in mind, TEF DE has two levers to improve the aforementioned KPIs. First, it can offer mobile data plans that include higher data volumes with higher nominal prices. Second, it can enforce higher implied prices per GB. This implies, that when accounting for the increased mobile data consumption TEF DE will be able to enforce an implied price per GB of EUR 1.00 in 2025e at an estimated monthly consumption of roughly 14 GB in the postpaid segment versus an implied price per GB of EUR 4.96 at an estimated monthly consumption of 2.9 GB in 2019 (Cf. Exhibit 14). Amongst others, we believe that TEF DE will manage to do so, because of two recent developments. First, because of the successfully completed integration of E-Plus in 2019, we argue that top decision-makers within the organization will be able to focus more on TEF DE's core business and be less distracted by M&A related issues (e.g. post-merger integration, etc.).

We believe that the re-focus on the core business will result in lower operating costs throughout the forecast horizon. Cost saving potentials are leveraged, as more backend services will be automated in the future, which will result in lower personnel costs (Cf. Exhibit 15), on comparing levels to TEF DE's peers. Other third-party costs could also be reduced when looking at the company's targets of the corporate digitization offensive *Digital4Growth*[16], because less commissions to third parties will be paid out as we bear in mind that an increasing number of sales will take place online. We have seen first positive outcomes of these efficiency enhancements already in 2018 (Personnel costs -4.98% YoY in 2018) and project this positive trend to continue throughout the forecasting horizon, resulting in an OIBDA-margin of 28.32% by 2030e versus 25.42% in 2019e (cf. Exhibit 15). Personnel expenses will make up 7.75% of revenues in 2030e (vs. 8.25% in 2019e) and other third-party services 27.5% respectively (vs. 29.56% in 2019e). We further believe that TEF DE will manage to enhance its ability to monetize the increased data consumption over the forecasting horizon because it will be able to provide an enhanced mobile network coverage with higher data transmission rates (following the completion of the network consolidation between E-plus and TEF DE and heavy infrastructure investments in the coming years), and also enlarge its coverage in rural areas across Germany by installing additional LTE stations[17]. The successful implementation of these measures, as well as the focus on the core business, give us reason to assume many endeavors announced in TEF DE's corporate strategy. This trust also goes back

[14] In our model "implied" is an attribute to a KPI that is not given by TEF DE and is derived by us on the base of other KPIs and presents the average price (if one would price it) of an exhausted GB used by TEF DE's customers
[15] Nowadays, postpaid mobile service revenues are driven by data consumption and not SMS or telephony services which are usually offered in flat-based bundles anyways. For simplicity reasons, in our valuation model we connect ARPUs with data usage and thus compute an "implied" price per GB which we again link to many drivers (cf. postpaid revenue forecast assumptions)
[16] https://www.telefonica.de/investor-relations-en/publications/news-ir/financial-news/news/6096/dgap-news-telefonica-deutschland-launches-transformation-programme-digital4growth-at-capital-market-day.html
[17] https://www.inside-digital.de/ratgeber/telefonica-o2-lte-netzausbau

to customer reactions. A recent industry survey graded TEF DE's mobile network with a mark of 2.2 (good) in the 2018 test and considered the progress of the expansion a quantum leap[18].

Forecast Assumptions

In the following, each segment's underlying forecast assumptions are illuminated. Thereby, special attention is given to the company's identified core value drivers.

Fixed Line Segment: TEF DE's future performance in the fixed line segment will not only be driven by its operational performance, but also by macro- and socioeconomic factors. In line with legal requirements, we assume in our model that the share of households with high speed internet (VDSL, Cable) coverage in Germany will grow to 98% by 2025 (BK1-17/001, 2018, p.168, "Versorgungsverpflichtung Haushalte") and for simplicity reasons remain constant thereafter, as there is no further evidence under which conditions very rural areas in Germany will have appropriate access to VDSL or Cable (Fibre) in the foreseeable future (ibid.). Obviously, data consumption will raise with increasing transmission speeds in the fixed line business, as well. Following that, we see the final migration from narrowband to broadband accounts (Cable, VDSL) of TEF DE's fixed line accounts enhanced, so that by 2025e the latest, TEF DE will have no remaining narrowband customers.

Having this in mind and acknowledging that the fixed line segment turned into a commodity over the past years with declining revenues for most MNOs, we think that despite continuing price pressure and a diverse competitive landscape, TEF DE as a sole vendor and not an operator for fixed line products will be able to more or less stabilize revenues with only small declines in the coming decade. This is also traced back to an improvement in market shares (in our analysis it increases from 8.8% in 2019e to 9.9% in 2025e) due to a wider product portfolio. And yet, TEF DE cannot fully leverage its greater market reach (cf. Competitive Positioning). This in mind, whilst the number of all fixed line customers is projected to increase only marginally from 4.36m in 2019e to 4.43m in 2030e in total, the average blended price (i.e. across all different bundle- and DSL/VDSL options) charged continues to decline from EUR 169 p.a. in 2019e to EUR 150 p.a. in 2030e (cf. Exhibit 16).

[18] https://www.chip.de/artikel/Netzabdeckung-O2-So-gut-ist-das-Netz_176646924.html

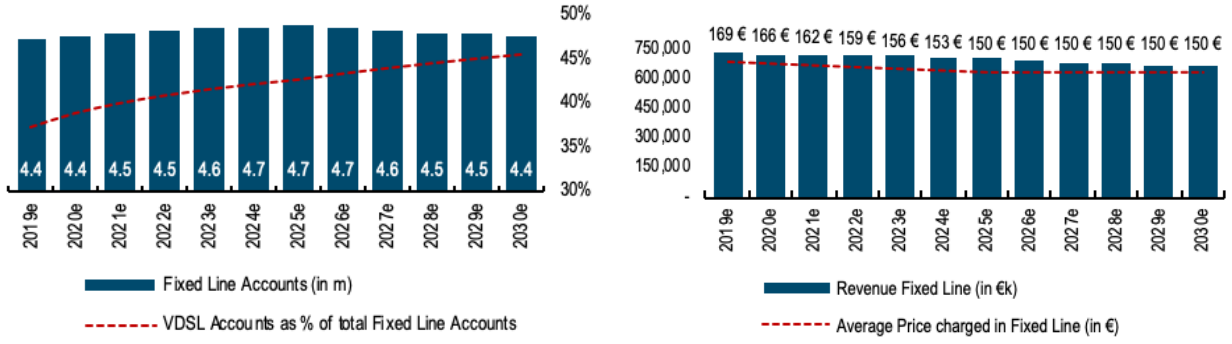

Exhibit 16: Fixed Line Accounts, VDSL Ratio (VDSL includes both Cable and VDSL accounts, i.e. high speed), Revenue Fixed Line & Average Price charged in Fixed Line - Source: own research

This price's development is assumed to diminish by the same percentage decrease as in the year before (i.e. -2% in 2018). However, with respect to TEF DE's latest strategy update, we expect that from 2020e on TEF DE will only offer the exclusive sale of both services (i.e. internet access and fixed telephony) in bundles. Consequently, fixed-line telephony accounts will match the number of internet & data access accounts in the long term. We apply 2025e as the year of final convergence. This will stabilize prices in the long-term. We thus assume that prices will remain constant from 2025e onwards, as the cost pressure for fixed lines due to the competition in fixed line business will first offset the bundle price effect. Moreover, fewer households will demand fixed-line telephony in the future because of an increasing smartphone penetration rate, a product we consider to be substitutive to fixed-line telephony and stationary internet access.

Handset: Handset revenues, are mostly driven by two factors: (i) smartphone prices; and (ii) smartphone penetration rate. The smartphone penetration rate is currently at 79% (as of 2019e) and is projected to reach 84% by 2024[19]. In our model then we believe that saturation will be reached at 90%, as this falls within the main target group for smartphone users in Germany (no users under 12 years). This saturation is assumed to be gradually reached over the next 10 years. The outlined development of the smartphone penetration rate in Germany is additionally linked to a projected population growth of 0.2% per year until 2022e and a declining population of -0.1% per year until 2030e. This is in line with general estimations concerning Germany's projected future population development[20]. Especially due to the growing smartphone penetration rate, TEF DE's addressable market (n.b.: per year) in this segment is also growing from around 18.4m people in 2019e to 21.1m people in 2030e. The addressable market is defined as the result of the number of all potential smartphone users in Germany with respect to the average smartphone holding period of 3 years[21].

[19] https://fesrvsd.fe.unl.pt:2060/statistik/daten/studie/500579/umfrage/prognose-zur-anzahl-der-smartphonenutzer-in-deutschland/
[20] https://www.worldometers.info/world-population/#table-forecast
[21] https://www.mafo.com/allgemein/jeder-vierte-deutsche-kauft-alle-zwei-jahre-ein-neues-smartphone/

Overall smartphone price development across all brands and price categories is based on the smartphone price development in Germany over the past ten years[22] as well as the ECB's long-term target inflation rate[23]. Against this background, we believe that smartphone prices in Germany will continue to raise by around 2% per year over the forecasting horizon. Despite the generally positive market environment in this segment (i.e. rising prices and rising market size), we, however, believe that TEF DE's market share will continue to slightly decline over the forecasting horizon which means that TEF DE cannot revert the negative trend from previous years.

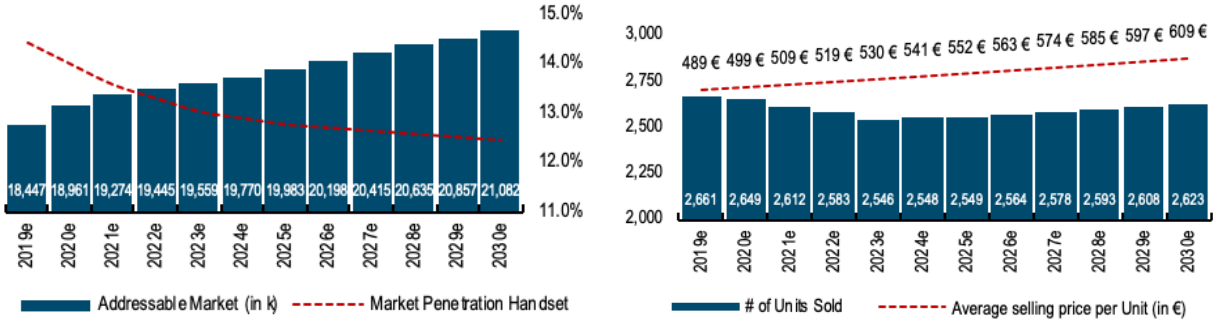

Exhibit 17: Addressable Market Handset, Market Penetration Handset, Number of Units sold in Handset and Average Selling Price per Unit in € - Source: own research

This in mainly due to the increasing competition from online sellers and used re-sellers as well as the improved product portfolio by market entrant 1&1, and a recent tendency for alternative smartphones (Goasduff, 2019). Following this, in our model TEF DE's market share (market penetration handset) is projected to decline from 14.4% in 2019e to 12.4% in 2030e (cf. Exhibit 17), which implies that the number of units sold in this segment will remain almost constant over the forecasting period regardless of the rather promising market environment. In particular, TEF DE's number of units sold in the handset sector is projected to marginally decline from 2.66m at an average price of EUR 489 in 2019e to 2.62m at an average price of EUR 609 in 2030e (cf. Exhibit 17).

