Spectrum: an asset or a liability?

Acquiring spectrum is increasingly a defensive strategy with limited scope for value creation and so operators should ensure they are maximising the value of their existing spectrum holdings

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Acquiring spectrum and value destruction

Is spectrum an asset or a liability?

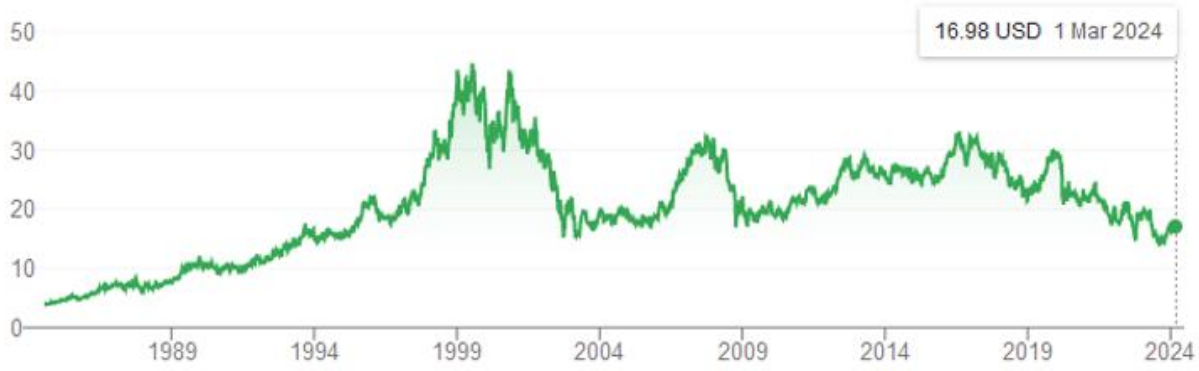
Normally, when a company invests large amounts of cash in a new asset, they do so with the expectation of increasing the value of their business and earning a return on that investment which exceeds their cost of capital. Spectrum auctions were first held in the early and mid-1990s and since then the industry has invested heavily in new spectrum "assets". A report by the Global Mobile Suppliers Association (GSMA) highlighted that in 2021 alone, the industry spent US$ 140 billion on new spectrum. This was the same year that the world's most expensive spectrum auction took place; when the US mobile industry invested US$ 81 billion in 3.5 GHz spectrum. With such a significant investment we would expect the value of the mobile operators in the US to increase and this to be reflected in their share prices.

Whilst US operator T-Mobile US Inc has increased in value by over 20% since 2021 (the S&P 500 increased 37% over the same period) both AT&T and Verizon have seen declining share prices as can be seen in the charts below.

