



## Multiple SIMs per user compared to market penetration

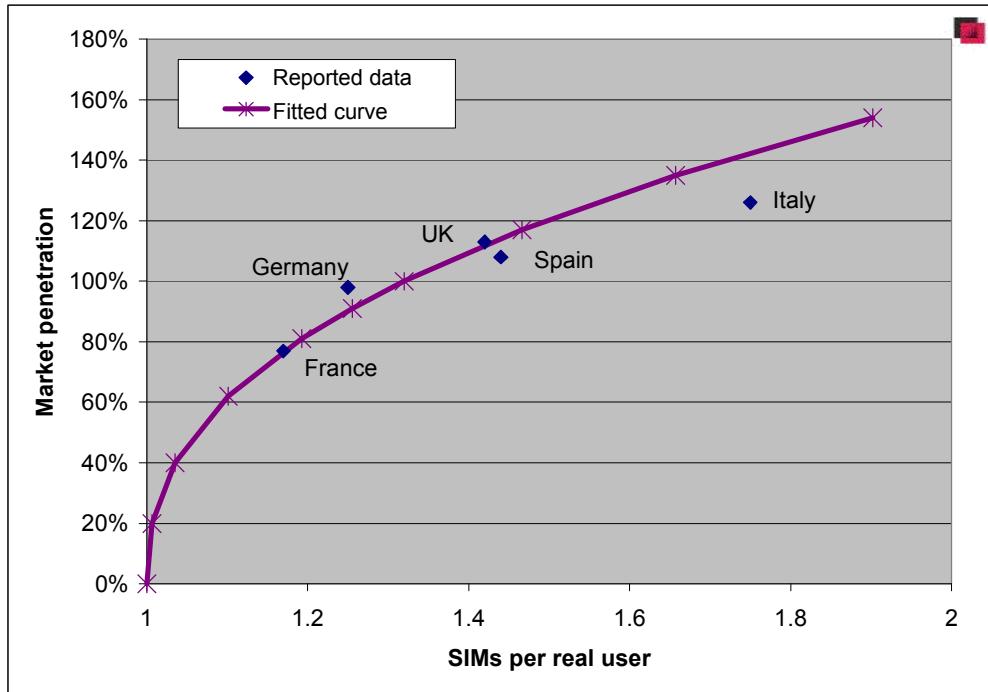
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*During 2006 we ran a series of reports looking into the phenomenon of multiple SIMs per user. We identified that this is a key factor that distorts metrics such as reported penetration, ARPU and minutes of use per user. Thanks to Vodafone, we now have a little more data to work with. This report shows that there appears to be a clear and simple relationship between reported market penetration and the number of SIMs per user for Western Europe, which we can use to estimate real penetration across the region. We offer this as a starting point for further discussion and invite operators to contribute more data on SIMs per user to us to strengthen the analysis.*



Figure 1 **The relationship between SIMs per real user and reported penetration**



Source: Wireless Intelligence, April 2007

The points on the graph are individual data points reported for different countries by Vodafone at different times. A simple power curve can be fitted to model the relationship, rising from one SIM per user when the market has very low penetration up to the levels observed today.

If this curve provides a valid relationship we can then use reported penetration in different countries to estimate SIMs per user where it is not reported.

Using the number of SIMs per user we can go on to calculate real penetration, real ARPU, real minutes of use per user and real price elasticity. These are important because they reflect the way actual people behave, where the currently reported metrics are built around the number of SIMs (connections). The difference between the two is significant as we discussed in earlier reports last year.

We offer this as a hypothesis and discuss what uses it can have.

We are aware that it is a cross-sectional analysis with limitations. It would be much stronger if it were built on a bigger data set. We invite readers to contribute more data on SIMs per user in their country, on a private basis if that's helpful, so that we can take this further.



## Analysis

### SIMs per user data

The only operator we are aware of that has provided any data on SIMs per user is Vodafone. The data is as follows:

Figure 2 **SIMs per user data**

Date	Country	SIMs/user reported data*	Reported penetration	Real penetration
May 06	Italy	1.75	126%	72%
May 06	Spain	1.44	108%	80%
May 06	UK	1.42	113%	80%
May 06	Germany	1.25	98%	78%
May 06	France	1.17	77%	66%
Nov 06	Romania	1.25	71%	57%
Nov 06	Turkey	1.25	68%	54%
Nov 06	S. Africa	1.30	68%	52%

Source: \*Vodafone, May and November 2006, Wireless Intelligence April 2007

Using the reported penetration from that time we can obviously calculate the 'real penetration' by dividing one into the other.