Postpaid: Given that we identified mobile data consumption as a key value driver for the German telecommunications industry, TEF DE's postpaid ARPUs are largely determined by mobile data consumption in the future as well. Driven by new applications, an increasing number of streaming offers as well as voice-over-IP, video chats and new technologies such as virtual- or augmented reality, the consumption of mobile data in Germany will continue to rise strongly[24]. Over the past years, mobile data consumption in Germany grew by a CAGR of 47.6% from

[22] https://fesrvsd.fe.unl.pt:2101/statistik/daten/studie/28306/umfrage/durchschnittspreise-fuer-smartphones-seit-2008/
[23] https://www.ecb.europa.eu/mopo/html/index.en.html#:~:targetText=The%20primary%20objective%20of%20the,2%25%20over%20the%20medium%20term.
[24] https://www.mediaimpact.de/data/uploads/2019/10/web_lf_mobile_nutzer_20190904.pdf

2014 to 2019e[25]. In our model we acknowledge the fact that there is a relationship between mobile data consumption and the transmission rate and therefore argue, that mobile data usage will differ amongst the different transmission standards (e.g. the year after the LTE auction mobile data usage doubled in Germany[26]). Mobile data usage of LTE customers is assumed to continue its strong growth, but with decreasing growth rates in the next 4-5 years (cf. Exhibit 18) (Ericsson, 2019). After that period, mobile data consumption is mainly driven by 5G. Details concerning non-LTE data usage are not published from TEF DE. Hence, the prediction for TEF DE's 3G users' mobile data consumption is based on a competitor analysis, where we observed that LTE customers consume 6x more data than Non-LTE customers (i.e. 3G) in Germany[27]. We therefore included a so-called 3G-factor in our analysis that equals 0.17 (i.e. 1/6). This ratio is assumed to stay constant throughout the entire forecasting period (cf. Exhibit 18). The same rationale is applied concerning the new transmission standard 5G.

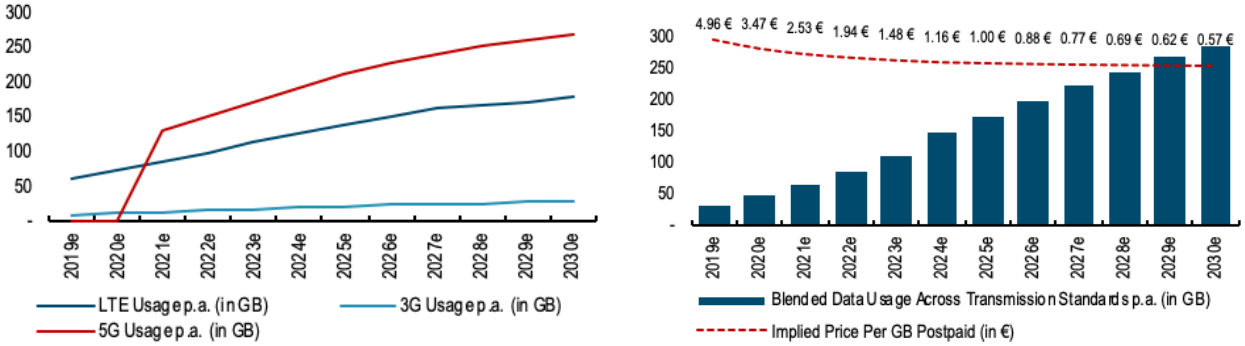

Exhibit 18: Data Usage across Transmission Standards and Implied Price per GB Postpaid - Source: own research

The 5G-factor is set to be constant at 1.5 to make sure the top line average blended data usage across all transmission standards is evolving in line with general forecasts regarding general data usage for postpaid customers (in Germany the CAGR in the next 4 years for blended data usage yields a 26% growth)[28]. We moreover assume that TEF DE's 5G penetration rate starts at 2% in 2021 (delayed start of 5G is expected, not before the second half of 2021 based on TEF DE's historical problems with the widespread introduction of LTE[29]). Then the penetration rate grows steadily. Our rationale regarding the growth rate is based on the time it took TEF DE to achieve an LTE penetration of 48% (with respect to its total customer base) after the LTE frequency auctions took place in Germany in 2010 (which took approx. nine years). Hence, we argue that it will take TEF DE nine years to reach a 5G penetration rate of 48.19% (with

[25] https://de.statista.com/statistik/daten/studie/172798/umfrage/datenvolumen-im-deutschen-mobilfunkmarkt-seit-2005/
[26] https://de.statista.com/statistik/daten/studie/172798/umfrage/datenvolumen-im-deutschen-mobilfunkmarkt-seit-2005/
[27] https://www.telekom.com/resource/blob/577610/4737cb778c46912c9c0049a54f96fcff/dl-2019-q2-praesentation-data.pdf
[28] https://tefficient.com/wp-content/uploads/2019/09/tefficient-industry-analysis-3-2019-mobile-data-usage-and-revenue-1H-2019-per-operator-5-Sep.pdf
[29] https://www.t-online.de/digital/smartphone/id_85687530/o2-telefonica-unter-druck-wegen-funkloechern-es-drohen-satte-strafen.html

respect to its total postpaid customers), implying a 5G customer penetration rate CAGR of 42.1% from 2021e to 2030e.An opposing behavior of mobile data consumption and the implied price per consumed GB could be observed in the past[30]. The implied price per GB is a dummy variable and hence a connecting piece of the value drivers which is the simple result of a multi-level breakdown forecast. Undoubtedly, the price will continue its downwards trending over the forecasting horizon (cf. Exhibit 18). Given the ever-increasing mobile data consumption, TEF DE cannot maintain a constant or even rising implied price per GB. We reflect for that and assume the percentual price drop to going down, accelerated by the introduction and proliferation of 5G availability from 2021/2022 onwards, which afterwards keeps the level around a 10% price drop of the implied price per GB per year in the long term (Cf. Exhibit 18). All put together, in our model we suggest TEF DE's postpaid ARPUs to develop sideways, increasing slightly in the next years but then decreasing again largely through the effects of 5G market adoption (a similar effect we had seen through LTE market adoption) (Cf. Exhibit 19). Similar to TEF DE's total market share, market share in the postpaid segment has also been declining since the completion of the acquisition of the E-Plus Group in 2014. However, we believe that with the overhauled network, TEF DE's customers will benefit from a better coverage and therefore predict that TEF DE will enhance its market share in the postpaid segment over the coming three years back to the strong 2017 and 2018 shares (only MNOs considered) of approximately 34% whilst accounting for the new market entrant 1&1 (cf. Competitive Positioning). All things considered and a constant churn rate of 6% p.a. makes TEF DE's number of postpaid customers rise considerably from ca. 21m in 2019e to 29m in 2030e (cf. Exhibit 19). The strongly increasing number of postpaid accounts is additionally promoted by TEF DE's prepaid to postpaid customer migration long-term strategy. Moreover, this strategy is also facilitated by 5G grid expansion, which will cause 3G coverage in Germany to diminish so that many prepaid customers are likely to be forced to switch to new 5G postpaid plans[31].

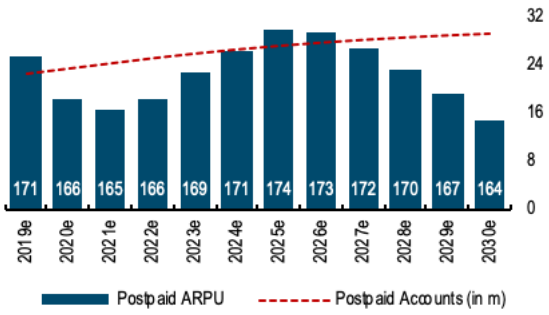

Exhibit 19: Postpaid ARPUs and Accounts - Source: own research

Prepaid: TEF DE recognizes that its postpaid division has much higher ARPU (more than 2.5x higher). What we see in the past years is, that TEF DE does not match the attractive data volume plans for their postpaid customers with their

[30] https://blog.deinhandy.de/statistik-beweist-datenvolumen-wird-immer-guenstiger
[31] https://www.t-online.de/digital/handy/id_85773678/5g-verdraengt-3g-millionen-smartphone-nutzer-muessen-den-tarif-wechseln.html

prepaid customers. Additionally, in their strategic outlooks TEF DE is addressing its conversion objectives (i.e. shifting prepaid customers to postpaid). Against that background, we believe that TEF DE will further incentivize prepaid customers to switch to a postpaid plan. This can be achieved by limiting the data volume options for prepaid customers which is one main driver for the ARPUs (which we assume to be consisting of "Blended Implied Price per GB across Prepaid packages" x "Data Usage Prepaid", considering that only the data volume will be priced in the future and telephony and messaging even changes from a commodity into a precondition).

Thus, for simplicity reasons we assume that ARPUs for Prepaid (a regressing business segment) will not experience any further growth and will remain at their current level of EUR 72 from 2019e to 2030e. The decline of the number of prepaid accounts over the past two years, however, is projected to continue over the forecasting period. This trend is ongoing for the last years because more required data volume is driving the shift from prepaid to postpaid. From 2025e this trend is assumed to continue, but with less drastic reduction since there is no current point of reference that determines how TEF DE will continue its conversion strategy from that point onwards. Hence, the number of prepaid accounts is declining from 20.0m in 2019e to 14.4m in 2025e and from that onwards to 12.5m by 2030e, which implies a CAGR of -4.2% over the forecasting horizon. In total the decline of prepaid accounts over time is almost completely compensated by the acquired accounts in the postpaid segment. Prepaid and postpaid accounts combined develop from 42.5m in 2019e to 41.9m in 2030e.

