April 5, 2010

India: Telecom Services

3G licensing: A winner's curse; near-term overhang on the sector

We see overbidding risks in 3G/BWA auction

As per DoT guidelines, the 3G auction process will begin on April 9. With nine operators bidding for three slots/circle for 3G and 11 operators bidding for two slots/circle for BWA (broadband wireless access), we see a risk of overbidding. We view the 3G licensing process as a near-term overhang on the sector and reiterate our Neutral ratings on Bharti/RCOM and Sell ratings on Idea/TCOM/MTNL. We expect MTNL to be impacted the most; as a public sector operator, it has to match the highest bid. We believe any overbidding may be a consolidation trigger as it would raise questions over the feasibility and profitability of the Indian telco operators.

We think 3G does not represent a profitable business case

A 3G operator's earnings would be dragged down by higher spectrum charges, incremental D&A, and potentially higher interest expense. We estimate these costs at Rs3.4 bn/Rs4.0 bn for first two years and believe that the 3G revenue uptake and 2G opex savings may not offset these costs. We expect incumbents to be aggressive in the 3G bidding process to maintain their brand perception and minimize churn of existing subs. We believe 3G is more likely to be used for freeing network congestion by incumbents and targeting the high-speed data market by new entrants.

BRTI/RCOM/Idea unlikely to be aggressive in BWA/3G capex

We do not expect Bharti/RCOM/Idea to aggressively bid for BWA as the LTE or Wimax ecosystem is at a nascent stage and any aggressive push for BWA services may cannibalize some of its potential 3G revenues. We also believe the 3G capex could surprise on downside due to passive/active infrastructure sharing and vendor financing agreements. We estimate capex spend of US$300/275/150 mn by Bharti/RCOM/Idea on 3G deployment in key urban areas in the first three years.

Not having a 3G license may not necessarily be negative

Industry participants believe that there is a business case for operators to survive even without 3G as voice remains the predominant application and the existing 2G spectrum is adequate for at least the next two to three years. A Malaysia telco case study shows that the stock price of an operator (Digi) without 3G outperformed its peers (with 3G licenses) by c.300% from May 2005 to May 2007, as Digi gained mkt share and focused on returning cash.

SUMMARY OF OUR RATINGS AND TARGET PRICES

Company	Ticker	Rating	Current Price (Rs)	12-m TP (Rs)	Potential Return	Valuation Methodology
Bharti	BRTI.BO	Neutral	311.90	315	1%	DCF
RCOM	RLCM.BO	Neutral	170.70	172	1%	SOTP
Idea	IDEA.BO	Sell	65.45	49	-25%	SOTP
TCOM	TATA.BO	Sell	280.40	250	-11%	SOTP
MTNL	MTNL.BO	Sell	73.20	70	-4%	DCF

Share prices based on the close as at March 31, 2010.
Source: Factset, Goldman Sachs Research estimates.

HEAD-TO-HEAD VALUATION (FISCAL YEAR BASIS)

	P/E (X)			EV/EBITDA (X)			FCF Yield	
	10E	11E	12E	10E	11E	12E	10E	11E
Bharti	13.3	12.4	11.0	7.6	6.8	5.8	3%	3%
RCOM	9.0	9.8	9.2	6.8	6.6	5.2	10%	2%
Idea	25.3	31.5	27.5	8.0	7.8	6.8	-2%	-3%
TCOM	NM	NM	NM	12.3	7.9	6.3	-13%	-32%
MTNL	NM	NM	NM	4.9	NM	13.4	-16%	-50%
Average	**15.9**	**17.9**	**15.9**	**7.9**	**7.3**	**7.5**	**-4%**	**-16%**

Source: Factset, Goldman Sachs Research estimates.

SENSITIVITY ANALYSIS

	Various Scenarios				
	(1)	(2)	Base case	(3)	(4)
			Bharti		
3G upfront amt. (Rs bn)	30.0	35.0	45.0	50.0	55.0
BWA upfront amt. (Rs bn)	0.0	0.0	0.0	17.5	18.5
3G/BWA capex (Rs bn)	6.5	10.4	13.0	16.2	19.5
Total amt. (Rs bn)	**36.5**	**45.4**	**58.0**	**83.7**	**93.0**
2011E Net Debt/EBITDA (X)	2.35	2.39	2.43	2.56	2.60
Implied value var.	2%	1%	0%	-2%	-3%
			RCOM		
3G upfront amt. (Rs bn)	15.0	25.0	35.0	40.0	45.0
BWA upfront amt. (Rs bn)	0.0	0.0	0.0	5.0	17.5
3G/BWA capex (Rs bn)	3.2	6.5	11.9	13.0	19.5
Total amt. (Rs bn)	**18.2**	**31.5**	**46.9**	**58.0**	**82.0**
2011E Net Debt/EBITDA (X)	2.18	2.31	2.43	2.56	2.73
Implied value var.	6%	3%	0%	-2%	-6%
			Idea		
3G upfront amt. (Rs bn)	10.0	15.0	25.0	35.0	45.0
BWA upfront amt. (Rs bn)	0.0	0.0	0.0	5.0	10.0
3G/BWA capex (Rs bn)	3.2	4.5	6.5	13.0	15.6
Total amt. (Rs bn)	**13.2**	**19.5**	**31.5**	**53.0**	**70.6**
2011E Net Debt/EBITDA (X)	1.86	2.01	2.30	2.79	3.23
Implied value var.	10%	7%	0%	-12%	-22%
			MTNL		
3G upfront amt. (Rs bn)	6.4	7.7	9.6	11.5	12.8
BWA upfront amt. (Rs bn)	3.2	3.2	3.2	3.7	4.2
3G/BWA capex (Rs bn)	0.023	0.032	0.045	0.059	0.072
Total amt. (Rs bn)	**9.6**	**10.9**	**12.8**	**15.2**	**17.0**
Implied value var.	12%	7%	0%	-8%	-15%

Source: Goldman Sachs Research estimates.

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The prices in the body of this report are based on the market close of 31 March, 2010.

We believe 3G does not make a strong business case in India

3G leads to additional capex and interest expenses; revenue benefits unknown

Based on our analysis, we believe the earnings of an operator who is acquiring a 3G license would be dragged down by: (1) higher spectrum charges, (2) amortization related to the 3G license, (3) incremental depreciation (associated with 3G capex), and (4) potentially higher interest expense (assuming an increase in debt to fund 3G). In addition, the operator would have to make incremental investments in capex to build a 3G network. We believe that such an operator would not be able to immediately generate incremental revenues (by way of higher 3G ARPU) or reduce network expenses/2G capex (as 3G technology is more efficient) to offset the impact related to 3G costs. Exhibit 2 highlights the additional costs associated with acquiring 3G licenses. The 3G expenses would further increase if operators decide to subsidize handset costs to make 3G more affordable (we note that CDMA operators in India offer handset subsidies).

Exhibit 1: Spectrum charge as % of annual gross revenue

Spectrum	Fee as % of AGR	
	Exisiting	After 3G
Upto 4.4 Mhz	2%	3%
Upto 6.2 Mhz	3%	4%
Upto 8.2 Mhz	4%	5%
Upto 10.2 Mhz	4%	6%

Source: DOT, Goldman Sachs Research estimates.