### Why is this important?

Understanding the number of real users is extremely useful as this small experiment demonstrates:

- a mythical operator has one user
- the user has a phone and spends \$60 per month, so the operator's ARPU is \$60
- the user buys a BlackBerry and spends an extra \$20 per month
- according to normal calculations the operator's ARPU has now gone down 30% from \$60 to \$40, i.e. \$80 per month across two connections
- but the user's spend has actually gone up 30% from \$60 to \$80.

When this phenomenon of multiple SIMs per user is spread in large numbers across the installed base it becomes important because it distorts the way we interpret reported data.

ARPU is seen to be falling, which causes doom and gloom amongst some analysts and media commentators. Actually users (or at least some of them) are spending more, which is good news for the operator.



The same distortion is found in minutes of use per user.

The same effect also affects market penetration and price elasticity calculations. Connections don't have a price elasticity; users do.

Given that users with multiple SIMs are generally spending more, we should understand the effect and think of multiple SIMs per user as an opportunity.

## Understanding the relationship with market penetration

### Western Europe

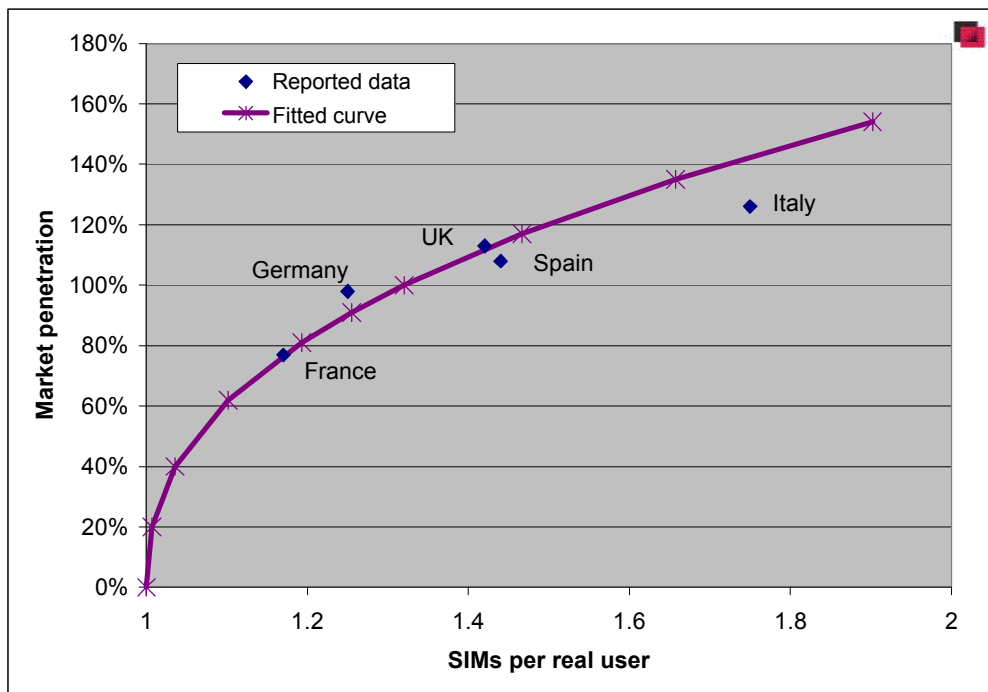
Using fairly simple curve fitting we find that a power curve fits the reported data nicely, with this formula:

$$Y = 1 + nX^z$$

where  $n = 0.32$ ,  $z = 2.4$

At the start of market growth, when market penetration is very low, we have one SIM per user. As market penetration rises there is a gradual build of multiple SIMs per user. Above market penetration of 100%, multiple SIMs per user becomes a significant effect.

