Contribution of Orange France Telecom Group to the Consultation on the ERG DRAFT Common Position "Next Generation networks Future Charging mechanism / long Term Termination Issues"

ERG Draft WP 2010

December 2009

Contact: affaires.reglementaires@orange-ftgroup.com
Link to the consultation:
http://erg.ec.europa.eu/doc/publications/2009/erg_09_34_draft_cp_ngn_future_charging_mechanisms_final.pdf

Executive Summary

On October 14, 2009, the ERG published a draft Common Position for consultation on Next Generation Networks' Future Charging Mechanisms.

The ERG considers it is appropriate to launch this third consultation on Bill and Keep after the 2006 (IP interconnection November 2006) and 2008 (ERG IP-IC/NGN Core 2008) consultations.

Orange France Telecom Group ("OFTG") has serious doubts concerning the validity of the arguments supporting BaK and also about the timing chosen by ERG to address the subject. This document outlines the point of view of OFTG on the matter. It also includes an independent paper written by Professor Robin Mason (University of Exeter Business School) on the Economics of Bill and Keep.

There is no demonstrated legal basis for implementing mandatory B&K

In its Consultation Document on Regulatory Principles of IP-IC/NGN Core, 2008, page 19, ERG stated that "The possibility to implement Bill & Keep under the current regulatory framework could be explored further by ERG." However, the current draft position fails to address this crucial point.

In contrast, the Commission Recommendation of 7.5.2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU recommends that termination rates should be based on the costs of an efficient operator.

In the attached Explanatory Note of the Recommendation, the Commission recognises that there is no record of Bill and Keep being imposed by a regulatory authority and that if there are efficiency gains from Bill and Keep, then, these arrangements could evolve naturally. But imposing them "may cause distortionary behaviour, bring arbitrage opportunities, lead to inefficient traffic routing and inefficient network utilisation."

The initiative by the ERG to investigate an alternative disruptive charging model for voice termination creates regulatory uncertainty as it is inconsistent with the European Commission's Recommendation.

It is also premature to consider a mandatory BaK policy as it is too early to draw any conclusions on the consequences of the EC Recommendation which NRAs have until 2013 to apply. If any, the ERG analysis should have analysed the impact of BaK with the situation created by the EC Recommendation, not with the situation before its implementation.

Favouring a mandatory BaK would send a negative signal from European regulators to the financial markets concerning investments in networks

A mandatory BaK scenario would lower the economic value of the networks, as it would send the negative economical signal that networks should be used for free.

It would negatively impact investment in the electronic communications industry from the point of view of the financial markets, which when viewed in the context of NGN requirements will have enduring negative consequences for operators and consumers alike.

Imposing BaK would distort relevant price signals at both the wholesale and retail levels

As a general rule, eliminating the pricing tool which underlies contractual relationships makes more difficult to deal with the issues of capacity and QOS, while reducing flexibility. The elimination of such a tool would lead to serious operational difficulties for the industry.

Contrary to the expectation of the ERG, mandatory BaK would not simplify regulatory issues like:

. Eligibility for interconnection,
. Point of interconnection location,
. Capacity of interconnection capacity,
. Level of quality,
. Routing.

Without price as the adjustment tool, numerous disputes will arise at all points along the technical chain. Instead of a hands-off approach to interconnection regulation, NRAs will become more involved in resolving interconnection disputes and day to day interconnection issues, in an environment where price cannot be used to arbitrate a solution and send sound economic signal.

The missing issue of data termination price

The ERG analysis could consider the appropriate charging model for voice and data and the introduction of a LRIC oriented data termination price. Charging for data termination may be the way forward to incentivise the growth in capacity required to meet the demand for access and should be assessed in further detail.

Part 1 of this document presents OFTG's answers to the ERG draft CP questions. Additional comments are stated in Part 2 of this document and developed in Annex 1 (independent paper from Pr. Robin Mason on the Economics of Bill and Keep) and Annex 2 (about the comparison between US and EU).

1 - Answers to the ERG draft Common Position questions

Question 1: Arbitrage

Do you agree that in a multi-service NGN environment, in which different services use a shared transport layer, different interconnection regimes for different services could create arbitrage problems? If yes, could you describe the problems that you foresee or that have already occurred? If no, what prevents these arbitrage problems in your view?

For telephony service, by definition, there is no separation between a service layer and a transport layer, on NGN as well as on PSTN. The telephone interconnection service integrates the service and the transport layers without any opportunity for arbitrage.