Exhibit 2: Our estimated incremental costs related to 3G

In Rs mn	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Our assumptions
Spectrum fee	1,007	1,116	1,237	1,359	1,478	1% additional spectrum charge
Depreciation	338	900	1,238	1,350	1,350	Depn due to US$300 mn 3G capex
Amortisation	1,250	1,250	1,250	1,250	1,250	Rs35 bn upfront fee amortised
Int. expenses	810	810	810	810	810	US$200 mn additional debt at 9%
P&L costs	**3,405**	**4,076**	**4,534**	**4,769**	**4,888**	
Capex	6,750	4,500	2,250			Incremental 3G capex: US$300 mn
Total costs	**10,155**	**8,576**	**6,784**	**4,769**	**4,888**	

Source: Goldman Sachs Research estimates.

Emerging markets' experiences suggest limited benefit to ARPU/margins from 3G

Exhibit 3: Key 3G KPIs for emerging market telcos
3G rollout neither leading to incremental ARPUs nor uplifting EBITDA margins

				At the time of 3G launch			Last reported quarter					
	3G launch date	Penet'n at 3G launch	3G tech-nology	Data as % of ARPU	Total ARPU US$	EBITDA Margin	Current Penet'n	3G subs % of subs	Data as % of ARPU	Total ARPU US$	EBITDA Margin	Qtrs since 3G launch
Indonesia												
Telkomsel	Sep-06	27%	WCDMA	22%	9.6	65.0%	74%	NM	34%	5.1	63.6%	13
Indosat	Nov-06	29%	WCDMA	34%	6.1	53.5%	74%	NM	44%	4.5	48.6%	13
Malaysia												
Celcom	May-05	56%	WCDMA	NA	16.3	47.6%	108%	NA	NA	14.4	44.7%	19
Maxis	Jul-05	56%	WCDMA	16%	20.4	56.4%	108%	NA	34%	14.6	50.0%	19
China												
Mobile	Jan-09	48%	TDS-CDMA	29%	10.7	52.7%	58%	0.7%	29%	11.8	49.0%	4
Philippines												
PLDT	Jan-06	41%	WCDMA	48%	6.7	62.8%	88%	6%	51%	4.4	60.6%	16
Globe	Jan-06	41%	WCDMA	39%	6.3	68.4%	88%	4%	50%	3.6	57.2%	16
Mexico												
AMX	Feb-08	66%	WCDMA	NA	16.4	52.1%	79%	NA	14%	13.4	52.7%	8
Brazil												
AMX	Nov-07	64%	WCDMA	NA	15.7	26.3%	93%	NA	NA	12.5	24.5%	9
TSU	Apr-08	68%	WCDMA	10%	18.6	20.0%	93%	5%	11%	15.4	28.2%	7

Source: Company data, Goldman Sachs Research.

We note that 3G rollout has not materially benefited emerging markets' operator ARPUs or EBITDA margins (see Exhibit 3). The primary reasons for this, we believe, are:

1. operators selectively rolling out 3G, mainly in urban areas;
2. entry-level WCDMA handset cost (ASP: US$100) is higher than entry-level 2G handset cost (ASP: US$20) and is not affordable for majority of the low-end subs; and
3. voice remains a predominant application with no "killer" 3G application driving the demand from the consumer side.

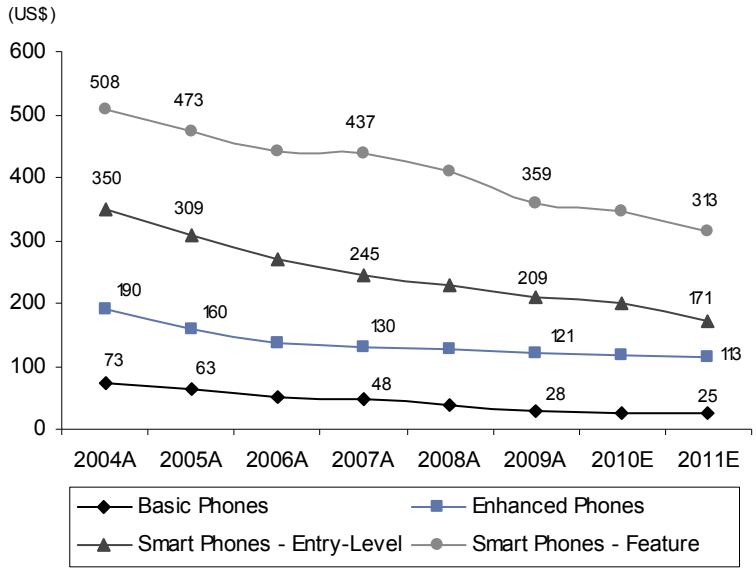
In addition, we note that as incremental subs were low ARPU subs, the overall ARPU continued to decline and was not able to offset any 3G benefits. The EBITDA margins for most of these operators declined slightly rather than showing any improvement due to 3G uptake. Up until now, not many of the emerging markets' operators have disclosed their 3G subs as those numbers are very small.

Similar to other emerging markets, we do not estimate any aggressive uptake of 3G services in India as we do not expect operators to push the service (we estimate limited 3G rollout and 3G being used to free voice capacity). We also do not expect a subscriber pull (given no "killer" 3G application and costlier handsets). We are therefore not modeling in any incremental revenues into our current forecasts from 3G for Indian operators.

3G handsets still costly; VAS market yet to develop in India

Despite handset costs declining over the past few years, we believe 3G handset is currently not a mass-market product in India with less than ten different WCDMA handset models priced in the range of US$100-US$170 (see Exhibits 4 and 5). While we expect handset costs to further decline over time (given the benefits from scale economies), we believe that in the initial few years, 3G will cater to the higher end of the market. Industry participants indicated that despite no 3G service in the market currently, approximately 10-12 mn WCDMA handsets are being used by urban consumers.

Exhibit 4: Average handset prices in India
Entry-level smart-phones are still costly



Source: Gartner, Goldman Sachs Research estimates.

Exhibit 5: Select low-end 3G handsets in India

Company	Nokia	Samsung	Sony-Eric	Samsung	Samsung	Nokia	Motorola
Model	2730	C5130	Naite	L700	J800	5233	ZN 300
Frequency	Quad band	Quad band	Quad band	Quad band	Tri band	Quad band	Quad band
Price (Rs)	4,650	5,200	6,650	6,700	7,000	7,500	7,799
Price (US$)	**103**	**115**	**147**	**148**	**154**	**165**	**172**

Source: My Mobile, Goldman Sachs Research.

Another factor, which we believe could limit the uptake of 3G is the growth of the VAS (value-added services) market in India. Currently, operators largely control the content accessed by consumers, and majority of VAS applications can be accessed through operator portals. Some of the VAS providers indicated that the revenue sharing is skewed in favor of operators and believe that if the application market needs to develop then (1) profit sharing must be more balanced and (2) consumers should be able to directly access content. However, it remains to be seen if this (balance of power between VAS providers and operators) changes after 3G launch.

Despite all these issues, we expect incumbents/new entrants to bid for 3G

Following our discussions with operators, we believe incumbents might be aggressive in the 3G bidding process due to the following reasons: (1) in order to maintain their brand perception as one of the top-end brands in the market; (2) fear that if they do not get the 3G license then their existing high-end subs might churn out over time to competitors who are able to offer the service; and (3) acquire spectrum, given that spectrum is a scarce resource. Exhibit 6 shows the key incumbent operators in different circles who may be forced to aggressively bid for 3G licensing in order to protect their subs-base from churning out. In addition, we expect new entrants like Tata DoCoMo/Aircel would bid for 3G licensing in order to target the high-end market by leveraging their parent company's 3G experience (DoCoMo in Japan and Maxis in Malaysia, respectively).