Figure 3 Western European data and fitted curve



Source Vodafone; Wireless Intelligence April 2007



**Emerging markets**

In emerging markets at present you would expect to see the same effect, but also some differences because:

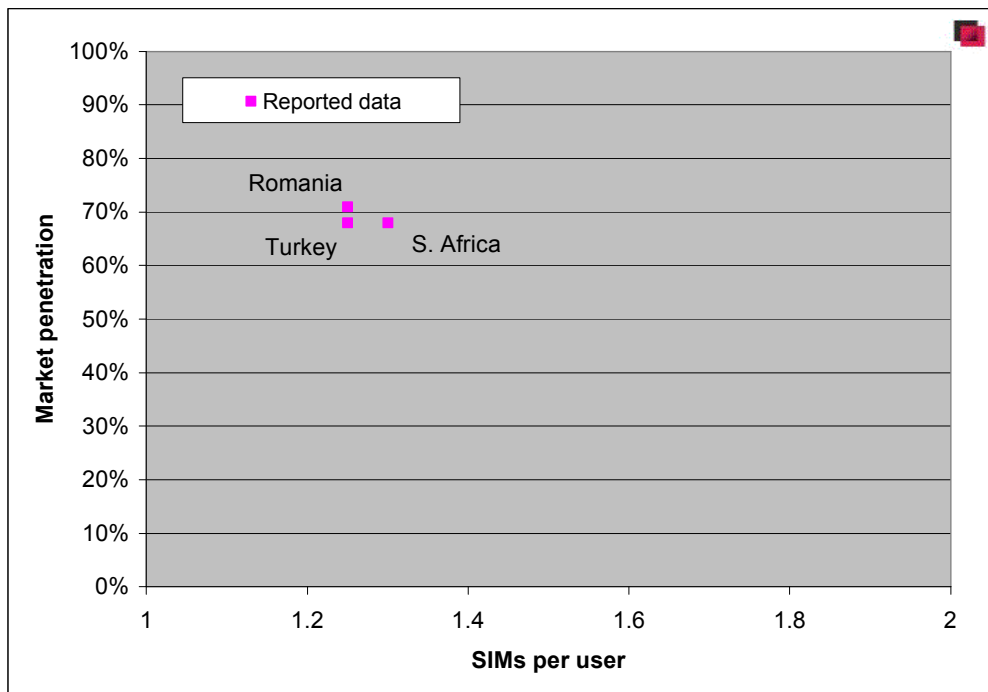
- there is a higher share of people on lower incomes, who are unlikely to have a phone
- there is lower penetration among children.

This means that the multiple SIMs per user effect should appear at lower levels of market penetration than you would find in a more mature market such as most of Western Europe.

As shown in *Figure 4*, this does seem to be true. However, the data is so tightly clustered that it is not sensible to try to fit a curve to it to explore the relationship.

We anticipate that the pattern would be similar to the one for Western Europe, but we do not have enough data at present to take this any further at this stage.

Figure 4 **Emerging markets data**



Source: Vodafone, November 2006

**Real penetration**

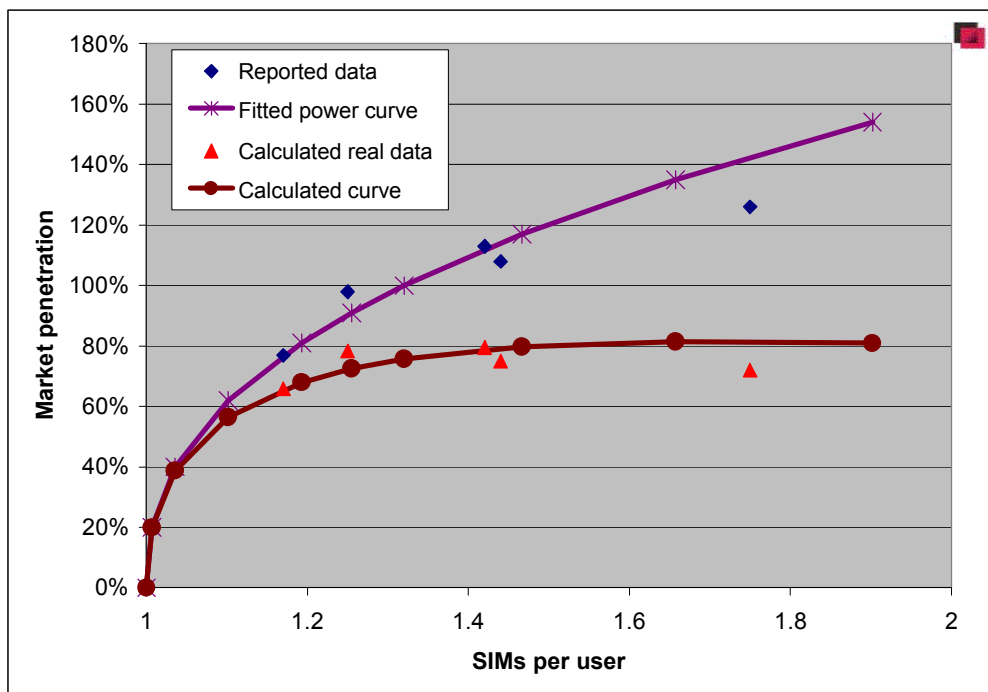
Using the fitted curve we can now easily estimate real penetration for the reported data points by dividing reported penetration by the number of SIMs per user as shown in *Figure 5*.