In an IP environment, the transport layer can convey the data on a shared layer but with specific usage rules depending on the service. Different service requirements are then invoiced separately. In this way, several financial models coexist as traffic can be differentiated and the point of interconnection can vary according to the type of traffic.

Arbitrage could only occur if data services and voice telephony services became directly substitutable. In that hypothesis, the introduction of a data termination price would address any problem of arbitrage.

More generally speaking, it is too early to give a general conclusion to this question due to the early stage of NGN deployment

Question 2: Layers separation

Question 2 *(Section 1 & 2.2)*: *What is the influence of the separation of transport and service for the interconnection regime and in particular the charging mechanism and in what way are NGNs and BaK related?*

Contrary to what the ERG draft document takes as a basis, there is no independence between the transport and service layers for the managed services and in particular for voice telephony services.

In the TDM interconnection world there is already a physical separation between the transport flows and the signal flows and this does not impact the economic model of interconnection.

As long as the quality of voice (or any service) is guaranteed, there will not be any decoupling of the service and transport layers, because the quality of service guarantee imposes an integrated management of service and transport.

- On page 17, it is mentioned: "Considering the multiservice character of NGNs, future networks can possibly evolve in two different ways: they can be either "service-aware" or "service-agnostic". This in turn may impact on the definition of the interconnection "service" and respectively the charging mechanism for it".

However, the notion of service-aware or service-agnostic is not specific to NGN networks and by definition voice interconnection cannot be service agnostic at the network level. The network resources bear requested in relation to the nature of the service.

And even assuming the "service agnostic" concept were relevant in the context of voice interconnection, which is a contradiction in itself, it would not imply BaK because nothing in principle prevents a "service-agnostic" interconnection being compatible with termination rates.

- On page 17 The ERG also states "The separation of transport and services will be crucial for the interconnection points. Transport and service interconnection might occur at different nodes and hierarchy levels. Considering the distinction between transport and service, transport interconnection could take place at a greater number of locations than service interconnection".

We consider that:

(a) NGN deployment is at a too early stage to make such statement. This is mainly related to network architecture choice and it is premature to conclude this.

(b) Even in the case of separate physical locations of command and media interconnections, in the case of telephone interconnection, the former will still control the latter so that both constitutes a unique interconnection which cannot be logically separated.

Question 3: Boundary

Question 3 *(Section 3.2)*: *How would you define the boundary for the application of BaK and where should it be located (i.e. points of interconnection where BaK is applicable)?*

We understand that the ERG draft CP suggestions related to boundaries are founded on the reference to the limits of transit and termination relevant markets (in the sense of the 2002 initial list of 17 relevant markets). No other definition would be consistent with the focus of the ERG draft CP, which is on interconnection charging models.

But the split between transit and termination in telephone interconnection is inconsistent, physically and conceptually, with the split between peering and transit in IP interconnection:

- In the IP world, when two networks are interconnected either they are peers and no fees are paid, or they are not peers and transit fees are paid. The chosen regime, peer or not peer, transit fee or not transit fee, applies to all the traffic between the two networks, independently of whether or not the traffic terminates or transits on the interconnected networks.
- On the contrary, regulation makes a clear distinction between the price regulation that should apply to traffic, depending on whether the traffic terminates on a network or just transits through this network.

Therefore the notion of transit in the IP context does not mean the same thing than the notion of transit in the context of interconnection market analysis, following Article 7 procedure of the European regulatory framework. If mandatory BaK was imposed on traffic termination, it would apply to categories of traffic which are not the same as the categories of traffic concerned by peering agreements. It follows that imposing BaK on voice termination would not make IP interconnection and voice interconnection consistent.

IP networks are still being deployed. The final network architecture is not defined. So it is impossible to make any statement yet about the number and location of the points of interconnection.

Question 4: Charging mechanism and penetration

What is your conclusion on the relationship between the charging mechanism and penetration, usage and price level?

In our view, the charging mechanism affects the level of penetration, especially in countries with a wide dispersion of income. The European termination rate system has allowed penetration to reach the highest levels by creating a business model which makes mobile phones affordable even for the lowest income consumers. Figure 2[1] presented in the ERG document does not take into account GDP per capita and disposable income, which are critical variables to evaluate the positive impact of the termination rate system in Europe for the lowest usage and lowest income customers.