Exhibit 6: Top 3 operators based on revenue market share as of December 2009
BRTI, RCOM, and Idea are in the top 3 in 22, 8, and 8 circles, respectively

	Circle	1		2		3	
Metros	Delhi	**BRTI**	32%	VOD	20%	MTNL	20%
	Kolkata	VOD	32%	**BRTI**	29%	RCOM	18%
	Mumbai	VOD	25%	MTNL	22%	**BRTI**	16%
Circle A	Andhra Pradesh	**BRTI**	40%	*Idea*	17%	VOD	12%
	Gujarat	VOD	40%	**BRTI**	21%	*Idea*	19%
	Karnataka	**BRTI**	51%	VOD	15%	RCOM	9%
	Maharashtra	*Idea*	29%	**BRTI**	21%	VOD	19%
	TN (incl. Chennai)	**BRTI**	34%	VOD	21%	Aircel	20%
Circle B	Haryana	VOD	23%	*Idea*	20%	**BRTI**	19%
	Kerala	*Idea*	29%	VOD	22%	**BRTI**	19%
	Madhya Pradesh	**BRTI**	29%	*Idea*	28%	RCOM	22%
	Punjab	**BRTI**	39%	*Idea*	18%	VOD	17%
	Rajasthan	**BRTI**	45%	VOD	23%	BSNL	10%
	Uttar Pradesh (E)	VOD	31%	**BRTI**	28%	BSNL	15%
	Uttar Pradesh (W)	*Idea*	28%	VOD	23%	**BRTI**	18%
	West Bengal	VOD	36%	**BRTI**	28%	RCOM	14%
Circle C	Assam	**BRTI**	34%	Aircel	25%	RCOM	19%
	Bihar	**BRTI**	46%	RCOM	19%	BSNL	8%
	Himachal Pradesh	**BRTI**	44%	RCOM	20%	BSNL	19%
	Jammu & Kashmir	**BRTI**	42%	BSNL	24%	Aircel	22%
	North East (NE)	**BRTI**	37%	Aircel	30%	BSNL	21%
	Orissa	**BRTI**	38%	RCOM	19%	BSNL	18%

Note: Market share as of Dec 2009 quarter.

Source: TRAI, Goldman Sachs Research estimates.

In Exhibit 7, we estimate the revenues and cost saving benefits for an operator in a 3G scenario. Although our subs and 2G capex savings assumptions are reasonable, we think our estimated incremental ARPU benefits from 3G are aggressive. We note that even after assuming such aggressive 3G ARPU estimates, the 3G benefits (revenues and capex savings) outgrow 3G costs from year 4. As highlighted in Exhibit 7, we believe the key benefits from 3G will be due to lower 2G capex rather than a material increase in revenues, at least for the first five years.

Exhibit 7: Potential 3G revenues and 2G capex savings

In Rs mn	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Our assumptions
3G subs (mn)	3.0	6.0	10.0	15.0	21.0	Assumed modest 3G uptake
Additional 3G ARPU (Rs)	50	51	52	53	54	We estimate aggressive incr. ARPU
Incremental 3G rev.	**600**	**918**	**1,665**	**2,653**	**3,897**	
2G capex savings	2,877	3,189	3,533	3,883	4,223	2% of 2G capex/2G sales savings
3G benefits (A)	**3,477**	**4,107**	**5,198**	**6,536**	**8,120**	
P&L costs	3,405	4,076	4,534	4,769	4,888	
3G Capex	6,750	4,500	2,250	0	0	
3G expenses (B)	**10,155**	**8,576**	**6,784**	**4,769**	**4,888**	
A-B	**(6,677)**	**(4,469)**	**(1,586)**	**1,767**	**3,232**	Benefits from Yr 4

Source: Goldman Sachs Research estimates.

Operator strategy for 3G; overbidding may trigger consolidation

Incumbents focus on freeing voice capacity, new entrants may focus on data

We believe incumbents would use 3G spectrum to free capacity constraints in 2G and not aggressively push data services given (1) Congestion issues with 2G spectrum in select urban areas; (2) unavailability of high-bandwidth backhaul, and (3) only 5MHz of 3G spectrum being available currently. Equipment vendors indicated that by proper RF (Radio frequency) planning, operators can provide high-speed data services to a larger subscriber base. However, we do not expect operators to aggressively push data services as it leads to substantial increase in capex and network opex (backhaul costs), without generating adequate returns.

Exhibit 8: 2G and 3G voice and data capacity for 5MHz in 1,800MHz and 2,100MHz

	2G Network: Capacity in Erlangs			Erlangs/Sub*
Configuration	Total	Voice	Data	
3/3/3	40.0	38.5	1.5	0.020
4/4/4	58.0	55.8	2.2	0.029
6/6/6	80.0	77.0	3.0	0.040

3G Network: Capacity in Erlangs			Erlangs/Sub*
Total	Voice	Data	
135.0	60.0	75.0	0.068

Note: * means Erlangs/Sub data is assumed for 2,000 subs.

Source: Goldman Sachs Research estimates.

Given that new entrants like Aircel, Tata DoCoMo and STel have adequate 2G capacities currently (as most of them have recently launched their respective 2G services), we expect them to be more aggressive on data services as compared with incumbents, if they get 3G licenses. This would in turn help these new entrants target the high-ARPU consumer base of the incumbents.

Exhibit 9: 3G bidders and their likely 3G strategy, in our view

Operator	Market Share		2G Presence	Likely 3G strategy (GS estimates)
	Subs	Rev.		
Bharti	23%	31%	All circles	Major focus on freeing spectrum; limited push on data service
RCOM	18%	12%	All circles	Freeing spectrum in incumbent circles; data push in others
Idea	11%	12%	All circles	Freeing spectrum in incumbent circles; data push in others
VOD	17%	20%	All circles	Major focus on freeing spectrum; limited push on data service
DoCoMo	11%	7%	17 circles	Focus on data; Leverage on DoCoMo's 3G expertise
Aircel	6%	4%	18 circles	Focus on data; Leverage on Maxis's 3G expertise
STel	0%	0%	3 Circle Cs	Unclear strategy
Etisalat	NA	NA	Not launched	Focus likely on bundling cellular and broadband services
Videocon	NA	NA	1 Circle A	Mgmt looking for a 3G partner as per Reuters, March 19

NA=Not Applicable.

Source: TRAI, Goldman Sachs Research estimates.

We see overbidding risks for 3G, given the widespread interest and deep pockets

Given that 9 operators are bidding for approximately 3 slots in 22 circles and considering that most of them are well capitalized (incumbents have adequate cash on balance sheet and new operators have secured debt-/cash-rich parent companies), we see risks of overbidding particularly in Metros and Circle A service areas. As per Economic Times (March 30, 2010), Bharti, RCOM, Vodafone, Tata DoCoMo, Idea, and Aircel have applied to bid for a pan- India spectrum while other operators are being selective. Exhibit 10 indicates the circles where we believe most of the operators are likely to bid aggressively

considering their market position and consumer profile. Given the uncertainties involved (limited clarity on operator strategies) and considering the dynamic process of licensing, we note that it would be difficult to predict who wins the 3G spectrum in which circle. We estimate the 3G licensing process would raise around Rs180 bn (approximately US$4 bn) for the government (assuming each pan-India 3G license generates Rs45 bn).