Exhibit 1: AT&T Inc. Share Price

Source: NYSE

Exhibit 2: Verizon Communications Inc. share price

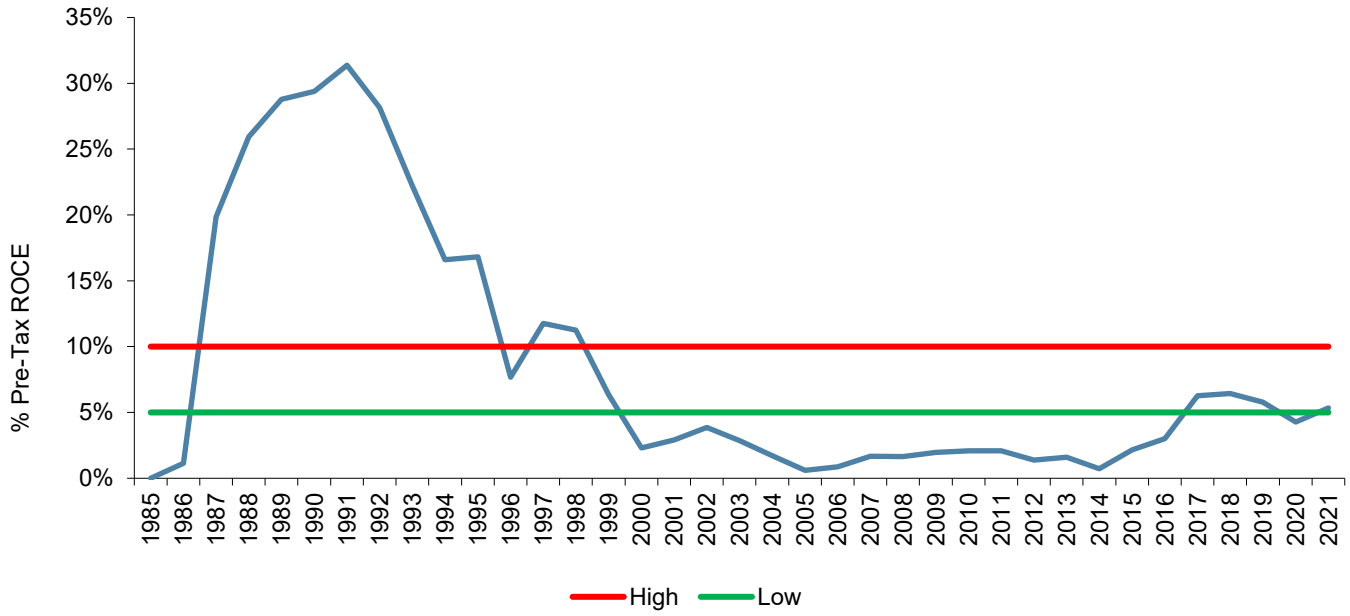


Source: NYSE

There have also been a range of studies which have revealed that mobile operators have consistently been delivering returns below their weighted average costs of capital (WACC). A study by HSBC published in February 2021 listed 10 major multi-national mobile operators who were delivering returns below their WACC.

The mobile industry in the UK has invested heavily through a series of spectrum auctions since the first auction which took place in 2000, the same year in which the Dot Com bubble burst. The chart below compares the pre-tax nominal Return on Capital Employed (ROCE) with estimates for an equivalent WACC and the chart reveals that investors have been earning less than their cost of capital for more than 20 years .

Exhibit 3: Total mobile industry pre-tax return on capital employed



Source: Operator statutory accounts

The acquisition of new spectrum and the associated investment in the deployment of that spectrum dominates the investment decisions of mobile operators. How can the industry be investing so heavily and yet apparently fail to deliver returns above their WACC and value for shareholders? Spectrum would appear to be more of a liability than it is an asset.

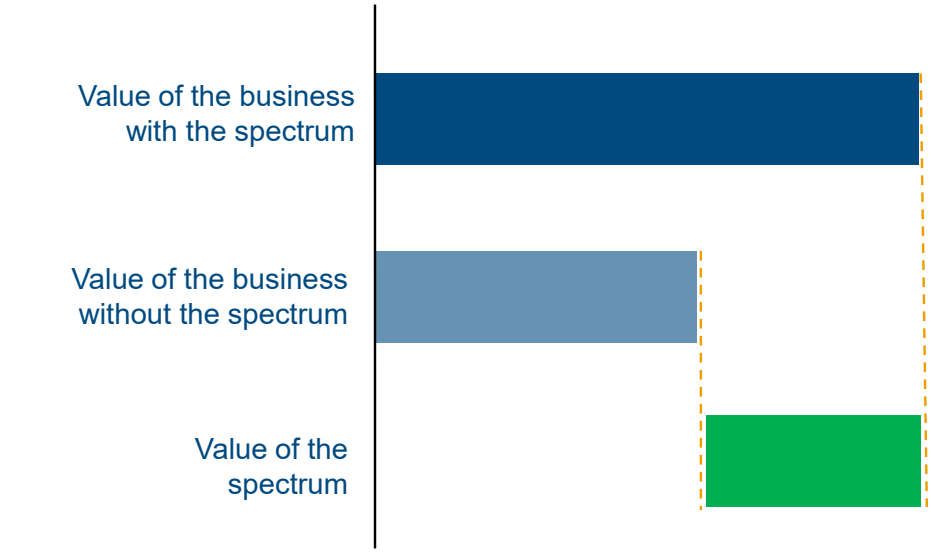
How does a mobile operator build the business case for new spectrum investment?

Coleago has supported mobile operators in more than 150 spectrum valuation exercises around the world and is one of the leading advisers on spectrum valuation and auction bidding strategy and so understands well how operators make their investment decisions.

Valuing spectrum, at least in practice, is relatively simple. The mobile operator needs to develop a long-term business case (typically 10 to 20 years) which assumes it acquires the new spectrum and determines, using Discounted Cash Flow Analysis using an appropriate estimate of the WACC, what this represents in terms of the value of the business today. The business case takes account of the investment in new radio equipment and any coverage obligations it might need to meet. The operator then repeats the task assuming it does not acquire the new spectrum and in doing so takes into account any new sites it might need to build to meet future traffic growth in the

absence of new spectrum and any competitive disadvantage it might suffer if competitors acquire the spectrum and can deliver a better service as a result.

Exhibit 4: Basic principle of spectrum valuation



Source: Coleago

The value of the two business cases, the “with” and “without”, are compared and the difference between the two is the value of spectrum. In the context of a spectrum auction or a spectrum award process more generally, provided the operator can acquire the spectrum at a price below their valuation, the decision is entirely rational and should, in theory, increase the value of their business.