M2M: The M2M business segment is still in a fledgling stage but has clearly the potential to develop into a promising segment for wireless revenue growth and thus into an antipole to the MSR downward trend in the past years. As mentioned in the beginning, we project M2M revenues to grow materially in the future with a CAGR of ~12.8% until 2030. Global demand for IoT connections is likely to increase tremendously over the next decade (cf. Company Overview). The number of M2M accounts is not linearly dependent on the development of IoT connections, but on those that are in need of a cellular connection, i.e. the insertion of a SIM card. For instance, according to an IDC market forecast (Rojas et al., 2017), worldwide cellular IoT connections are projected to grow by a CAGR of 16.4% whereas LPWAN or WLAN IoT connections grow much faster (CAGR of 38% and 21.6%, respectively). This is very relevant to consider as we assume the projected demand for M2M accounts can be easily overstated. Because on the IDC market forecast (ibid) we link worldwide M2M IoT connections to the respective demand coming from Germany. Here, we apply

Germany's innovation factor[32] in combination with its world population share as a good proxy for the future M2M IoT connection demand coming from Germany's economy. TEF DE's market penetration in the M2M segment is held stable for simplicity reasons and the hard predictability in this aspirant business segment. The other top-line value driver for M2M is its respective ARPU (per Account). This value is derived from the average data usage multiplied with the "implied" [33] price per GB which steadily declines by 24% in our model in the forecast period. This is in line with the past years and assumed as the best proxy and therefore held stable. Our forecast of the average data usage for the next years is based on a study by the reputable 451 Research[34].

In subsequent years, the value driver grows by 28% from 2022e-2025e in our model (same growth rate as in the 451 Research) and is then increased up to 40% in order to account for the introduction of new technologies, mainly the broad adoption of autonomous driving (level 4 and 5 reaching market adoption by that time making vehicle-to-vehicle (V2V) connection necessary) and smart grid automation which is equal to a 40% increase of the previous growth rate which we project to take place[35]. Because of the offsetting effects between mobile data consumption and the price charged per consumed GB, we expect M2M ARPUs to fall to EUR 58 in 2025e but increase onwards up to EUR 77 in 2030 driven by the more than before increasing usage of M2M data due to the mentioned technologies reaching market adoption (cf. Exhibit 20). Our analysis regarding M2M revenues is to be understood as a best guess for an approximation. Some data sets for the underlying value drivers are dependent on developments that are difficult to forecast. We therefore calculated with very conservative numbers (e.g. the growth rate for worldwide IoT connections is not changed to a higher number beyond the years for which we have available forecast numbers from studies). We believe that success factors for the increasing demand for M2M connections in Germany are very dependent on the build-out of the "use-case-driving" 5G infrastructure, cost-benefit analyses of the multiple possible use cases and above that the integration into existing workflows and functionally adequate hardware

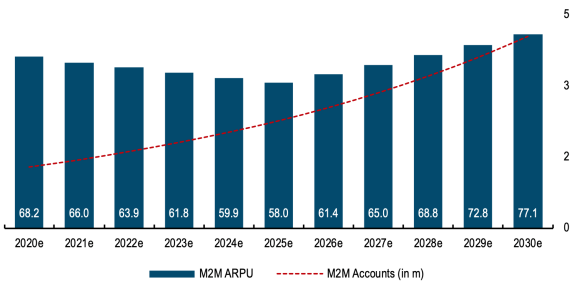

Exhibit 20: M2M ARPUs & Accounts - Source: own research

[32] https://www.globalinnovationindex.org/gii-2019-report --> By that, we suggest that the more innovative a country is, the higher its demand for IoT devices is going to be. Thus, this implies that approx. 2% of all cellular IoT-Devices will be used in Germany.
[33] In our model "implied" is an attribute to a KPI that is not given by TEF DE and is derived by us on the base of other KPIs and presents the average price (if one would price it) of an exhausted GB used by TEF DE's customers
[34] https://www.statista.com/statistics/752799/worldwide-m2m-average-monthly-cellular-data-usage/ **and** https://451research.com/blog/1662-featured-data-1
[35] In line with the research report from Allied. We then hold 2026 numbers stable: https://www.alliedmarketresearch.com/cellular-iot-market/

for the M2M SIM deployments. Accompanied by that, other analyses attribute a more optimistic growth to the M2M business segment for telecommunication companies as we do (Knoll et al., 2015).

Growth Rate of Revenues

In accordance with this valuation's projections, TEF DE's total revenues grow only moderately over the forecasting period (cf. appendix 2). MSR revenues continue to be the largest segment, although handset revenues show more stable growth rates. Fixed line's revenues decrease with a CAGR of -0.94% over the forecasting period, whilst handset revenues are projected to grow with a CAGR of 1.88% over the forecasting horizon (cf. Exhibit 21). Revenues within the sub-segments of TEF DE's MSR segment behaved somewhat more volatile. Prepaid revenues fall from EUR 1.5bn. in 2019e to EUR 898m in 2030e, implying a CAGR of -4.36% (cf. Exhibit 21).

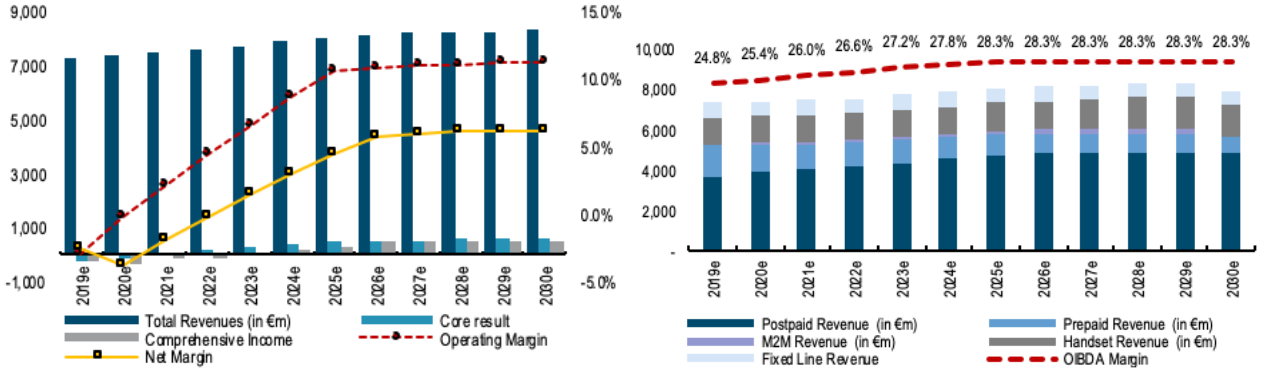

Exhibit 21: Overall Margin Development, Top Line Development and Segment Development - Source: own research

However, because of the significant increase in mobile data consumption and its customer gain, TEF DE records overall growing postpaid revenues with a CAGR of 2.33%. The most impressive performance is forecasted for TEF DE's M2M segment. As outlined, the demand for cellular IoT-devices is expected to grow substantially within the forecasted period and TEF DE is well prepared for this arising business opportunity. Hence, M2M revenues are projected to grow with a CAGR of 10.92% over the forecasting horizon. With respect to the forecasted organizational performance enhancements, TEF DE's core margin and net margin rise strongly until 2025e and subsequently level off until 2030e when they peak at 11.2% and 6.3% respectively (cf. Exhibit 21).

Balance Sheet Forecast

With reference to the "Accounting Analysis" chapter, there were substantial changes in TEF DE's balance sheet captions. The mentioned right of use assets is linked to the revenues as we assume this caption to be directly revenue driven.

We forecast this relation until 2025e and then stabilize the absolute amount onwards. With the matching caption with regards to lease liabilities we proceed in the same way. Other intangible assets increased drastically this year. This increase ensuing from the realization of the spectrum payable captions. In the following years, we assume other intangible assets to diminish as a result of the post-merger affects in consolidation and going back to percentage levels prior to the E-Plus Group acquisition (which was 16.8% in 2012 and 2013). Similar to that, PP&E caption is assumed to further decrease which is a logic consequence of the high depreciations that more than offset the investments in the TEF DE network. Another reason for the assumed decline is the accomplished network consolidation (the reconstruction of all 27,000 mobile phone sites was finished this year[36]). However, the decline is thwarted by massive investments in the 5G network roll out. Considering depreciation and amortization this all together falls down to a CAPEX-to-Sales ratio of 17.6% on average in the course of our forecast period (cf. CAPEX scenario analysis).

Valuation

Cost of Capital

Exhibit 22: Development of 10Y-Government Bond Germany -Source: FRED - Economic Research

Taking everything into account, the appropriate WACC has been pushed to a quite low figure as we arrive at a WACC of 3.35%. The downward trend of the cost of capital over the last years continued and is clearly demonstrated in this value[37]. This is particularly driven by a drastically receding risk-free rate (cf. Exhibit 22). The unprecedented low interest environment that is mainly caused by the ECB's quantitative easing program, puts extra pressure on the final composition of the appropriate WACC. As an appropriate proxy for the risk-free rate in this valuation we selected the long-term government bond of Germany (10y). This rate currently trades in sub-zero territory and was last at -0.25% (cf. Exhibit 13). The associated increase of the market risk premium (MRP) could not compensate the further sharp decline of the risk-free rate. As the market portfolio for the valuation of the MRP, we chose the EUR-denominated Stoxx Europe 600 (STXE 600) as our well-diversified, pan-European market proxy. STXE 600 returned 7.28% p.a. (cf. Exhibit 23). Following this, our analysis yields an implied MRP of 7.54%[38]. For the beta estimation, we conducted a market analysis of comparable companies to retrieve an unlevered beta for further application. The respective comparables are the same used for the multiple analysis in order to stay consistent. These are mainly nationally operating European

WACC Input Driver	Values
Risk Free Rate	-0.25%
Market Return (STXE 600)	7.28%
Implied MRP (STXE 600)	7.54%
D/E Target Ratio	61%
Levered Beta	0.70
Unlevered Beta	0.51
Re-Levered Beta TEF DE	0.72
Return on Equity Unlevered	3.56%
Return on Equity Levered	5.14%
WACC	**3.35%**

Exhibit 23: WACC Input - Source: own research, Bloomberg, Thomson Reuters & Yahoo Finance

[36] https://www.telefonica.de/press/press-releases/company/news/8775/telefonica-germany-stronger-than-ever-five-years-after-the-acquisition-of-e-plus.html
[37] These rates are confirmed by others calculating the WACC for the German telecom industry: https://pwc-tools.de/kapitalkosten/en/telecommunications/
[38] In line with other analyses. A good benchmark comparison is KPMG's annual cost of capital study (here: 2019 study): https://home.kpmg/de/en/home/insights/2019/10/cost-of-capital-study-2019.html

telecommunication companies with a large exposure to mobile services and apart from that operate in the same segments. Large telecoms, such as Vodafone Group, Orange, DTE, Telecom Italia or BT Group, are excluded based on this reasoning. They do not serve as comparables since they are multinational corporations, showing variations in their business models and their risk profiles. The resulting peer group was then further narrowed to industry peers (cf. Exhibit 25) that exhibit a similar risk profile compared to TEF DE.