Exhibit 10: Circles where we believe operators are likely to bid aggressively are denoted by "Yes"

		Deposit*	Bharti	RCOM	Idea	VOD	DoCoMo	Aircel	STel	Etisalat	Videocon	Bidders	Slots
Metros	Delhi	400	Yes	Yes	Yes	Yes	Yes	Yes	?	Yes	?	7	3
	Kolkata	200	Yes	Yes	Yes	Yes	Yes	Yes	?	?	Yes	7	3
	Mumbai	400	Yes	Yes	Yes	Yes	Yes	Yes	?	Yes	?	7	3
Circle A	Andhra Pradesh	400	Yes	Yes	Yes	Yes	Yes	Yes	?	Yes	?	7	3
	Gujarat	400	Yes	Yes	Yes	Yes	Yes	Yes	?	Yes	?	7	3
	Karnataka	400	Yes	Yes	Yes	Yes	Yes	Yes	?	Yes	?	7	3
	Maharashtra	400	Yes	Yes	Yes	Yes	Yes	Yes	?	Yes	?	7	3
	TN (incl. Chennai)	400	Yes	Yes	Yes	Yes	Yes	Yes	?	Yes	?	7	3
Circle B	Haryana	200	Yes	Yes	Yes	Yes	Yes	Yes	?	?	?	6	3
	Kerala	200	Yes	Yes	Yes	Yes	Yes	Yes	?	?	?	6	3
	Madhya Pradesh	200	Yes	Yes	Yes	Yes	Yes	Yes	?	?	?	6	3
	Punjab	200	Yes	Yes	Yes	Yes	Yes	Yes	?	?	?	6	4
	Rajasthan	200	Yes	Yes	?	Yes	Yes	Yes	?	?	?	5	3
	Uttar Pradesh (E)	200	Yes	Yes	?	Yes	Yes	Yes	?	?	?	5	3
	Uttar Pradesh (W)	200	Yes	Yes	Yes	Yes	Yes	Yes	?	?	?	6	3
	West Bengal	200	Yes	Yes	?	Yes	Yes	Yes	?	?	?	5	4
Circle C	Assam	75	Yes	Yes	?	Yes	?	?	Yes	?	?	4	3
	Bihar	75	Yes	Yes	?	Yes	?	?	Yes	Yes	?	5	4
	Himachal Pradesh	75	Yes	Yes	?	Yes	?	?	Yes	?	?	4	4
	Jammu & Kashmir	75	Yes	Yes	?	Yes	?	?	Yes	?	?	4	4
	North East (NE)	75	Yes	?	?	Yes	?	?	Yes	?	?	3	3
	Orissa	75	Yes	Yes	?	Yes	?	?	Yes	?	?	4	3
Deposit			5,050	5,050	5,050	5,050	5,050	5,050	375	4,275	200		

Note: Cells highlighted in blue denote existing 2G operations for operators and cells in grey denote operators do not have operations in the respective circles. Data as of Feb '10. Amount in Rs mn deposited with DoT.

Source: Goldman Sachs Research.

3G could be a likely trigger for consolidation

In our view, sustaining 12-13 operators per circle is not feasible in the long run as there are insufficient profitable business cases for all of them; and we believe consolidation is inevitable (with 5-6 operators more realistic). We believe any overbidding in the 3G licensing process could be a likely trigger for consolidation as any aggressive bidding would prolong the breakeven and further raise questions on a profitable business case for 3G. We believe consolidation would be more likely in 2011 as: (1) operators may be forced to review their business models under the ongoing situation of intense competition in the industry; and (2) foreign parent companies and debtors may exert pressure to meet pre-agreed financial targets.

What we model in our estimates

Exhibit 11: Base-case upfront fee estimates for 3G licenses

In Rs bn	Metro/A	B	C	Total	Our assumptions
Bharti	32.4	10.8	1.8	45.0	2/5 circles at 1.8x/1.3x reserve price; All B,C Circles at reserve price
RCOM	32.3	2.4	0.3	35.0	2/5 circles at 1.8x/1.3x reserve price; Select B & C Circles at reserve price
Idea	20.2	4.8	0.0	25.0	2/2 circles at 1.8x/1.3x reserve price; Select B Circles at reserve price

Source: Company data, Goldman Sachs Research estimates.

We estimate Bharti will win a pan-India 3G license (given its incumbent position) and we model in an upfront fee payment of Rs45 bn in our base case. We expect RCOM and Idea to be selective in their bidding and acquire 3G spectrum in the circles where they have a strong/incumbent position. We estimate RCOM and Idea will pay upfront fees of Rs35 bn and Rs25 bn, respectively. We do not factor in any incremental revenue benefits from 3G or lower 2G capex (given more spectrum availability) in our base case.

Exhibit 12 shows our sensitivity analysis for 3G license bidding, highlighting our key assumptions and sensitivity to implied value and net debt/EBITDA. In scenarios (1) and (2), we assume operators do not get a pan-India 3G license and acquire licenses in select circles. Their incremental 3G investments also reduce accordingly. In scenarios (3) and (4), we assume operators overbid for 3G licenses and also acquire BWA licenses.

Exhibit 12: Scenario analysis for different upfront fee and 3G capex estimates

	Various Scenarios: Bharti				
	(1)	(2)	Base case	(3)	(4)
3G (Rs bn)	30.0	35.0	45.0	50.0	55.0
BWA (Rs bn)	0.0	0.0	0.0	17.5	18.5
Incr. capex (Rs bn)	6.5	10.4	13.0	16.2	19.5
Total (Rs bn)	**36.5**	**45.4**	**58.0**	**83.7**	**93.0**
			Bharti		
2011E Net Debt/EBITDA (X)	2.88	2.91	2.97	3.10	3.14
Implied value var.	2%	1%	0%	-2%	-3%

	Various Scenarios: RCOM				
	(1)	(2)	Base case	(3)	(4)
3G (Rs bn)	15.0	25.0	35.0	40.0	45.0
BWA (Rs bn)	0.0	0.0	0.0	5.0	17.5
Incr. capex (Rs bn)	3.2	6.5	11.9	13.0	19.5
Total (Rs bn)	**18.2**	**31.5**	**46.9**	**58.0**	**82.0**
			RCOM		
2011E Net Debt/EBITDA (X)	2.18	2.31	2.43	2.56	2.73
Implied value var.	6%	3%	0%	-2%	-6%

	Various Scenarios: Idea				
	(1)	(2)	Base case	(3)	(4)
3G (Rs bn)	10.0	15.0	25.0	35.0	45.0
BWA (Rs bn)	0.0	0.0	0.0	5.0	10.0
Incr. capex (Rs bn)	3.2	4.5	6.5	13.0	15.6
Total (Rs bn)	**13.2**	**19.5**	**31.5**	**53.0**	**70.6**
			Idea		
2011E Net Debt/EBITDA (X)	1.86	2.01	2.30	2.79	3.23
Implied value var.	10%	7%	0%	-12%	-22%

	Various Scenarios: MTNL				
	(1)	(2)	Base case	(3)	(4)
3G (Rs bn)	6.4	7.7	9.6	11.5	12.8
BWA (Rs bn)	3.2	3.2	3.2	3.7	4.2
Incr. capex (Rs bn)	0.023	0.032	0.045	0.059	0.072
Total (Rs bn)	**9.6**	**10.9**	**12.8**	**15.2**	**17.0**
			MTNL		
Implied value var.	12%	7%	0%	-8%	-15%

Note: For Bharti, the net debt is after Zain acquisition; for MTNL Net Debt/EBITDA is not meaningful.

Source: Goldman Sachs Research estimates.