The calculated curve rises asymptotically towards 80- 82% as a ceiling on real penetration. This seems reasonable because:

- roughly 14% of the population is aged 0-11 and would not normally be expected to have a phone (although some usage is evident among 8-11 year-olds)
- a further few % or so would also be expected not to have a phone through preference or being on a very low income

Figure 5 **Real penetration in Western Europe**



Source: *Wireless Intelligence, April 2007*

### Modelling other countries

Assuming that the relationship holds for all of Western Europe, we can easily estimate real penetration for all countries in Western Europe, as shown in *Figure 6*.



Figure 6 **Estimates of real penetration for all Western European countries, Q1 2007**

Country	Estimated SIMs/user	Reported penetration	Real penetration
Austria	1.40	110%	78%
Belgium	1.27	94%	74%
Cyprus	1.25	91%	72%
Denmark	1.38	108%	78%
Finland	1.43	113%	79%
<b>France</b>	<b>1.17</b>	<b>77%</b>	<b>66%</b>
<b>Germany</b>	<b>1.25</b>	<b>98%</b>	<b>78%</b>
Greece	1.18	79%	67%
Iceland	1.35	104%	77%
Ireland	1.62	132%	81%
<b>Italy</b>	<b>1.75</b>	<b>126%</b>	<b>72%</b>
Liechtenstein	1.33	102%	76%
Luxembourg	1.50	121%	80%
Malta	1.70	139%	82%
Netherlands	1.26	91%	73%
Norway	2.03	163%	80%
Portugal	1.23	88%	71%
<b>Spain</b>	<b>1.44</b>	<b>108%</b>	<b>75%</b>
Sweden	1.35	104%	77%
Switzerland	1.37	106%	77%
<b>UK</b>	<b>1.42</b>	<b>113%</b>	<b>80%</b>

*Note: bold entries are reported, others are modelled*

*Source: Wireless Intelligence, April 2007*

This analysis implies that the overall penetration for Western Europe is approximately 75%. If the real penetration curve is asymptotic to just over 80% of the population, this suggests that there is growth in real users of around 5% of the population left in Western Europe before user saturation is reached.

However, growth of connections should be much higher than this because of the multiple SIMs per user opportunity.



## Critique of the analysis

As far as we can see this analysis is useful as a first step in understanding and modelling the phenomenon of multiple SIMs per user, and hence allowing us to dig deeper into real ARPU, real MoU per user and other metrics.

We would expect the relationship identified to hold in mature cellular markets in developed economies including Western Europe, the US, Canada, Japan, South Korea, Australia, Israel, Singapore, Hong Kong.

However, it has a number of limitations:

- It is based on a snapshot in time. We could have more confidence in the findings if the modelling included some time series data for a few countries
- It is a cross-sectional analysis. There are different conditions in the various countries included and this could mean that the relationship does not hold in some cases.
- Related to the previous point, the curve fitting was not quite optimal. It is possible to choose co-efficients for the formula that provide a better-fitting curve. However, the curve then gives rise to a calculated real penetration curve that turns back downwards as the number SIMs per user rises.

On the last point, we do not believe that real penetration would decline at any point as the number of SIMs per user rises. Instead we think it's more likely that the point for Italy (or possibly some of the other countries) does not fit the relationship perfectly and should be treated as an outlier. Reasons for this might include:

- different definitions of active user in that country
- different user database cleaning policy
- the make up of Vodafone's user base being different from the overall user base for the country.

In our view, the best way to explore and overcome these limitations is to extend the analysis with lots more data.

We therefore invite operators to contribute more data on SIMs per user data to us – on a private basis if necessary – so we can go further with this.





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