If we assume that mobile operators have developed sensible and credible business cases and they have applied DCF analysis correctly then why have operators seen declining share prices, a loss in shareholder value and depressed returns below their cost of capital, despite investing billions in new spectrum?

Acquiring spectrum is increasingly a defensive strategy

There is value in spectrum - the problem for the mobile industry is that value is largely accruing to customers. The performance of the UK mobile industry is typical of many developed markets and the chart below shows the historic trend in nominal and real revenue growth for the UK mobile industry.

For more than 10 years, the UK mobile market has not delivered any real growth after adjusting for inflation. Even in nominal terms, revenue growth has been weak. The same pattern can be seen across Europe. Merrill Lynch’s Global Wireless Matrix (February 2023) revealed that real service revenue growth across all developed markets was negative at 2%. The EMEA region declined 3.3%, Asia Pacific declined 4% and North America fell by 1.2%. During the last 10 years there have been a large number of spectrum events throughout the developed markets.

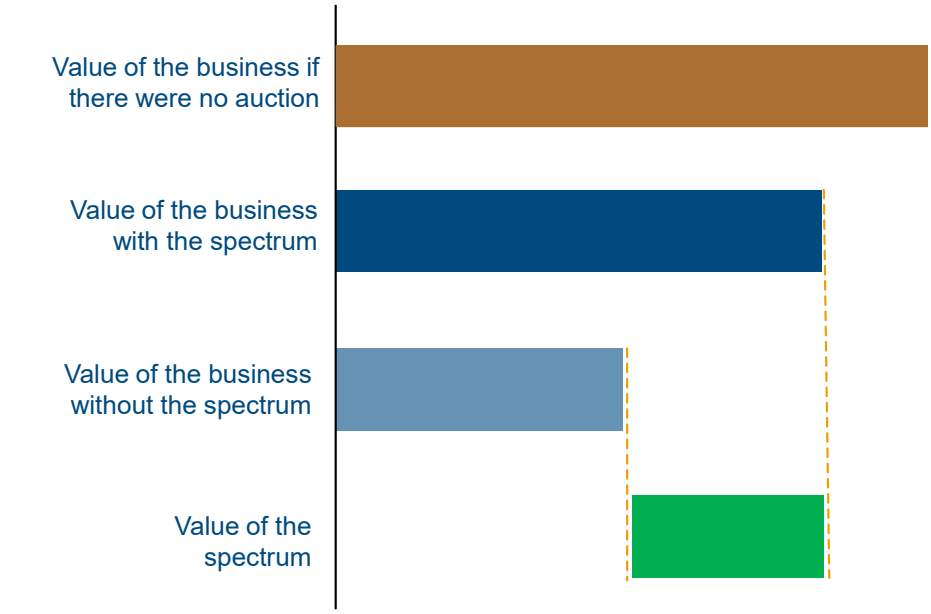
Exhibit 5: UK industry revenue growth

Source: Operator statutory accounts, Ofcom

Revenue growth has been non-existent despite customers consuming more voice minutes, text messages and most recently data traffic and increasingly, data traffic at ever higher speeds and in ever more remote parts of the country – all of this enabled by the increase in spectrum made available to the mobile industry. So, if the value of additional spectrum is largely accruing to the customer, then why does the industry continue to invest?

The answer is largely explained by the exhibit below which introduces an additional business case and valuation – the value of the business if there were no auction.

Exhibit 6: Value destruction and spectrum acquisition



Source: Coleago

Students of economics will tell you that in order to create value for shareholders, a company must earn a return above its cost of capital. They will also tell you that the only way a company can earn a return above its cost of capital is if it has some form of competitive advantage, some form of Unique Selling Proposition or source of differentiation.

In a mobile market where operators typically share the same sites and use the same vendors and offer the same products and services, spectrum can offer one of the few sources of sustainable competitive advantage. Regulators of course recognise this and through the use of spectrum caps (limits on the amount of spectrum an individual operator can hold) seek to ensure that no one operator gains a competitive advantage through holding a disproportionate share of industry spectrum. As a result, acquiring new spectrum seldom offers any significant commercial competitive advantage to an operator because any advantage new spectrum offers is quickly competed away with the benefit accruing to the customer. So, if there is no commercial benefit and no revenue upside and yet the operator has had to pay significant amounts for new spectrum and invest in its deployment, the result will be a reduction in the value of the business. This is why the value of the business with the new spectrum is less than the value of the business if there were no auction.

There are significant positive externalities of increasing mobile broadband access and improving mobile broadband speeds which are not reflected in the private value of spectrum to mobile operators. Unless required to do so, mobile operators will not expand mobile broadband coverage to uneconomic rural areas even though there is a potentially significant socio-economic benefit in doing so. As a result, regulators often attach costly coverage obligations to the acquisition of new spectrum. These costly coverage obligations serve to increase the value that is lost as a result of acquiring new spectrum.