Exhibit 13 highlights our NPV (net present value) estimates for Bharti, Idea and RCOM. Our assumptions are mentioned below. We estimate NPV of 3G subscribers to be negative for all three operators even after assuming material increase in ARPU and EBITDA margins. We note that for the NPV of 3G subs to be neutral, operators need to be selective in bidding for 3G spectrum and spend less on 3G capex.

Exhibit 13: Our NPV assumptions for subs of Bharti, Idea, RCOM in 2G and 3G scenarios

2G NPV	Bharti	Idea	RCOM
ARPU (US$)	5.1	4.4	3.3
EBITDA margin (%)	41%	29%	36%
Capex/Sub (US$)	25	24	31
NPV of 2G sub (US$)	**35**	**13**	**30**
Other assumptions:			
Monthly Churn (%)	4.5%	7.1%	2.0%
WACC (%)	12.8%	12.3%	12.0%
Economic Life of network (years)	8	8	8

3G NPV: Assuming same ARPU/Margins as 2G	Bharti	Idea	RCOM
ARPU (US$)	5.1	4.4	3.3
EBITDA margin (%)	41%	29%	36%
Capex/Sub (US$)	2,861	3,140	3,213
NPV of 3G sub (US$)	**(629)**	**(447)**	**(1,628)**
Assumptions:			
The upfront fee is included in capex; but spread across 20 yrs (license life)			
Include 3G capex as highlighted in base case			
Estimate 5% of total subs migrate to 3G			

3G NPV: Assuming ARPUs/Margins improve	Bharti	Idea	RCOM
ARPU (US$)	6.1	5.3	3.9
EBITDA margin (%)	43%	31%	38%
Capex/Sub (US$)	954	1,047	1,071
NPV of 3G sub (US$)	**(171)**	**(133)**	**(500)**
Assumptions:			
We estimate ARPU will increase 20% from base case			
We estimate EBITDA margin will increase 200 bps			
We estimate 15% of subs will migrate to 3G			

3G NPV: Capex/Sub needed for "0" NPV	Bharti	Idea	RCOM
ARPU (US$)	5.1	4.4	3.3
EBITDA margin (%)	41%	29%	36%
Capex/Sub (US$)	175	115	88
NPV of 3G sub (US$)	**0**	**0**	**0**
We assumed the following to arrive at our capex/sub est.: (1) operators do not acquire a pan-India 3G license, and (2) ARPUs improve by 30%-40%			

Source: Goldman Sachs Research estimates.

Consensus largely factoring in 3G upfront fee?

Based on Bloomberg consensus capex estimates for FY10, we believe most sell-side analysts are largely factoring in 3G upfront fee assumptions (we think the estimated timing of 3G license payment by consensus is before March 10). We therefore believe the upfront fee payment is largely factored into consensus estimates.

Exhibit 14: Bloomberg consensus capex estimates

(Rs mn)		Bloomberg consensus est.		
	9M FY10A	4Q FY10E (Implied)	FY10E	FY11E
BRTI	66,770	44,733	111,503	109,014
RCOM	32,835	36,313	69,148	57,658
Idea	27,700	21,868	49,568	46,850

Source: Company data, Bloomberg, Goldman Sachs Research.

3G capex estimates could surprise on the downside

We think incumbents will roll out 3G coverage in key urban areas

Following our interactions with industry participants, we believe operators will roll out 3G coverage in key urban areas in the next 6-8 months after they get 3G spectrum (GS estimate: in October 2010). We expect private operators to roll out 3G coverage in spectrum-constrained places and cities where they see demand for data services (all metros and key Circle A areas). In other circles, we expect minimum rollout in order to meet the 3G rollout obligations as stipulated by DoT (Department of Telecommunications) (see Exhibit 15). On the contrary, we believe BSNL's 3G coverage will be better than the private operators, particularly in semi-urban/rural areas and estimate the company to cover around 600 DHQs (District Head Quarters) in the next 12 months (BSNL has already launched its 3G services and has had a head start over private operators).

Exhibit 15: Rollout obligations for 3G services as stipulated by DoT

Area	3G rollout obligations
Metros	At least 90% of the service area within five years of the Effective Date
Circle A, B and C	At least 50% of DHQ in the service area, of which at least 15% of the DHQs should be rural Short Distance charging area (SCDA) within five years of the Effective Date

Source: DoT, Goldman Sachs Research estimates.

US$1 bn-US$2 bn capex required to roll out 3G in key urban cities, in our view

Based on our discussions with equipment vendors, we estimate the capex required for a pan-India 3G coverage could vary between US$993 mn and US$1,985 mn depending upon whether the existing BTS (Base Transceiver Stations) are 3G-enabled or not. We believe majority of the towers of the new entrants (who are bidding for 3G) are 3G-enabled and estimate that a larger portion of towers of incumbent operators in semi-urban/rural areas are not 3G-enabled. We note that our 3G capex estimates for Bharti, RCOM, and Idea for the next three years are US$300 mn, US$275 mn, and US$150 mn, respectively.

Exhibit 16: Our estimates on capex requirements for 3G rollout across India

Number of BTS required for	BTS	Frequency
Pan-India 2G coverage	~50K	1800 MHz
Pan-India 3G coverage	~30K	2100 MHz
3G coverage in 30 key cities	~8K	2100 MHz

Cost of BTS (including electronics, backhaul, etc.)	Rs mn	US$
3G-enabled BTS	~1.5	33,083
Non-3G-enabled BTS	~3.0	66,167

Estimated cost for 3G network rollout	In US$ mn	In Rs bn
30 key cities with 3G-enabled BTS	265	12.0
30 key cities without 3G-enabled BTS	529	24.0
Pan-India with 3G-enabled BTS	993	45.0
Pan-India without 3G-enabled BTS	1,985	90.0

Note: Estimates do not include investments in core network.

Source: Goldman Sachs Research estimates.

Active infrastructure sharing/"Pay as you grow" model could lead to lower 3G capex

We expect 3G capex could be lower in the first few years as: (1) operators could piggyback on their existing passive 2G network; (2) we do not rule out selective sharing of active infrastructure among 3G license winners (equipment vendors indicated that operators could save about 25%-30% on BTS costs by active infrastructure sharing); and (3) we estimate capex costs could be driven down further by awarding low-cost Chinese vendors a greater share of 3G infrastructure. We expect larger operators like Bharti to follow a "Pay as you grow/transmit" model (i.e., not paying upfront capex but paying capex as 3G subs increase) for its 3G infrastructure payments, and for smaller operators to approach vendors for financing agreements — based on the size of their balance sheets.

BWA licensing: The unexplored territory

Widespread interest in BWA; wireless operators less likely to overbid, in our view

Given the demand for BWA licenses is higher than our expectations (11 operators are bidding vs. our expectation of 4-5), we do not rule out the possibility of BWA licenses being auctioned at a price higher than the reserve price of Rs17.5 bn. We note that the number of operators (11) who are participating in the BWA bidding process (for two slots) are higher than the number of operators (9) bidding for the 3G licensing process (for three slots). We believe 3G remains a priority for the listed wireless operators (Bharti/RCOM/ Idea) and do not expect these operators to aggressively bid for BWA as 1) The LTE/Wimax ecosystem is at a nascent stage as compared with the WCDMA ecosystem; and 2) an aggressive push for BWA services may cannibalize some of their potential 3G revenues.