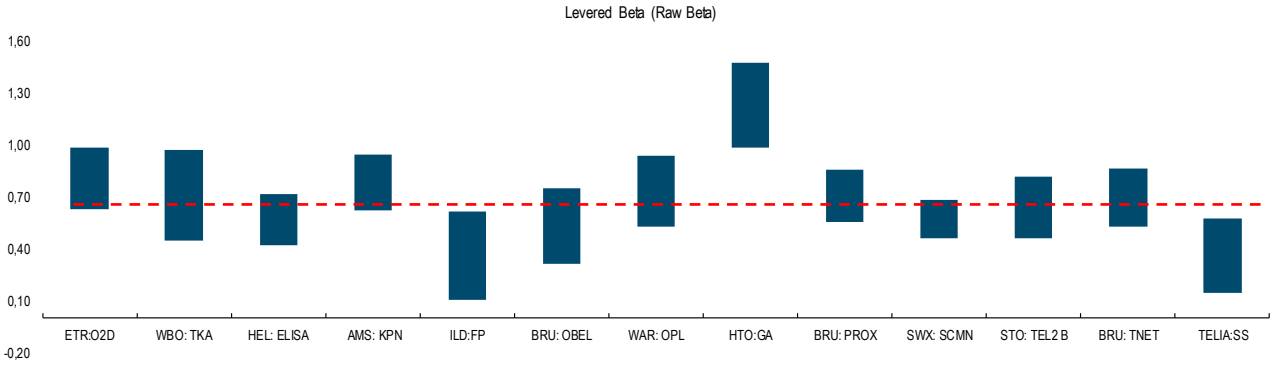

Exhibit 24: Levered Beta (Raw Beta) - Source: own research, Bloomberg

Each stock of the peers was then regressed to an appropriate index (ceteris paribus) to retrieve their raw betas[39]. Subsequent to un-levering betas according to each company's current market D/E ratio, the median unlevered beta of the peer group (incl. TEF DE) is 0.51 (cf. Exhibit 26) which is quite comparable to TEF DE's unlevered beta of 0.57 resulting from the regression against the STXE 600 index. The re-levered beta then is 0.72[40]. Implementing the re-levered beta in the CAPM[41], we compute TEF DE's levered cost of equity at a value of 5.14%. The unlevered cost of equity on the other hand is calculated using the obtained unlevered Beta-Factor, as it seeks to value the company independently of its leverage ratio. Following this approach, the unlevered cost of equity yields a value of 3.56%. This rate is deployed in the APV valuation method (cf. APV valuation section).

Comparables
Telefónica Deutschland (ETR:O2D)
A1 Telekom Austria (WBO: TKA)
Elisa OYJ (HEL: ELISA)
Koninklijke KPN (AMS: KPN)
Iliad SA (ILD:FP)
Orange (Belgium) (BRU: OBEL)
Orange Polska (WAR: OPL)
OTE (Hellenic Telecommunications Organization SA) (HTO:GA)
Proximus SADP (BRU: PROX)
Swisscom AG (SWX: SCMN)
Tele2 AB (STO: TEL2 B)
Telenet Group Holding (BRU: TNET)
Telia Co AB (TELIA:SS)

Exhibit 25: TEF DE Comparable List - Source: own research

[39] Except for TEF DE (own regression) this was done via Bloomberg
[40] Which seems particularly reasonable when comparing it to the levered beta of the TEF DE / STXE 600 regression is 0.81
[41] CAPM means Capital Asset Pricing Model whose author is William F. Sharp, amongst others

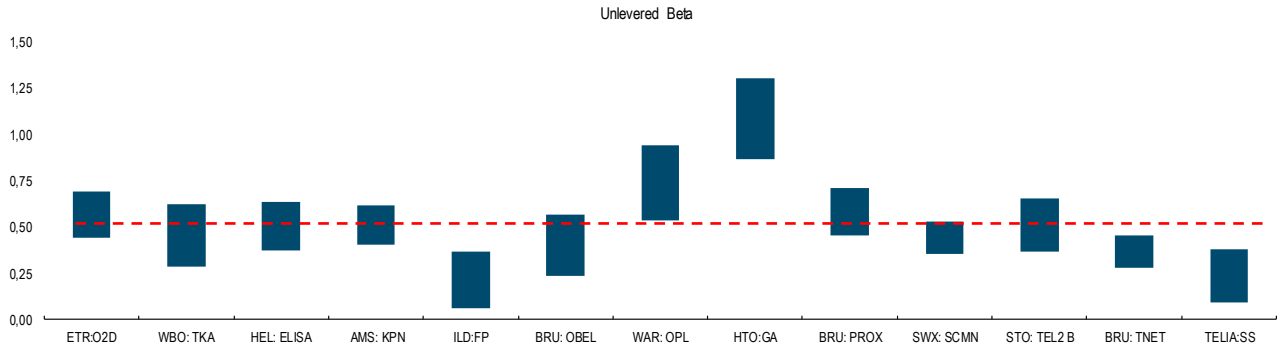

Exhibit 26: Unlevered Beta - Source: own research, Bloomberg

As a common proxy for the opportunity cost of debt, we look at TEF DE's outstanding bonds. TEF DE has currently only two trading corporate bonds with a remaining maturity of 5.53 years and 1.13 years, respectively. Due to currently exceptionally low trading yields-to-maturity (YTMs) of 0.79% for bond 1 and -0.12% for bond 2, our estimated cost of debt based on the outstanding corporate bonds implies expected returns of 0.60% and -0.18% (cf. Exhibit 27). The necessary information for the respective probability of default and the recovery rate (from which the loss given default is derived) regarding Fitch Ratings' BBB European corporate ratings is obtained directly from the rating agency and suggests an adjustment of -0.18% for the expected return on debt of bond 1 and an adjustment of -0.06% for the respective rate bond 2 (cf. Exhibit 27). The results should generally serve as a good proxy for the opportunity cost of debt. However, given the low YTM of the second bond and the fact that the same bond is reaching its maturity rate, it is not conclusive and thus insufficient to derive a proper analysis of the cost of debt using the second issued corporate bond. Thus, bond 1 (long maturity of 5.53y) serves as the best proxy for the opportunity cost of debt reflecting not only the next year for the cost of debt (compared to bond 2). On that account, we derive TEF DE's return on debt from its 2018 issued corporate bond which lead us to an estimated fair cost of debt of 0.60%. For our target capital structure, we set the current market D/E ratio of 60%. We assume that TEF DE will maintain its levered D/E ratio from 2019e which now reflects the major changes resulting from the spectrum auction and the IFRS16 implementation (cf. Accounting Analysis). All things considered, the current ratio is still uncritical (as stated in the beginning) and is not assumed to be drastically reduced in the coming years. Minor changes with regards to the capital structure prove to be irrelevant to the final valuation. As these changes are reflected in our APV method which ultimately yields a deviation of 0.7% with regards to the EV compared to the DCF approach (€19.22bn vs. €19.36bn.). With all relevant components, the final WACC yields a rate of 3.35% as mentioned above. And yet, the low WACC seems reasonable for a company that not only operates in an

Cost of Debt Driver	Values
Placement Date (Bond 1)	05.07.2018
Maturity (Bond 1)	05.07.2025
Years until maturity (Bond 1)	5.53
Coupon (Bond 1)	1.75%
Price (in €) (Bond 1)	105.21
YTM (Bond 1)	0.78%
Probability of Default (BBB 5.5y)	1.69%
Recovery Rate	40.5%
Cost of Debt	**0.60%**

Exhibit 27: Cost of Debt - Source: own research, Bloomberg

industry with a low volatility, but also in a solid, stable and growing economy. When comparing TEF DE's WACC with the recent development of the industry's blended WACC, this value becomes even more accurate[42].

- Terminal Growth Rate

At the end of the projected period, for each forecast-based valuation (i.e. DCF, APV, EVA and FTE) a going-concern scenario is assumed. It is in line with both the ROIC and the growth rate of the projected core operating cash flows starting to stabilize over time in our forecasted period (ROIC levels off at 5.5%, thus ≥ WACC, and cash flows grow at below 1% in the last years). In our valuation model in forecasted year 2030e, TEF DE's core operating free cash flows grow at a rate of 0.36% indicating an appropriate year to determine TEF DE's terminal value. Reaching a steady state in our model with constant profitability and constant market share ratios, we put the terminal growth rate on a level with the growth rate of TEF DE's core operating cash flows in the last forecasted year, i.e. 0.36%. Moreover, net working capital requirements remain constant, CAPEX and D&A offset one-another and both profit margins as well as financial ratios stay persistent in the steady state.

Valuation and Methodologies

In our model, we take several methods for valuation into account. By that, we combine yield methods, i.e. discounted cash flow methods, as intrinsic valuation techniques with relative valuation methods, i.e. multiples, to infer a reasonable estimate of TEF DE's fair EV and deriving share price.