Post-paid and prepaid customers are affected differently by the charging mechanism.
The ERG is correct to point out that there is a transfer between high usages to low usage customers under a termination charging system and equally there will be a transfer from low usage to high usage customers under BaK. It is essential therefore to maintain a termination rate charging system resulting in the optimal balance of post-paid and prepaid subscribers to the ultimate benefit of society.
Cost-based termination rates entail high penetration because they allow for the provision of both post-paid and prepaid services ensuring that the costs of provision for both types of customer are covered. A prepaid customer who mainly receives calls and therefore contributes very little to retail revenue can be maintained on the network due

[1] Page 25 Mobile penetration plotted against the level of MTRs. Source: ML and ERG

to the termination revenue generated. A customer who uses its phone only for emergencies and travels about the country will generate a significant cost as the radio access network tracks where the customer is if the phone is switched on. Therefore this prepaid customer is generating cost but would not be contributing any revenue under bill and keep. Hence the termination rate charging mechanism is a more efficient way to recover the costs of providing a service to this customer.

A move to BaK could require the introduction of a standard access fee for all customers, which prepaid customers do not currently have to pay, just to cover the cost of maintaining a customer on the network. Otherwise if some customers do not make sufficient calls to cover the underlying costs, operators won't have any incentive to keep them connected.

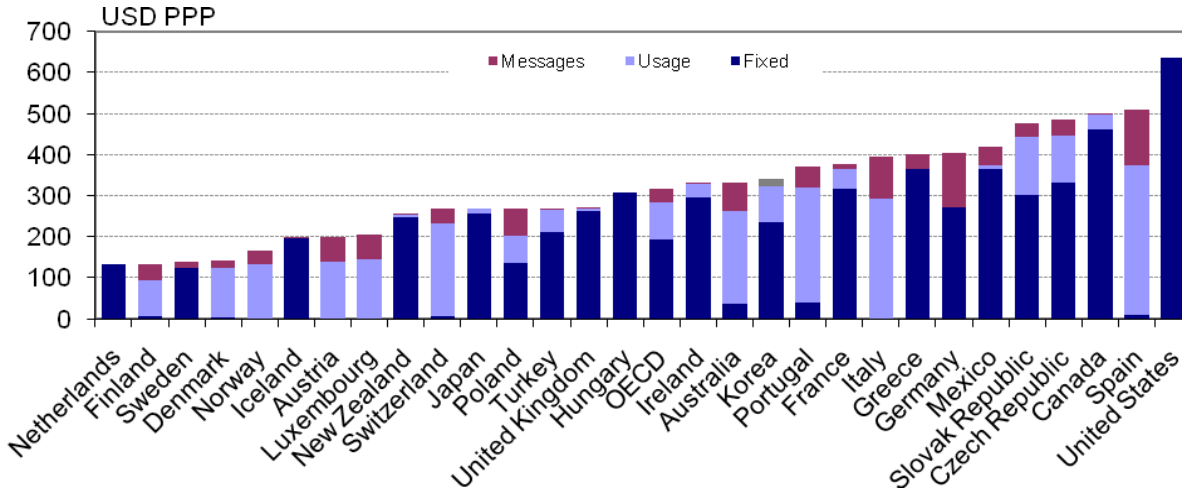
MVNOs may find a BaK environment difficult to live in. Indeed, the US market is dominated by a few major players and many MVNO business models fail. This leads to a less competitive marketplace overall.

The result of moving to BaK in Europe would be a less competitive market with fewer players and lower penetration.

The Merrill Lynch data presented by the ERG suggests that BaK countries have higher usage but fails to capture how BaK relates to retail offers in the US. Retail offers in the US are typically dominated by family plans so that high users and low users are covered by one package – the family plan. These plans generally have a minimum one-year subscription. The family plan system would not apply well to Europe as consumers are used to individual subscriptions and privacy associated with controlling personal use.

OFTG also notes that alternative international data sources, such as the OECD[2] or Ofcom, report that mobile services are more affordable in European countries than in the United States. Even if we have reservations about the OCDE methodology, this benchmark shows that there are other references and that the ERG choice is rather opportunistic.

OECD mobile medium-usage basket, August 2008, tax included



[2] See "Mobile pricing trends" section in OECD "Communications Outlook 2009," August 2008.

Question 5: Regulatory certainty

How does BaK affect regulatory certainty and the risk of legal disputes?

The level of regulatory uncertainty as well as the risk of legal disputes would be significantly increased in a regime of mandatory interconnection coupled with BaK. Price can no longer be used as an adjustment factor and congestion problems will arise from multiple requests to interconnect from unknown parties.

We certainly agree with the ERG draft CP statement that "the most appropriate long term regulatory regime for termination should be efficient in terms of welfare results from a static and a dynamic perspective. Given the objective that sector specific regulation should be temporary, there is also a clear desire to simplify regulation and reduce the regulatory costs for all parties involved. Other important criteria are that the interconnection regime sets incentives for efficient use of the network and arbitrage can be prevented. Regulatory costs should be low and uncertainty should be minimised. The regime should be flexible with regard to future network and service evolution."