Exhibit 17: Participants in the BWA spectrum auction

Operator	Brief Description	Promoter	Experience in broadband
Bharti Airtel	No. 1 wireless operator by subs	Bharti; SingTel	Yes
RCOM	No. 2 wireless operator by subs	Anil Dhirubhai Ambani Group	Yes
Idea Cellular	No. 5 wireless operator by subs	Aditya Birla Group, Axiata	No
Vodafone	No. 3 wireless operator by subs	Vodafone Group Plc.	Yes (Internationally)
TCOM	Provides enterprise services & internet/broadband services	Tata Group	Yes
Aircel	GSM operator, which has 4% revenue market share.	Maxis (74%); Apollo Hospitals (26%)	No
Augere	Wireless broadband services provider founded in 2007. Has a presence in Pakistan/ Bangladesh under the brand name "Qubee".	Sanjiv Ahuja (former CEO of Orange)	Yes (Internationally)
Infotel Broadband Services	Part of the HFCL group, which manufactures telecom equipments.	Mahendra Nahata (Chairman of HFCL group)	Yes
Qualcomm	Inventor of CDMA technology. One of the largest fabless chip suppliers in the world.	NYSE listed company	Yes (Internationally)
Spice ISP	Part of Spice Global, which has a presence in retail, BPO, entertainment & other businesses.	BK Modi (Chairman of Spice Global)	No
Tikona Digital Networks	Network service provider, founded in 2008. Has a pan-India ISP license and offers wireless broadband services under the brand name 'Tikona Wi-Bro'. Has a presence in 10 Indian cities.	Prakash Bajpai (Founder, MD & CEO)	Yes

Note: Market share as of Dec 2009.

Source: Company data, TRAI, Goldman Sachs Research.

Different bidders focus on different technologies (Wimax and LTE)

Based on our interactions with various operators and media articles, we believe different operators intend to use different technologies in the 2.3 GHz band. Operators like TCOM and Aircel who already offer fixed Wimax services would likely roll out WiMax services (802.16e) if they get the BWA license, in our view. We believe incumbents like Bharti/Vodafone would likely roll out LTE (Long-term-evolution) services as 1) LTE provides a clearer roadmap to 4G and 2) the Wimax ecosystem is at the nascent stage. In an interview to CNBC India on March 17, 2010, Qualcomm India's CEO, indicated that they will use LTE-TD technology and if successful will secure Indian partners to provide wireless broadband services. Qualcomm India's CEO also mentioned that they are open to any partner (could be any one right from Bharti to RCOM).

We expect limited uptake of services given the BWA ecosystem is yet to mature (vs. 3G)

We note the allocation of unpaired spectrum for TDD (Time Division Duplexing) usage in the FDD (Frequency Division Duplexing) band will require vendors to develop new equipments for BWA services (be it LTE or Wimax) in India. This would mean that the Indian BWA ecosystem would not enjoy global economies of scale both for base station and CPEs (Customer Premise Equipments), thus leading to higher costs for equipments. In comparison, we note that the WCDMA ecosystem is more mature given widespread adoption of this technology across the globe. We therefore do not expect BWA to be a big threat to 3G in India. In addition, we note that BWA operators may not have the financial ability to compete (on aspects like marketing/branding; network rollout, etc.) with the incumbents who would likely adopt WCDMA technology.

What if an operator does not get a 3G license?

Industry participants believe there is a business case without 3G license/spectrum

Although we believe that any leading operator/incumbent who fails to procure a 3G license in majority of the circles may have a competitive disadvantage in the long run (after 4-5 years) given the limited spectrum availability, we do not think that the operator will face any immediate competitive disadvantage. This is because currently only few incumbents/operators are facing spectrum constraints in select urban cities (which largely could be solved by investments in capex, in our view) though adequate 2G spectrum is available in semi-urban/rural areas. Most of the industry participants we spoke to believe that there is a business case for operators to survive even without 3G as: (1) voice remains the predominant application (with non-sms data as a % of ARPU being 5%/6%/6% in 3QFY10 for Bharti/RCOM/Idea, respectively); (2) the existing 2G spectrum is adequate for the next two to three years at least; and (3) operators may get more 2G spectrum depending on requirement (although the timing and exact spectrum availability is unknown).

Exhibit 18: 2G spectrum availability and launch status in all circles for operators across India

Service Area	Category	Bharti	RCOM	VOD	BSNL / MTNL	Idea / Spice	TTSL DoCoMo	Aircel	Loop (BPL)	SSTL Sistema	Datacom Videocon	S Tel	Swan Etisalat	Unitech Telenor	Total spectrum	Circle-wise operators with spectrum	Circle-wise operators with operations
Chennai	Metro	9.2	4.4	8.0	10.0	4.4	4.4	8.6	4.4	2.5	4.4		4.4	4.4	69.1	12	8
Delhi	Metro	10.0	4.4	10.0	12.4	8.0		4.4		2.5	4.4		4.4	4.4	64.9	10	7
Kolkata	Metro	8.0	6.2	9.8	10.0	4.4	4.4	4.4	4.4	2.5	4.4			4.4	62.9	11	8
Mumbai	Metro	9.2	4.4	10.0	12.4	4.4	4.4	4.4	10.0	2.5	4.4		4.4	4.4	74.9	12	9
Andhra Pradesh	A	10.0	4.4	6.2	10.0	8.0	4.4	4.4	4.4	2.5	4.4		4.4	4.4	67.5	12	8
Gujarat	A	6.2	4.4	9.8	7.4	6.2	4.4	4.4	4.4	2.5	4.4		4.4	4.4	62.9	12	6
Karnataka	A	9.8	4.4	8.0	10.0	6.2	4.4	4.4	4.4	2.5	4.4		4.4	4.4	67.3	12	9
Maharastra	A	6.2	4.4	6.2	10.0	9.8	4.4	4.4	4.4	2.5	4.4		4.4	4.4	65.5	12	8
Tamil Nadu	A	9.2	4.4	7.2	10.0	4.4	4.4	9.8	4.4	2.5	4.4		4.4	4.4	69.5	12	9
Haryana	B	6.2	4.4	6.2	10.0	6.2	4.4	4.4	4.4	2.5	4.4		4.4	4.4	61.9	12	7
Kerala	B	6.2	4.4	6.2	10.0	8.0	4.4	4.4	4.4	2.5	4.4		4.4	4.4	63.7	12	9
Madhya Pradesh	B	6.2	6.2	4.4	10.0	8.0	4.4	4.4	4.4	2.5	4.4		4.4	4.4	63.7	12	6
Punjab	B	7.8	4.4	6.2	6.2	7.8	4.4	4.4	4.4	2.5	4.4		4.4	4.4	61.3	12	6
Rajasthan	B	6.2	4.4	6.2	8.0	6.2	4.4	4.4	4.4	5.0	4.4		4.4	4.4	62.4	12	6
UP (East)	B	6.2	4.4	8.0	10.0	6.2	4.4	4.4	4.4	2.5	4.4		4.4	4.4	63.7	12	8
UP (West)	B	6.2	4.4	6.2	10.0	8.0	4.4	4.4	4.4	2.5	4.4		4.4	4.4	63.7	12	8
West Bengal	B	6.2	6.2	6.2	8.0	4.4	4.4	4.4	4.4	2.5	4.4			4.4	55.5	11	8
Assam	C	6.2	6.2	4.4	10.0	4.4	4.4	6.2	4.4	2.5	4.4	4.4		4.4	61.9	12	6
Bihar	C	8.0	8.0	4.4	10.0	4.4	4.4	4.4	4.4	2.5	4.4	4.4	4.4	4.4	68.1	13	10
Himachal Pradesh	C	6.2	6.2	4.4	10.0	4.4	4.4	4.4	4.4	2.5	4.4	4.4		4.4	60.1	12	7
J&K	C	6.2	4.4	4.4	8.0	4.4		4.4	4.4	2.5	4.4	4.4		4.4	51.9	11	6
North East	C	4.4	6.2	4.4	10.0	4.4		4.4	4.4	2.5	4.4	4.4		4.4	53.9	11	6
Orissa	C	8.0	6.2	4.4	10.0	4.4	4.4	4.4	4.4	2.5	4.4	4.4		4.4	61.9	12	9

Note: Cells shaded in grey denote areas where operations have not started

Note: Data as of February 2010 and unit is MHz.