DCF Method		
		Values
Enterprise Value (in € mn.)		19,220
Equity Value (in € mn.)		14,669
Price per Share	€	4.93

Exhibit 28: Share Price according to DCF Valuation - Source: own research

Discounted Cash Flow (DCF): The DCF valuation methodology is conducted following both the EV approach and the Flow-to-Equity (FTE) approach. Applying the enterprise DCF method and our computed WACC, we calculate an EV for TEF DE's of EUR 19,220m. The Net Debt and Invested Capital in Non-Core Business is assumed to be EUR-4,493m and EUR-58m, respectively, by the end of 2020e. Contrary to most German mid- and large-cap companies however, TEF DE does not report any long-term provisions or unfunded pension liabilities. So, its Net Debt does neither require any further adjustments nor normalizations. Ultimately, the enterprise DCF method results in a share price of EUR 4.93 (cf. Exhibit 28).

Concerning the FTE technique, no adjustments for the computed Equity Value (EQ henceforth) are necessary. Due to TEF DE's specific ownership structure (cf. Shareholder Structure), we apply the FTE method in order to account for the

[42] https://www.bundesnetzagentur.de/EN/Areas/Telecommunications/Companies/MarketRegulation/CostOfCapital/costofcapital-node.html

FTE Method	Values
Equity Value (in € mn.)	6,474
Price per Share	€ 2.18

Exhibit 29: Share Price according to FTE Valuation - Source: own research

importance of a high dividend payout ratio (i.e. 70%, c.f. Shareholder Structure) that TEF DE continues to target. By that, we derive a share price by measuring how much cash the company can return to its shareholders. We compute cash flow to equity as dividends[43] which is a result linking the target dividend payout ratio to net profits. This dividend-based model can be used since we expect the firm to pay dividends close to the free cash flow to equity over the forecast period. This is also based on the fact that TEF DE recently announced to cut its dividends[44] aligning its dividend payout policy more to its actual capacity to pay these dividends in the future. This in line with our model applying the 70% target ratio to the expected net profits in the coming years. Applying the levered cost of equity shown above, we obtain an EQ of EUR 6,474m, resulting in a suggested share price of EUR 2.18 (cf. Exhibit 29). We ascribe the obvious difference between the results given by the DCF and FTE method mainly to our estimate of the dividends paid in the future[45]. Therefore, we want to reflect for the more realistic dividend payments and attach a weighting of 20% to the FTE approach as an alternative valuation approach in our final valuation.

APV Method	Values
Enterprise Value (in € mn.)	19,361
Equity Value (in € mn.)	14,811
Price per Share	€ 4.98

Exhibit 30: Share Price according to APV Valuation - Source: own research

Adjusted Present Value (APV): By applying the APV, we want to configure a valuation with more flexibility to the underlying firm's capital structure. We apply the computed unlevered cost of equity (cf. Cost of Capital) to the operating free cash flows and the tax shields and yield a very similar EV for TEF DE (EUR 19,361m, i.e. a deviation of 0.7%) compared to the DCF method. Minor changes with regards to the capital structure thus prove to be irrelevant to the final valuation. Almost identical to the DCF method, the APV implies a share price of EUR 4.98 (cf. Exhibit 30).

Transaction Comps	EV/Revenue	EV/EBITDA	EV/Subscriber
Average	1.55x	11.78x	0.50x
Median	1.79x	9.27x	0.46x
Implied EV TEF DE - Transaction Multiples (in € mn.)	**EV/Revenue**	**EV/EBITDA**	**EV/Subscriber**
Average	11,395	23,781	21,532
Median	13,153	18,710	19,985
Implied Equity Value TEF DE - Transaction Multiples (in € mn.)	**EV/Revenue**	**EV/EBITDA**	**EV/Subscriber**
Average	6,710	19,096	16,847
Median	8,467	14,025	15,300

Exhibit 31: Multiples - Source: own research, Bloomberg, Capital IQ, Mergermarket, Pitchbook

Multiple Analysis: As TEF DE operates in the telecommunication sector, a sector that finds many similar companies across borders, the EV-multiples we derive create valuable insights, even with a careful selection of an appropriate peer group. In the following, we identified EV/Sales, EV/EBITDA and EV/Customers as the most appropriate and hence comparable multiples. Above that, transaction multiples regarding the same multiple selection are reviewed in order to include some none-forecast biased benchmarks. An EV/EBIT multiple is not applicable in our case since TEF DE had repeatedly faced negative EBIT values in the past years and is further expected to.

The EV/EBITDA multiple is chosen against the background that telecoms are generally capital-intensive companies with high fixed costs but being often exposed to quite different infrastructure costs. As TEF DE, for instance, is leasing

[43] We do not consider a share repurchase program or equity issuance in our model as there is no indication for that
[44] https://www.reuters.com/article/telefonica-de-strategy/telefonica-deutschland-cuts-dividend-as-it-prioritises-network-investments-idUKFWN28K0YS
[45] It is in line with the general reasoning for differences resulting from these two approaches: http://people.stern.nyu.edu/adamodar/pdfiles/ovhds/dam2ed/dcfveg.pdf

Trading Comps			
	EV/Revenue	EV/EBITDA	EV/Subscriber
Average	2.78	8.04	0.91
Median	2.37	7.53	0.81
Implied EV Transaction Multiples (in € mn.)			
	EV/Revenue	EV/EBITDA	EV/Subscriber
Average	20,354	14,635	43,693
Median	17,381	13,703	39,112
Implied Equtiy Value Transaction Multiples (in € mn.)			
	EV/Revenue	EV/EBITDA	EV/Subscriber
Average	15,861	10,143	39,200
Median	12,888	9,210	34,619

Exhibit 32: Multiples II Multiples - Source: own research, Bloomberg, Capital IQ, Mergermarket, Pitchbook

a part of the infrastructure of its fixed line business from DTE, whereas other companies only operate with their own networks. We conclude that an EV/EBITDA multiple that is excluding accounting impacts with regards to CAPEX, is most suitable. An EV/Sales multiple is additionally considered. The main reasons for that are the comparable maturity of telecom markets among different countries which allow for a good comparison of the revenues and the similar line of businesses which are characterized by a straightforward revenue generation (i.e. ARPU * # of accounts). As a third metric we took a non-financial industry specific multiple, EV/Subscribers, into account[46] (cf. Exhibit 31). This metric serves only as a benchmark and is not considered in the final valuation as we account for a difficulty in the commensurability of the number of subscribers for telecommunication businesses.

Transaction Comps

Data from Pitchbook (European deals last 15years w/ >EUR100m deal size and available information)

Company Name	Investors	EV/Revenue	EV/EBITDA	EV/Subscriber
Base Company	Telenet Group Holding (BRU: TNET)	1.87	7.98	0.40
Orange Netherlands	T-Mobile Netherlands	2.14	11.31	0.67
HanseNet Telekommunikation	Telefónica (XMAD: TEF)	0.77	5.68	0.45
Pipex Communications	Tiscali UK Holdings	0.70	10.56	n/a
Debitel Danmark	Telia Company (STO: TELIA)	1.11	12.97	0.47
Invitel Távközlési	Digi Communications (BSE: DIGI)	1.70	5.82	n/a
Cosmo Bulgaria Mobile	Telenor Group (OSL: TEL)	1.90	5.31	n/a
Comunitel	Tele2 (STO: TEL2 B)	2.19	34.61	n/a

Exhibit 33: Transaction Analysis Multiples - Source: own research, Bloomberg, Capital IQ, Mergermarket, Pitchbook

Multiples				
	Trade Multiples		Transaction Multiples	
	Revenue	EBITDA	Revenue	EBITDA
weights	*10%*	*10%*	*5%*	*5%*
Enterprise Value (€m)	17,381	13,703	13,109	16,870
Equity Value (€m)	12,888	9,210	8,616	12,377
Share Price	€ 4.33	€ 3.10	€ 2.90	€ 4.16

Exhibit 34: Multiples III Multiples - Source: own research, Bloomberg, Capital IQ, Mergermarket, Pitchbook

In the end, the EV/Revenue and EV/EBITDA multiples are weighted into the final valuation. By doing so, the most importance is ascribed to the trading multiples, giving them a 10% weight each for the Sales and EBITDA figure. Less importance is given to transaction multiples. Moreover, a robust set of market comparables can only be created if peers are selected. For the transaction comparables, 8 deals from the last 15 years with a transaction volume of at least €100M are analyzed (cf. Exhibit 33). All of the deals were telecom operator transactions and based in Europe. For the trading comparables a group was chosen that only includes telcos from Europe, limited in their operations to the greatest extent to the country of origin and operating in the same business lines. To assure consistency, it is the same set of comparables selected for the beta estimation. The EV/Revenue median multiple yields a 1.55x for the transaction comps, whereas the same multiple results in a 2.19x analysing the trading comps. Furthermore, the EV/EBITDA median multiple gives a 11.78x and a 6.76x for transaction and trading comps, respectively. At last, the EV/Subscriber media multiple shows a value of 0.46x (cf. Exhibit 34). The trading comparables

[46] Chirputkar, Abhijit & Kulkarni, Prasanna & Chintanvadgama, & Prabhu, Sandeep. (2016). Valuation Techniques in Telecommunication Industry – An Alternative Approach based on Operating Cash Flow and Number of Subscribers. Telecom Business Review. 9. 32-38.

analysis results in a median EV/Revenue multiple of 2.37x, an EV/EBITDA multiple of 7.53x and a (negligible) EV/Subscriber multiple of 0.81x.