So, if acquiring new spectrum destroys shareholder value, why can it still be rational for a mobile operator to acquire new spectrum? The answer is that, given that there is going to be an auction, if all of your competitors acquire new spectrum and you do not, then you will be worse off. You might not be able to offer the same data speeds and customer experience as competitors or you can match them in terms of network performance but you will have to invest much more heavily in additional sites due to lower spectrum holdings.

The acquisition of new spectrum is therefore largely defensive. If you acquire new spectrum, you will most likely destroy value for shareholders. But, given that there is going to be an auction, if you do not participate, then you will destroy even more value and so it remains rational to participate. Through participation, an operator reduces the amount of value that is destroyed and it is the loss of value that is avoided, which generates the positive value for spectrum. New spectrum could be seen as a liability!

Operators should seek to maximise the value of existing spectrum assets

If the acquisition of new spectrum tends to reduce shareholder value, mobile operators should ensure they maximise the value of their existing spectrum holdings. Coleago recently conducted a Strategic Spectrum Review across a portfolio of 16 mobile operations. In every case, we identified significant inefficiencies in the existing spectrum assignments and significant opportunities for improvement. We estimate that through a series of swaps, trades and band replanning, spectral efficiencies could be increased in the region of 10% to 30%. Mobile operators should ensure they are maximising the value of the spectrum assets they do hold to reduce the need for acquiring value destroying new spectrum.

Unfortunately, given the continued rate of data traffic growth, new spectrum acquisition is likely to be unavoidable. Mobile operators should therefore also ensure that any new spectrum acquired can be used as efficiently as possible and acquired on the most

favourable terms. A Strategic Spectrum Review is essential to ensure that spectrum can be treated more as an asset than a liability.

Coleago's Strategic Spectrum Review

The scope of Coleago's review was as follows:

- an industry-wide review of existing spectrum holdings to identify opportunities for swaps, trades and potential acquisitions to optimise the spectral efficiency of existing spectrum assignments – we look for win-win-win opportunities that would benefit all parties as otherwise other operators would have no incentive to cooperate;
- a review of the current band plan and national radio frequency plan to identify opportunities for replanning existing bands and to identify the potential for future spectrum release and when the spectrum would be available;
- Passive Intermodulation (PIM) risk analysis of existing and potential future spectrum assignments to ensure that future spectrum acquisition delivers maximum efficiency gains;
- a bottom-up modelling exercise that forecasts future customer traffic growth (enhanced mobile broadband and fixed wireless access) for the next 15 years and the future site build that would be required to meet the traffic growth based on existing spectrum holdings only and planned network capacity enhancements including re-farming of 2G and 3G spectrum, greater sectorisation and higher order MiMO deployments, etc;
- a review of the likely evolution of site growth to identify when site build begins to accelerate significantly which indicates that the business is facing a shortage of spectrum and a "capacity crunch"; and
- next, we combine our review of the national radio frequency band plan with our traffic and site growth projections to identify which spectrum bands, in which quantities and when would be needed to alleviate the need for uneconomic site build.

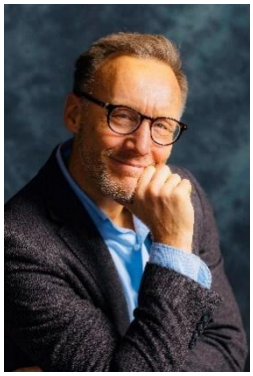
In addition, the review looks at the cost of spectrum:

- where possible, we compare the price paid by the operator for spectrum with auction benchmarks to determine whether the market was a high or low spectrum cost market;
- we also calculate the total cost of spectrum ownership, taking account of upfront fees and annual spectrum usage fees, and express this as a proportion of revenue to compare total spectrum costs across the different markets; and finally
- the cost of future spectrum needs based on adjusted spectrum auction benchmark prices.

Finally, we compare the regulatory regime with best practice across a range of topics related to spectrum which included the renewals process, new spectrum assignment, technology and service neutrality, swaps and trading, active network sharing, spectrum sharing and a future spectrum roadmap. Based on the analysis we provide recommendations for priorities in terms of a regulatory engagement strategy.

About Coleago Consulting Ltd

Graham Friend, M.A., M.Phil., (Cantab), ACA, is an economist, an award-winning author and the Managing Director and Co-Founder of Coleago Consulting. Coleago is a specialist telecoms strategy consulting firm and advises regulators and operators on issues relating to spectrum, regulation and network strategy. If you would like to discuss any of the issues raised in this paper or learn more about the benefits of conducting a Strategic Spectrum Review, then please contact Graham.



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