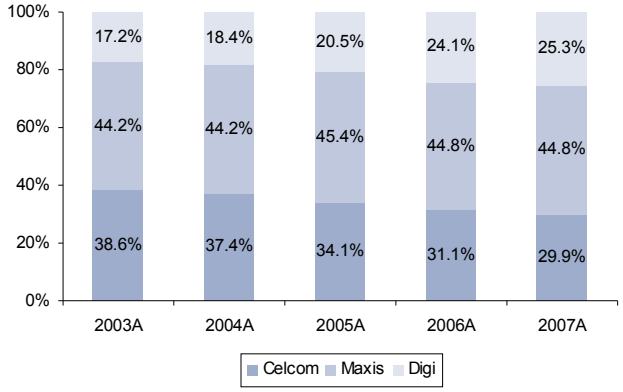
Source: DoT, TRAI, Company data, Goldman Sachs Research.

Malaysia case-study: Digi outperformed its peers for about 2 yrs without 3G license

In Malaysia, out of the three large wireless operators, only Celcom and Maxis got 3G licenses and Digi did not get a 3G license (Celcom and Maxis had launched 3G in May 2005 and July 2005, respectively). However, despite Digi not getting a 3G license, its stock price increased four fold from to MYR18.79 (May 31, 2007) MYR4.15 (May 3, 2005), primarily due to its steady market share increase and capital management exercise. It is worth highlighting that both Celcom and Maxis were not aggressive in the initial years in pushing data services given limited 3G coverage and lesser availability of 3G handsets.

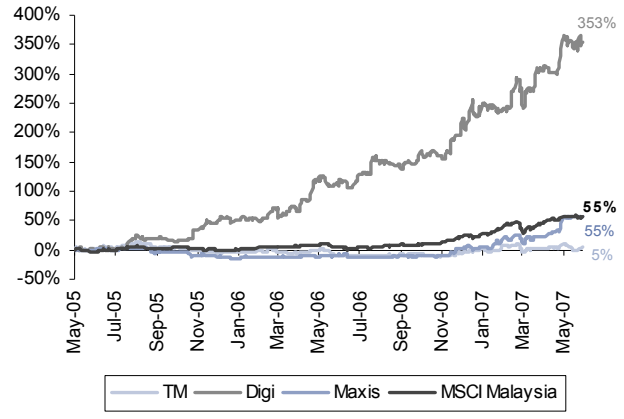
We note that what worked for Digi in Malaysia may not necessarily work for any operator in India (given Malaysia is not a spectrum-constrained country like India and the 3G ecosystem has developed since 2005). But if indeed any Indian operator (who does not get a 3G license) is able to increase its market share and show better net profit margins (due to lower D&A and interest expense); then we do not rule out the possibility that the stock price of such an operator could outperform its peers (who have 3G licenses).

Exhibit 19: Revenue market share of Malaysian telcos
Digi's market share increased even without 3G license



Source: Company data, Goldman Sachs Research.

Exhibit 20: Share price performance from May '05-'07
Digi outperformed its peers and MSCI Malaysia



Source: Bloomberg, Goldman Sachs Research.

Key risks to our 12-month target prices

Bharti and RCOM: Downside risks: (1) Overbidding for 3G/BWA licenses: higher-than-estimated bidding price may further increase the company's leverage and reduce our DCF-based value; (2) higher-than-estimated spectrum charge fee. Upside risks: (1) Faster-than-expected revenue growth from cellular business; (2) higher-than-estimated contribution from non-wireless business.

Idea: (1) Lower-than-estimated capex outflows leading to an increase in FCF and therefore an increase in the DCF value; (2) higher upside in a recovery phase given that Idea is a pure wireless operator; and (3) Idea may benefit from earlier-than-expected consolidation, subject to valuations, either as an acquirer (which would increase its scale) or as a target (if a stake sale happens at a substantial premium to its current market price).

MTNL: (1) Overbidding for 3G and BWA licenses; (2) higher-than-estimated impact of ongoing price competition in the wireless market on fixed line and wireless revenues; and (3) any cash burn from potential overseas acquisitions.

TCOM: (1) Faster-than-expected uptake of data revenues may lead to improvement of margins; (2) lower-than-estimated D&A and net interest expense due to less-than-estimated capex investments and debt; and (3) faster-than-expected rollout of BWA (WiMax) service and higher-than-estimated uptake of service.

Appendix 1: The 3G auction process in India

Excerpts from 3G/BWA notice inviting applications

Each of the auctions shall be a simultaneous ascending e-auction, conducted over the Internet. Winning bidders of a spectrum will be awarded a block in each service area and this shall be determined in the first stage, a Clock Stage, which will allocate spectrum blocks simultaneously for the service area(s). A second stage, a Frequency Identification Stage, will identify specific frequencies for the winning bidders.

Exhibit 21: 3G and BWA: Available spectrum and reserve price
Pan-India 3G and BWA spectrum reserve price is Rs35 bn and Rs17.5 bn, respectively

		Market Share		3G Spectrum			BWA Spectrum		
Service Area	**Category**	Dec-09 Subs.	Dec-09 Rev.	Reserved for BSNL /MTNL	Slots Auctioned	Reserve price Rs mn	Reserved for BSNL /MTNL	Slots Auctioned	Reserve price Rs mn
Delhi	Metro	5.1%	9.9%	1	3	3,200	1	2	1,600
Kolkata	Metro	2.9%	2.6%	1	3	1,200	1	2	600
Mumbai	Metro	4.6%	9.2%	1	3	3,200	1	2	1,600
Andhra Pradesh	A	7.9%	7.7%	1	3	3,200	1	2	1,600
Gujarat	A	5.6%	5.5%	1	3	3,200	1	2	1,600
Karnataka	A	6.2%	7.0%	1	3	3,200	1	2	1,600
Maharashtra	A	7.6%	7.5%	1	3	3,200	1	2	1,600
TN (incl. Chennai)	A	9.4%	8.6%	1	3	3,200	1	2	1,600
Haryana	B	2.4%	2.1%	1	3	1,200	1	2	600
Kerala	B	4.2%	4.4%	1	3	1,200	1	2	600
Madhya Pradesh	B	5.4%	4.3%	1	3	1,200	1	2	600
Punjab	B	3.5%	4.0%	1	4	1,200	1	2	600
Rajasthan	B	5.8%	4.6%	1	3	1,200	1	2	600
Uttar Pradesh (E)	B	7.3%	5.6%	1	3	1,200	1	2	600
Uttar Pradesh (W)	B	5.2%	4.1%	1	3	1,200	1	2	600
West Bengal	B	4.1%	2.8%	1	4	1,200	1	2	600
Assam	C	1.5%	1.5%	1	3	300	1	2	150
Bihar	C	6.1%	4.2%	1	4	300	1	2	150
Himachal Pradesh	C	0.9%	0.8%	1	4	300	1	2	150
Jammu & Kashmir	C	0.9%	0.8%	1	4	300	1	2	150
North East (NE)	C	0.9%	1.0%	1	3	300	1	2	150
Orissa	C	2.5%	1.9%	1	3	300	1	2	150
All India		**100%**	**100%**			**35,000**			**17,500**

Source: DoT, TRAI, Goldman Sachs Research estimates.