Trading Comps

As of 27/12/2019 from Bloomberg (2019 estimated values, all in EUR denominated)

Peer Group	EV/Revenues	EV/EBITDA	EV/Subscriber EV		Subscriber (in k)
Telefónica Deutschland (ETR:O2D)	**1.71**	**6.87**	**0.26**	**12,509**	48,011
A1 Telekom Austria (WBO: TKA)	1.83	5.93	0.34	8,479	25,000
Elisa OYJ (HEL: ELISA)	4.82	14.30	1.52	9,484	6,247
Koninklijke KPN (AMS: KPN)	3.41	7.82	1.88	18,988	10,118
Iliad SA (ILD:FP)	2.37	7.88	0.54	13,082	24,175
Orange (Belgium) (BRU: OBEL)	1.22	5.98	0.37	1,793	4,837
Orange Polska (WAR: OPL)	1.37	5.78	0.18	4,043	22,246
OTE (Hellenic Telecommunications Organization	1.98	5.88	0.65	8,267	12,688
Proximus SADP (BRU: PROX)	1.97	5.92	0.81	11,215	13,767
Swisscom AG (SWX: SCMN)	3.03	8.31	1.62	33,013	20,431
Tele2 AB (STO: TEL2 B)	4.76	13.12	1.44	12,194	8,477
Telenet Group Holding (BRU: TNET)	4.23	7.53	1.20	10,365	8,658
Telia Co AB (TELIA:SS)	3.38	9.19	1.03	26,753	26,100

Exhibit 35: Trading Analysis Multiples - Source: own research, Bloomberg, Capital IQ, Mergermarket, Pitchbook

EVA Method	
	Values
PV of Annual Economic Profit (in € mn.)	5,950
Equity Value (in € mn.)	13,107
Price per Share	€ 4.41

Exhibit 36: Share Price according to EVA valuation - Source: own research

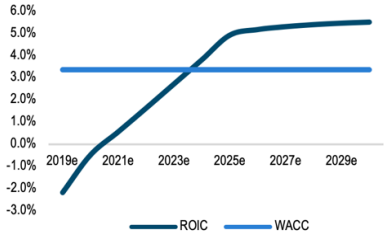

Exhibit 37: ROIC vs. WACC - Source: own research

Economic Value Added (EVA): We treat the EVA method as a performance indicator which is supposed to shed light on the time of value creation from TEF DE's core invested capital. As TEF DE relies strongly on the core invested capital for its operations and is currently coming out of a period with negative (net) profits, we also apply the EVA to exhibit a certain stability in the economic profit created by TEF DE in the future. Applying the method demonstrates that TEF DE is presumably destroying value over the next years until 2024e, when the ROIC exceeds the cost of capital for the first time in years (3.79% ROIC vs. 3.35% WACC). The YoY changes in EVA do stabilize nicely from 2026e onwards (cf. Exhibit 37). TEF DE will therefore create a total present value of economic profit of EUR 5,950m. Considering (i.e. adding) its 2020e invested capital in core and (deducting) Net Debt and Non-Core Invested Capital, we would technically arrive at a share price of EUR 4.41 (cf. Exhibit 36).

Final Share Price Recommendation

Weighting the most applied[47] DCF EV method the strongest with 30% (20% actual value, 5% each for downside and upside scenario), the APV and FTE as alternative valuation methods with each 20% and adding a 30% weight on the relative valuation (20% on the more frequently used method with trading multiples and 10% on the less often used transaction multiples), we arrive at a share price of **EUR 3.98 (cf. Exhibit 38)**. By that, we value the intrinsic valuation methods, namely DCF, APV, and FTE stronger than our relative valuation.

[47] Generally, the DCF analysis is perceived as the most accurate and flexible method (cf. Koller, Goedhart & Wessels, 2005)

Valuation - Target Share Price

	Multiples				DCF			APV	FTE
	Trade Multiples		Transaction Multiples			Downside (SA)	Upside (SA)		
	Revenue	EBITDA	Revenue	EBITDA					
weights	*10%*	*10%*	*5%*	*5%*	*20%*	*5%*	*5%*	*20%*	*20%*
Enterprise Value (€m)	17,381	13,703	13,109	16,870	19,220	16,800	20,367	19,361	10,966
Equity Value (€m)	12,888	9,210	8,616	12,377	14,669	12,249	15,816	14,811	6,474
Share Price	€ 4.33	€ 3.10	€ 2.90	€ 4.16	€ 4.93	€ 4.12	€ 5.32	€ 4.98	€ 2.18

Share Price Range	2.18 - 5.32
Net Debt (€m)	(4,493)
Invested Capital Non Core	(58)
Shares outstanding (in m.)	2,975

Target Share Price (€)	€ 3.98
Price at 30 Dec 2019 (€)	€ 2.58

Exhibit 38: Final Valuation - Target Price Calculation (source: own model)

Key Risks and Potentials to TEF DE

In the following we briefly highlight the most crucial risks that we see related to our valuation model and that, if occurring, could impair our valuation recommendation regarding TEF DE. Subsequently, we conduct a sensitivity analysis (SA) in the light of changing two essential input factors that drive the valuation.

- **Operational Risk:** one of the key forecast revenue drivers in our model is TEF DE's postpaid market share whose development is largely dependent on 1&1's market entrance strategy as an upcoming independent mobile network operator. In accordance with that, there is also the risk that revenues coming from MVNOs (especially 1&1) experience a cut sooner than expected.
- **CAPEX spending**: In our model we already raised our Net CAPEX assumptions leading to a higher CAPEX to Sales (C/S) ratio than previously expected due to the updated C/S guidance by TEF DE mid-December 2019. Key risk here is that the 5G network expansion will cost more than currently expected (cf. CAPEX scenario analysis).
- **Prepaid to Postpaid Migration:** The long-term strategy of TEF DE to migrate its prepaid to postpaid customers might be pressured by a bigger churn rate than expected potentially coming from aggressive MVNO bidding for new customers.
- **Upside:** We might underestimate M2M data revenue potential, overestimate CAPEX spending, be too critical with fixed line revenue decline be to conservative with the projected 5G penetration rates

Sensitivity Analysis

In this section we take a look at two very sensitive factors to the outcome of Telefónica's recommended share price. First, we computed different reasonable

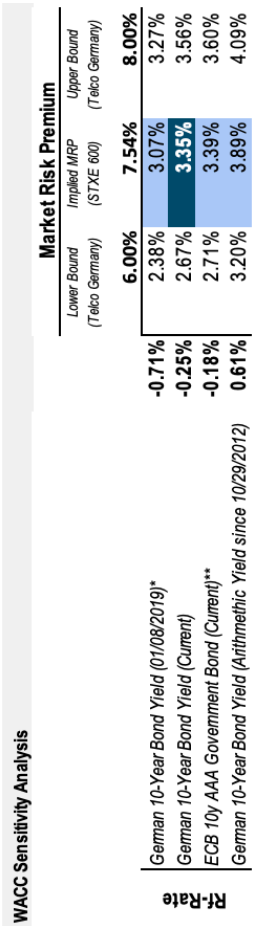

Exhibit 39: Sensitivity Analysis I - Source: Own Research

rates for the cost of capital which would be justified by different input numbers for the MRP and the risk-free rate. By that, we implement the numbers seen in the WACC SA as shown below. The range for the MRP is derived from an annual study examining the MRP for the German telecommunications industry[48] and depict the lower and upper bound for the MRP experienced in Germany.

The alternative risk-free rates on the other hand portray rates experienced earlier this year for the lower bound and the average rate for the 10y German government bond since the IPO of TEF DE. The outcome yields a range for the WACC between 2.38% and 4.09% (ceteris paribus). For the share price SA, however, we only plug in the range for WACC rates adhering to our previously computed MRP which already gives us a 27% output range for the WACC. As a second input factor we select TEF DE's terminal growth rate which is equal to the FCF growth rate of the last year in our forecast. This growth rate declines nicely in the last 4 years to a value below 0.5% and stabilizes at 0.36% in the last years. This rate is always attached with an uncertainty. However, we think that for a mature company, such as TEF DE, in a very mature industry this long-term rate is more than reasonable. Therefore, we set a 0.3% confidence interval in the SA for the second driver, the terminal growth rate. Our SA outcomes are based on the DCF valuation method (cf. Exhibit 39) and demonstrate the sensitivity to changes regarding these two input drivers, yielding in a share price range between €3.78 and €5.94 for this valuation method. This does not change our final recommendation now which we derive from in the chapter before. In the individual part, one of the analysts focuses on a SA with regards to CAPEX.

Sensitivity Analysis – Enterprise Value (in € mn.)

WACC / Terminal Growth Rate	0.21%	0.29%	0.36%	0.44%	0.51%
3.07%	20,367	20,794	21,245	21,722	22,227
3.35%	18,514	18,858	19,220	19,600	20,000
3.39%	18,258	18,591	18,941	19,309	19,695
3.89%	15,782	16,020	16,269	16,529	16,800

Exhibit 40: Sensitivity Analysis II - Source: Own Research

Sensitivity Analysis – Share Price (in €)

WACC / Terminal Growth Rate	0.21%	0.29%	0.36%	0.44%	0.51%
3.07%	5.32	5.46	5.61	5.77	5.94
3.35%	4.69	4.81	4.93	5.06	5.19
3.39%	4.61	4.72	4.84	4.96	5.09
3.89%	3.78	3.86	3.94	4.03	4.12

Exhibit 41: Sensitivity Analysis III - Source: Own Research

[48] https://pwc-tools.de/kapitalkosten/en/telecommunications/

Appendix:

DCF Calculation

in € million

			1	2	3	4	5	6	7	8	9	10
	2019e	2020e	2021e	2022e	2023e	2024e	2025e	2026e	2027e	2028e	2029e	2030e
Core result	(200)	(62)	63	184	303	420	535	555	567	576	582	587
Depreciation & Amortization	2,039	1,901	1,779	1,677	1,588	1,503	1,421	1,421	1,421	1,421	1,421	1,421
Gross Free Cash Flow (core)	1,839	1,839	1,842	1,861	1,892	1,923	1,956	1,975	1,988	1,997	2,003	2,008
Change in Net Working Capital	(72)	1	(1)	6	12	10	10	15	9	7	5	3
Change in Net CAPEX	(2,604)	(1,560)	(1,487)	(1,454)	(1,412)	(1,319)	(1,238)	(1,421)	(1,421)	(1,421)	(1,421)	(1,421)
Change in Other Core-Invested Capital	(2,405)	35	(18)	(29)	(37)	(35)	(35)	15	9	7	5	3
Change in Core-Invested capital	(5,081)	(1,524)	(1,506)	(1,476)	(1,438)	(1,344)	(1,264)	(1,392)	(1,402)	(1,407)	(1,411)	(1,414)
Operating Free Cash Flow	**(3,242)**	**315**	**336**	**385**	**454**	**579**	**692**	**584**	**586**	**589**	**591**	**594**
Discounted Free Cash Flows (@ WACC)	(3,242)	315	325	360	411	508	587	479	465	453	440	427
Growth Rate			6.63%	14.52%	18.10%	27.55%	19.51%	-15.66%	0.31%	0.64%	0.37%	0.36%

Terminal Value	20,530
Present Value of Terminal Value	14,765
% of EV	*76.8%*
Enterprise Value	**19,220**
Net Financial Assets	(4,493)
Invested Capital Non Core	-58
Equity Value	**14,669**
# of shares outstanding (in m)	*2,975*
Price per share	**4.93**