However, we develop concrete examples showing that mandatory interconnection coupled with BaK does not simplify the process of interconnection and payment, and therefore cannot lead to improvements in efficiency or costs. Instead, mandatory BaK would require more regulatory intervention to resolve disputes between operators.

I) Who will be authorized to interconnect?

Actors not currently interconnected (typically actors not coming from the communications sector, retail customers…) could seek to take advantage of a mandatory BaK system and seek to access networks free of charge. A similar problem exists under the common interconnection regime in place, but it would gain a completely new dimension in a BaK environment. Today's interconnection regime involves interconnection contracts which are under the control and scrutiny of NRAs. Experience in the IP world has shown that, in the absence of pricing issues, a number of operators may choose not to bear the cost of a formal contractual negotiation before interconnecting. Therefore under BaK, there is a real risk of facing a growing proportion of "informal" interconnection situations.

Due to the availability of protocols like ISUP [3] there is no technical barrier to interconnection anymore. For example, in France 800 actors are known to ARCEP as being providers of electronic communications networks and services and can therefore ask for interconnection, even if some have no clear activity in the sector, whereas at the moment, fewer than 200 are connected to the France Telecom network. In a BaK environment, the figure would explode.

Telecommunications operators have already seen many private companies requesting interconnection not for the purpose of selling public telephone services on the market, but rather to cover their own needs.
Even though they have very asymmetrical traffic profiles, for example, Broadcasters have asked for BaK interconnection.

[3] ISUP defines the protocol and procedures used to setup, manage and release trunk circuits that carry voice and data calls over the public switched telephone network. ISUP is used for both ISDN and non-ISDN calls.

In such a way, any large company outside of the telecoms sector can request interconnection, if necessary by creating an ad hoc subsidiary, in order to be granted a BaK status and thus benefit from free telecommunication services from network operators. Interconnection would enable such actors to originate and send traffic from a virtual private network (VPN) without bearing any of the cost of the network infrastructure used to transmit the call.

Due to the double obligation of interconnection and BaK, new candidates for interconnection will bring traffic but no revenue streams necessary to maintain and develop the network capacity, generating network congestion and, consequently, quality problems.

Due to network over-burdening and lack of investment, the regulator will have to issue a list of criteria to define how non-discrimination can be guaranteed and how to deal with interconnection disputes. An economically sound solution could be based on a minimal interface capacity or on a guarantee of symmetrical arrangements. But this will lead to litigation on the grounds of discrimination or regulatory capture.

II) Who will decide on the capacity of the interconnection?

Prices are a key element of interconnection agreements, especially when managing capacity requirements. If mandatory BaK eliminates price as an adjustment factor, the only remaining adjustment factors will be quality and capacity. This phenomenon was very common in the bilateral national agreements related to international trunk groups. When an operator disagreed with a proposed tariff, considering that it was not equitable due for instance to the unequal volumes of exchanged flows, the consequence was often a reduction in interconnection capacity.

This will lead to disputes and to congestion at the connecting point; however, congestion can and will spread throughout the networks through the following phenomena:

(1) when a direct route is congested, routing algorithms try indirect routes, hence the average number of links and nodes per communication increase, this inflates the amount of traffic to be carried by network elements and produces new congestion,

(2) in a congested network, calls or packets are lost and are thus repeated at the source of the traffic until they reach their destination, therefore the traffic generated by traffic sources increases.

In a congested network, it is extremely difficult to identify the original cause of congestion. It is very likely that increasing capacity somewhere will generate congestion elsewhere with no improvement of end to end performance for customers. It is difficult therefore, to define where capacity provisioning would be necessary. On purely technical grounds alone, this issue is very complex and so it would be even more so under litigation.

III) Who will decide where the point of connection is located?

In the context of mandatory BaK, where will the physical location of the interconnection point be? Will interconnection be mandatory at the interconnection point requested by the access seeker? Who should build the infrastructure and who should cover the direct cost of interconnection?

With no return value from the interconnection point or the transmission and switching equipment, there is no rationale for investing in the network.
Mandatory interconnection plus BaK mechanism will generate conflicts which the regulator will be frequently requested to solve. In the meantime, no satisfactory service will be available for customers.

Conclusion: mandatory BaK will lead to poor performance for customers and to a high level of litigation.