Clock Stage: The Clock Stage will establish the bidders to be awarded a block in each telecom service area where there is at least one block available to auction. In this stage, in each service area bidders will bid for a block (i.e., a right to a single spectrum block not linked to any specific frequency). The Clock Stage will consist of a number of rounds (the "Clock Rounds"). These rounds will stop when (i) for every service area where a spectrum is being auctioned, the number of bids at the prices set in the last completed Clock Round is less than or equal to the number of blocks available; and (ii) there are no opportunities for bidders to increase their demand in accordance with the activity rules. The Clock Stage will establish a common winning price for all blocks within a service area, and the winning bidders in each service area.

Frequency Identification Stage: The Clock Stage will be followed by a Frequency Identification Stage that will identify specific frequencies for the winning bidders. The frequencies identified will be announced simultaneously along with the outcome of the Clock Stage. The Frequency Identification Stage will involve a random identification of frequencies that would be performed automatically by the Electronic Auction System.

The successful bidders will be allowed to commercially use 3G Spectrum from September 1, 2010.

Exhibit 22: Timeline of 3G/BWA spectrum auctions

Auction timeline for 3G spectrum	
Last date for submission of Applications	March 19, 2010
Publication of ownership details of Applicants	March 23, 2010
Bidder Ownership Compliance Certificate	March 26, 2010
Pre-qualification of Bidders	March 30, 2010
Mock Auction	April 5-6, 2010
Start of the 3G Auction	April 9, 2010
Start of the BWA Auction	2 days from the day of close of the 3G Auction
Payment of the Successful Bid Amount	Within 10 calendar days of the close of the relevant Auction

Source: DoT, Goldman Sachs Research.

Appendix 2: 3G upfront fee payments

Exhibit 23: 3G upfront fee payments in various countries

Markets	License awarded	No. of licenses	Popln* mn	GDP per capita* US$	Amount raised Total US$ mn	Amount raised / license US$ mn	License Price per Capita* US$	License Price per Sub* US$	License Price per GDP/Capita US$
Asia									
Indonesia	Feb '06	5	223	1,635	177	35	0.79	4	108
Malaysia	Jul '02	2	24	4,157	26	13	1.08	3	6
Singapore	Apr '01	3	4	20,700	166	55	40	64	8
Taiwan	Feb '02	5	23	12,529	1,398	280	62	63	112
Korea	Dec '00	3	47	11,347	2,886	962	61	108	254
European									
Germany	Jul '00	6	82	23,145	45,850	7,642	558	1,283	1,981
UK	Apr '00	5	59	24,637	35,390	7,078	601	1,265	1,436
Italy	Oct '00	5	57	19,269	10,070	2,014	177	256	523
France	May '01	2	59	22,634	1,102	551	19	33	49
Spain	Mar '00	4	40	14,422	444	111	11	26	31
India (est.)									
At Rs 35 bn	Apr '10	4	1,171	1,338	3,088	772	2.6	5.5	2,308
At Rs 40 bn	Apr '10	4	1,171	1,338	3,529	882	3.0	6.3	2,638
At Rs 45 bn	Apr '10	4	1,171	1,338	3,970	993	3.4	7.0	2,968
At Rs 50 bn	Apr '10	4	1,171	1,338	4,411	1,103	3.8	7.8	3,298

*- At the time when license was awarded

Source: Company data, Goldman Sachs Research estimates.

Reg AC

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The precise calculation of each metric may vary depending on the fiscal year, industry and region but the standard approach is as follows:

Growth is a composite of next year's estimate over current year's estimate, e.g. EPS, EBITDA, Revenue. **Return** is a year one prospective aggregate of various return on capital measures, e.g. CROCI, ROACE, and ROE. **Multiple** is a composite of one-year forward valuation ratios, e.g. P/E, dividend yield, EV/FCF, EV/EBITDA, EV/DACF, Price/Book. **Volatility** is measured as trailing twelve-month volatility adjusted for dividends.

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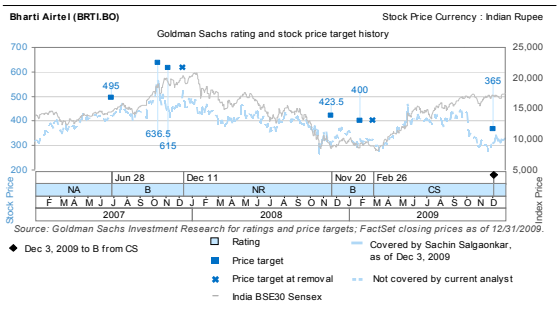

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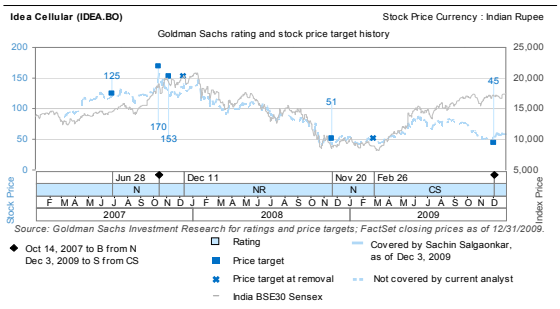

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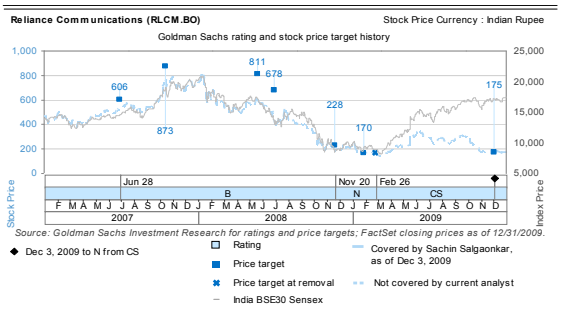

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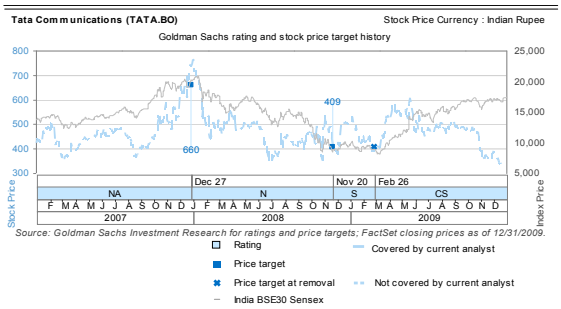

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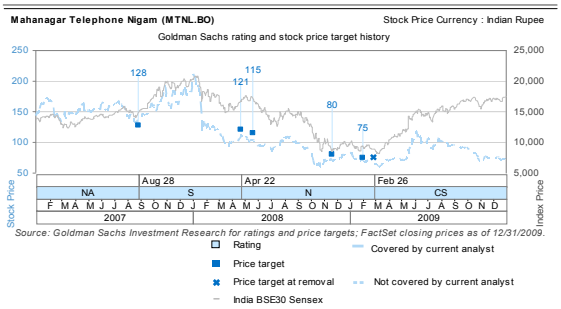

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