Input	
WACC (in %)	**3.35%**
Terminal Growt	**0.36%**

Appendix 1: DCF Calculation (Source: Own Valuation Model)

	Historical						
Income Statement (in € million)	**2017**	**2018**	**2019e**	**2020e**	**2021e**	**2022e**	**2023e**
Core							
in €m							
Revenues	**7,296**	**7,319**	**7,334**	**7,408**	**7,468**	**7,583**	**7,737**
YoY in %	*-2.75%*	*0.32%*	*0.20%*	*1.01%*	*0.82%*	*1.53%*	*2.04%*
Mobile Business Revenue	6,415	6,539	6,595	6,678	6,740	6,858	7,014
Mobile Service Revenues	5,287	5,267	5,293	5,356	5,410	5,517	5,665
Postpaid Revenue	*3,726*	*3,697*	*3,743*	*3,890*	*4,014*	*4,185*	*4,393*
Prepaid Revenue	*1,498*	*1,494*	*1,467*	*1,377*	*1,301*	*1,228*	*1,160*
M2M Revenue	*62*	*76*	*83*	*88*	*95*	*103*	*112*
Handset Revenue	1,128	1,272	1,301	1,322	1,330	1,341	1,349
Fixed Line	862	767	735	726	725	720	719
Other Revenue	19	13	4	4	4	4	4
Operating expenses	**(5,497)**	**(5,512)**	**(5,513)**	**(5,525)**	**(5,526)**	**(5,566)**	**(5,634)**
Supplies	(2,396)	(2,459)	(2,452)	(2,465)	(2,474)	(2,500)	(2,539)
as % of Revenue	*32.84%*	*33.60%*	*33.44%*	*33.28%*	*33.12%*	*32.97%*	*32.81%*
Personnel expenses	(642)	(610)	(605)	(605)	(603)	(606)	(612)
as % of Revenue	*8.80%*	*8.33%*	*8.25%*	*8.16%*	*8.08%*	*8.00%*	*7.91%*
Other expenses	(2,459)	(2,443)	(2,456)	(2,455)	(2,449)	(2,460)	(2,483)
Other third-party services	(2,168)	(2,190)	(2,168)	(2,164)	(2,155)	(2,162)	(2,180)
as % of Revenue	*29.71%*	*29.92%*	*29.56%*	*29.21%*	*28.86%*	*28.51%*	*28.17%*
Advertising	(291)	(253)	(288)	(291)	(293)	(298)	(304)
as % of Revenue	*3.99%*	*3.46%*	*3.93%*	*3.93%*	*3.93%*	*3.93%*	*3.93%*
OIBDA	**1,799**	**1,807**	**1,820**	**1,883**	**1,943**	**2,017**	**2,103**
Depreciation and amortisation	(1,870)	(1,988)	(2,039)	(1,901)	(1,779)	(1,677)	(1,588)
Depreciation of PP&E	(862)	(959)	(882)	(818)	(757)	(706)	(661)
as % of PP&E	*21.33%*	*25.28%*	*24.55%*	*23.84%*	*23.15%*	*22.48%*	*21.83%*
Amortisation of intangible assets	(1,008)	(1,029)	(1,157)	(1,083)	(1,021)	(971)	(927)
as % of Other Intangible Assets	*18.38%*	*21.77%*	*21.06%*	*20.38%*	*19.71%*	*19.07%*	*18.45%*
Core result before taxes (Core-EBIT)	**(71)**	**(181)**	**(218)**	**(17)**	**164**	**340**	**515**
Core Taxes	(278)	(14)	19	(44)	(101)	(156)	(211)
Core result	(349)	(195)	(200)	(62)	63	184	303

Appendix 2: Excerpt Core Income Statement Forecast (Source: Own Valuation Model)

	Historical						
Balance Sheet Forecast	**2017**	**2018**	**2019e**	**2020e**	**2021e**	**2022e**	**2023e**
in €m							
Core							
Operating Cash	146	146	147	148	149	152	155
Inventories	105	261	143	144	145	148	151
Average Holding Period (in days)	*5.3*	*13.0*	*7.1*	*7.1*	*7.1*	*7.1*	*7.1*
Trade and other receivables (current)	1,265	1,301	1,329	1,342	1,353	1,374	1,402
Average Collection Period (in days)	*63.3*	*64.9*	*66.1*	*66.1*	*66.1*	*66.1*	*66.1*
Other non-financial assets (current)	107	413	415	415	416	416	417
Goodwill	1,960	1,960	1,960	1,960	1,960	1,960	1,960
Other intangible assets	5,485	4,727	5,492	5,313	5,182	5,090	5,024
in % of Revenues	*75%*	*65%*	*74%*	*72%*	*69%*	*67%*	*65%*
Property, plant and equipment (PP&E)	4,041	3,793	3,593	3,432	3,271	3,140	3,029
in % of Revenues	*55%*	*52%*	*49%*	*46%*	*44%*	*41%*	*39%*
Right-of-use assets	-	-	2,617	2,644	2,665	2,706	2,761
in % of Revenues			*36%*	*36%*	*36%*	*36%*	*36%*
Trade and other receivables (non-current)	69	70	71	71	71	71	71
Other non-financial assets (non-current)	129	206	223	219	215	212	210
Trade and other payables (current)	(2,224)	(2,419)	(2,256)	(2,268)	(2,275)	(2,299)	(2,335)
Average Payable Period (in days)	*338.8*	*359.1*	*335.7*	*335.7*	*335.7*	*335.7*	*335.7*
Provisions (current)	(142)	(188)	(171)	(171)	(171)	(172)	(174)
in % of Operating Expenses	*2.6%*	*3.4%*	*3.1%*	*3.1%*	*3.1%*	*3.1%*	*3.1%*
Deferred income (current)	(527)	(535)	(538)	(544)	(548)	(556)	(568)
in % of Revenue	*7.2%*	*7.3%*	*7.3%*	*7.3%*	*7.3%*	*7.3%*	*7.3%*
Trade and other payables (non- current)	(19)	(19)	(18)	(18)	(19)	(19)	(19)
in % of Revenue	*0.3%*	*0.3%*	*0.2%*	*0.2%*	*0.2%*	*0.2%*	*0.2%*
Provisions (non-current)	(599)	(526)	(539)	(545)	(549)	(558)	(569)
in % of Revenue	*8.2%*	*7.2%*	*7.4%*	*7.4%*	*7.4%*	*7.4%*	*7.4%*
Deferred income (non-current)	(255)	(176)	(289)	(292)	(295)	(299)	(305)
in % of Revenue	*3.5%*	*2.4%*	*3.9%*	*3.9%*	*3.9%*	*3.9%*	*3.9%*
Deferred tax liabilities	(1)	(177)	(95)	(143)	(137)	(131)	(127)
in % of Revenue	*0.0%*	*2.4%*	*2.4%*	*2.4%*	*2.4%*	*2.4%*	*2.4%*
Invested Capital in Core	9,702	9,041	**12,084**	**11,707**	**11,434**	**11,234**	**11,083**

	Historical						
Balance Sheet Forecast	**2017**	**2018**	**2019e**	**2020e**	**2021e**	**2022e**	**2023e**
in €m							
Non-Core							
Other non-financial assets (current)	79	-	24	24	24	24	24
Other tax receivables	79	-	24	24	24	24	24
Other non-financial assets (non-current)	-	-	-	-	-	-	-
Other tax receivables	-	-	-	-	-	-	-
Other non-financial liabilities	132	39	113	113	113	113	113
Other financial assets (current)	5	2	4	4	4	4	4
Investments in start-ups	-	-	-	-	-	-	-
Interest rate swaps	4	2	3	3	3	3	3
Loans	1	-	2	2	2	2	2
Other financial assets (non-current)	26	20	28	28	28	28	28
Investments in start-ups	18	1	15	15	15	15	15
Interest rate swaps	6	5	9	9	9	9	9
Loans	2	14	4	4	4	4	4
Invested Capital in Non-Core	(22)	(17)	(58)	(58)	(58)	(58)	(58)

	Historical						
Balance Sheet Forecast	**2017**	**2018**	**2019e**	**2020e**	**2021e**	**2022e**	**2023e**
in €m							
Financial							
Excess of cash	441	605	1,108	1,408	1,721	2,049	2,395
Other financial assets (current)	12	8	11	11	11	12	12
Other financial assets (non-current)	67	82	82	82	82	82	82
Interest-bearing debt (current)	637	145	337	341	344	349	356
in % of Revenue	*8.7%*	*2.0%*	*4.6%*	*4.6%*	*4.6%*	*4.6%*	*4.6%*
Interest-bearing debt (non-current)	1,268	2,004	1,633	1,650	1,663	1,689	1,723
in % of Revenue	*17.4%*	*27.4%*	*22.3%*	*22.3%*	*22.3%*	*22.3%*	*22.3%*
Current lease liabilites	-	-	509	514	519	527	537
Non-current lease liabilites	-	-	2,098	2,120	2,137	2,170	2,214
Payable - Spectrum (current)	-	-	87	88	89	90	92
as % to Revenue			*1.2%*	*1.2%*	*1.2%*	*1.2%*	*1.2%*
Payable - Spectrum (non-current)	-	-	1,269	1,282	1,292	1,312	1,339
as % to Revenue			*17.3%*	*17.3%*	*17.3%*	*17.3%*	*17.3%*
Net financial assets	(1,385)	(1,454)	(4,733)	(4,493)	(4,228)	(3,993)	(3,772)

Appendix 3: Balance Sheet Forecast Divided into Core, Non-Core, Financial (Source: Own Valuation Model)

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Hold	Expected total return (including expected capital gains and expected dividend yield) between 0% and 10% over a 12-month period.
Sell	Expected negative total return (including expected capital gains and expected dividend yield) over a 12-month period.

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TELEFÓNICA DEUTSCHLAND – AN EQUITY RESEARCH

A detailed look at Telefónica Deutschland's Competitive Positioning and Market Share Development per Segment

–

INDIVIDUAL ASSIGNMENT

FELIX RAASCH, 34000

A Project carried out on the Master in Finance Program, under the supervision of:

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Abstract

The German telecommunications market is characterized by high competitive pressure and constant technological change. In particular, the market entry of 1&1 Drillisch AG as an independent, fully integrated wireless services provider with its own wireless services network from 2022 onwards confronts Telefónica Deutschland with major challenges. As a result, Telefónica Deutschland will lose relative market share in each segment in the long term, except in the M2M division. However, due to the overall growing market, TEF DE manages to keep the number of its total customers almost constant over the forecasting horizon.

Keywords (up to four)
Competition / Postpaid / Machine-to-Machine / Fixed Line

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Competitive Positioning & Market Share Development per Segment – Individual Assignment

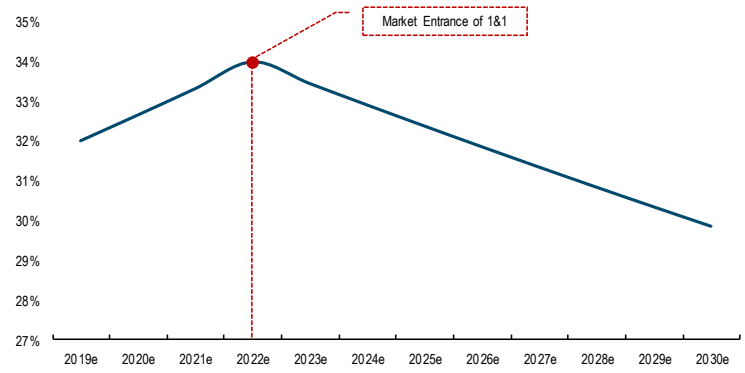
Telefónica Deutschland's (TEF DE) market share in Germany has been declining since the acquisition of the E-Plus Group was completed in 2014[1]. In addition to the tough market environment (cf. Bundesnetzagentur, 2019), TEF DE was busy integrating E-Plus, renewing its infrastructure and combining both networks together. In 2019, however, the integration was finalized[2]. Again, we believe that based on the enhanced network, TEF DE's customers will benefit from an overall better coverage throughout Germany. Therefore, we predict that TEF DE can partially increase its market share over the next years.

Postpaid Segment

We consider for a direct impact on TEF DE's market share with regards to 1&1 Drillisch AG's (1&1) market entrance as a fully integrated mobile network operator (cf. Competitive Environment). 1&1 purchased 70 MHz in this year's 5G auction but we expect that it will take a few years until 1&1 can take over a fair stake in the postpaid segment. This can be exemplified: 1&1 purchased two frequency blocks (2GHz) in this year's auction that can be used for UMTS. Nevertheless, these frequencies can only be used from 2026 onwards[3]. The 5G auction rights that were purchased, however, will foreseeably be used from 2022 on. This in turn means that 1&1 can only use 50/70 purchased MHz frequencies until 2026. We therefore reflect for 1&1's market entrance in 2022, but also consider that 1&1 will have to build up a new network from scratch, and thus will lack behind its other three competitors [i.e. TEF DE, Vodafone Deutschland (VODI) and Deutsche Telekom (DTE)]. Consequently, we assume that from 2022 onwards 1&1 will gradually gain a market share over the years with a maximum of 12.5% which would imply a respective market share in relation to the purchased frequencies that can effectively be used (50/70MHz out of 400/420MHz that were given away during the

[1] https://fesrvsd.fe.unl.pt:2101/statistik/daten/studie/3339/umfrage/umsatz-in-der-deutschen-telekommunikationsbranche-seit-1998/
[2] https://www.telefonica.de/news-telefonica-deutschland/startseite/news/8773/telefonica-deutschland-fuenf-jahre-nach-der-uebernahme-von-e-plus-stark-wie-nie.html
[3] https://www.dgap.de/dgap/News/adhoc/drillisch-sichert-sich-frequenzen-der-frequenzauktion/?newsID=1158637

auction). Based on current market shares (as of today, TEF DE, VODI and DTE approx. control a third of the market each), we assume at this point that TEF DE will lose one third of 1&1's gained 12.5% market share. Because of an increased network coverage with regards to TEF DE's successful integration of E-Plus though, TEF DE is also projected to increase its market share from 32% to 34% from 2019e up until 1&1's licensees become effective in 2022 (cf. Graph 1). This implies, that TEF DE will improve its market share in the postpaid segment over the coming three years. Then, TEF DE is starting to lose market share to 1&1 until we expect its market share to level off at 29.8% by 2030e. Still, compared to its market share as of 2019e, TEF DE only losses roughly 2% of its market share to 1&1 over the entire forecasting horizon.



Graph 1: Postpaid Market Share TEF DE

Prepaid Segment:

Similar to the postpaid sector, we argue that market shares in the prepaid sector will be predominantly affected by 1&1's market entrance. Again, with respect to the purchased 5G frequencies, 1&1's market share will increase subversively from 2022 onwards. This implies that – in terms of customers – we expect TEF DE's market share to decline over the forecasting horizon, resulting in a loss of ca. 7.6m prepaid customers (ca. 20.0m in 2019e vs. ca. 12.4m in 2030e). Such strong customer decline was already observed in the past (i.e. -5.6% customer growth in 2018 and 2017 Year-over-Year) and in accordance with TEF DE's corporate strategy, we have no reason to believe that this trend is reversed over the forecasting horizon (cf. Forecast Revenues). Moreover, we also expect that the trend towards flat rate tariffs will continue to increase in the future and therefore argue that none of TEF DE's competitors will change their strategic orientation in the prepaid segment over the forecasting horizon (cf. VuMA, 2019). Accordingly, except for 1&1's market entrance, TEF DE's prepaid market share is not expected

to be exposed to further competitive influences, as industry focus is assessed to be shifted towards more lucrative segments in the future.

M2M Segment:

TEF DE, DTE, 1&1 and VODI follow different strategies to increase their market share in this segment. While DTE relies on direct sales via its in-house system house *T-Systems*, VODI attempts to expand its range of services with the acquisition of the IoT system house *grandcentrix*[4] to expand its own M2M business. 1&1 on the contrary has not published any specific strategies focusing at M2M and/or IoT specifically yet, as it currently focuses on gaining market shares in the postpaid- and fixed line segment. With respect to its recent acquisition of E-Plus, we have no reason to believe that TEF DE will pursue inorganic growth in this segment. However, M2M usage will mostly be driven by the availability and quality of the 5G mobile transmission standard (cf. Forecast Revenues). We therefore do not apply TEF DE's current market shares from the mobile service segment but incorporate the purchased 5G spectrum frequencies as the best proxy of how market shares in the M2M business will be distributed. We assume, that the relations with the fourth market player (i.e. 1&1) having entered in this year's auction will not drastically change. Accordingly, TEF DE will maintain its current market share of 21% (i.e. TEF DE purchased 90MHz of the 420 MHz available 5G licenses). Because the addressable market in Germany is anticipated to grow strongly in the future though (cf. Revenue Forecast), we nonetheless project, that TEF DE's M2M accounts will quadruple over the forecasting horizon to ca. 4m by 2030e (vs. ca. 1.1m in 2019e).

Fixed Line:

In the fixed line segment, TEF DE not only competes with VODI, DTE and 1&1 but also with numerous local cable network providers (e.g. BADEN.NET, NetCologne, etc.). Similar to the M2M segment, the fixed line business is also driven by technological progress and the increased

[4] https://www.vodafone.de/newsroom/unternehmen/strategische-uebernahme-von-grandcentrix-vodafone-will-iot-geschaeft-und-position-als-digitalisierungspartner-der-wirtschaft-staerken/

data consumption, so that distinguishing factors in this segment will be the availability of fast and reliable internet connections. Since 2006, TEF DE has been offering fixed-network broadband connections with speeds of up to 16 Mbit/s (DSL) and 100 Mbit/s (VDSL), but its broadband offerings were largely restricted as TEF DE does not own any required infrastructure and has been leasing the so-called last mile from its competitor DTE[5]. This will change by partnerships made this year which allow TEF DE eventually to add cable offerings with up to 250 Mbit/s to its more diversified broadband portfolio, including, cable and FttH[6] products, which improves TEF DE's competitiveness in the hard-fought fixed line segment in terms of quality, product variety and transmission speed. This product expansion is mainly enabled by VODI's acquisition of Unitymedia, as it attempts to counteract any potential concerns that could be raised by the EU Commission with regards to competitive restrictions (cf. Müller, 2019). Additionally, by partnering with VODI, TEF DE significantly diminishes its dependence on its partnership with DTE in its broadband business. However, VODI will upgrade its cable network to gigabit speeds within the coming years, but only leases cable connections with speeds of up to 300 Mbit/s to TEF DE (cf. Milosevic, 2019). Hence, although the deal will allow TEF DE to expand its product offering (e.g. TV via Internet) and theoretically reach more customers (i.e. in theory up to 24m households[7]), we do not expect TEF DE to increase its market share significantly in the future, as TEF DE can only offer slower connections than its competitors in the long run. Having said this, we assess that VODI will be able to offer gigabit speeds from 2022[8] onwards and therefore argue, that the deal made with VODI is only a short term solution. Accordingly, it will prevent TEF DE from losing customers, but will not lead to a significantly increased market share. Hence, TEF DE's number of fixed line accounts is assumed to rise slowly but steadily until 2025e, when it peaks at ca. 4.7m and decreases thereafter to ca. 4.4m until the end of the forecasting horizon (vs. ca. 4.4m in 2019e).

[5] This basically means connecting TEF DE's mobile communication sites to Telekom's fibre-optic infrastructure
[6] FttH = fibre to the home, which stands for fibre-optic cables that are terminating right in the customer's home
[7] https://www.pcwelt.de/news/O2-Telefonica-Deutschland-nutzt-kuenftig-Kabelnetz-von-Vodafone-Unitymedia-10587302.html
[8] https://www.vodafone.de/unternehmen/netz-kabelglasfaser.html

Handset:

The distribution of market shares in this segment is only marginally based on the competitive positioning of the individual market participants. Instead, it is primarily driven by the demand for smartphones and the general penetration rate of them as well as possible future innovations. Additionally, the retail sector is also part of the extended competitive environment in this segment. We therefore assume that the market shares of TEF DE as well as its main competitors (i.e. DTE, VODI and 1&1) are not based on the strategic orientation of the companies and have no reason to believe, that market shares in this segment will significantly change in the future. Given the extended competitive environment and TEF DE's corporate focus on the postpaid- and M2M segment though, we project that TEF DE will continue to suffer marginal losses in its handset market share over the forecasting period (i.e. 14.4% in 2019e vs. 12.4% in 2030e).

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