Question 6: Unwanted calls

Question 6 *(Section 5.2.1.3): How do different wholesale charging mechanisms impact on the number of unwanted calls? Do you expect (other) effects on consumers/consumer groups? Where possible, provide a quantitative assessment of the expected effects.*

If termination through BaK becomes a free of charge service, traffic will escalate due to unsolicited calls creating SPAM/SPIT for consumers. Email provides the perfect example, because sending an email costs nothing.

It would be a nightmare for all customers if, as for their email box, most of the phone calls they received, day and night, were unsolicited. Moreover, customer voicemail or answering machines would be rendered totally useless, as it is much more difficult to browse through an even lightly filled vocal mailbox than it is through an email spam box.

Vocal or multimedia content filtering is not the obvious solution. If it conforms to legislation, it would require prior consent from the user and would be incomparably more difficult and costly to develop and deploy than email text-based filtering. It is obviously preferable to avoid spam deployment in the first place.

To conclude, fraud and unsolicited calls are easier to set up in an IP environment than in the TDM network. Charging for communications is an efficient way to fight against Spam. This is also a way for the upstream operator to take responsibility for sending communication to the downstream operator by covering the consequential costs. Receiving customers should not be expected to screen their calls or hang up a spam call – this kind of call should not reach the customers in the first place. However, a clear problem with BaK is that it creates an environment where spam calls can flourish.

Question 7: Externalities

Question 7 *(Section 5.2)*: *How do you assess the quantitative relevance of call and network externalities?*

The academic paper by Professor Mason included in Annex 1 reviews the arguments that have been put forward in support of Bill-and-Keep (BaK) as the basis for termination charges between mobile operators in Europe. Professor Mason's paper demonstrates that there is currently no evidence to support any move from cost-based regulation towards a bill and keep regime.

Network externalities imply that the social benefit from a new subscriber joining a mobile network is greater than the private benefit as the new subscriber does not internalise all the benefits to others who are now able to contact that subscriber. Network externalities imply that termination rates should be set above cost to provide an incentive to operators to attract and retain subscribers. Network externalities have historically been central in network economics and, for instance, are the justification for interconnection obligations in the regulatory framework. However, we understand that NRAs place less emphasis on network externalities in the context of high penetration levels in Europe.

Call externalities can be either positive or negative depending upon whether a caller and a receiver receive more or less benefit from the call than they pay for. The call externality is effectively the benefit from the call that either the caller or the receiver does not pay for.

BaK is efficient if and only if there is a traffic balance between callers or each side can pay for the cost of the call in proportion to the benefit they receive from the call. However, there are many reasons why both sides do not benefit equally from a call. Indeed, there must be some benefit to a receiver otherwise they would not receive the call but conversely they cannot benefit too much from the call (or as much as the caller) because otherwise they would have initiated the call and everyone would be callers rather than receivers. Some calls are pure marketing calls which are unwanted by the receiver creating a negative call externality. Receiving calls generates in any case an opportunity cost. Sometimes the receiver may be unable to identify the caller when deciding whether to take the call or not. Call externalities are also likely to be internalised by individuals.

As yet, there is no empirical evidence about the size of call externalities and until there is evidence which proves that call externalities are significant, termination rates should continue to be set at cost.[4]

[4] See The Economics of Bill-and-keep from Robin Mason, 13 February 2009 in the Annex

Question 8: Impact on Business

How would your business be affected by a move from CPNP to BaK? Please explain the expected impact on prices, volume of supplied services and profit.

If operators are required to offer zero termination rates then operators are effectively offering a termination service to their competitors for free. On the technical side, this may result in problems of interconnection, as any private service or network operators can request interconnection which will ultimately result in the inefficient operation of the network. Spam will proliferate as service providers providing marketing materials do not have to pay the cost of termination leading to a poor customer experience and general inefficiencies.

On the pricing side, operators will be incentivised to pursue customers who mainly make outgoing calls and demand flat-rate tariffs to the detriment of prepaid customers who mainly receive calls. It may be necessary to introduce some regular charge for prepaid customers to cover the cost of these customers and to enable the mobile business model to endure. However, there will be a negative impact on penetration as the current pricing flexibility is lost. The market will tend to a more US style model with a few dominant players who set a flat rate and little competition from MVNOs. A flat-rate pricing model with less choice for customers, less flexibility in the prepaid model and less incentive to increase capacity is damaging to consumer welfare.

There is less incentive to invest in networks – in capacity and coverage – ultimately resulting in a lower quality of service for our customers.

Therefore, our conclusion is that under BaK consumer welfare will reduce resulting from lower penetration, less pricing flexibility in the prepaid model and lower quality of service. Figure 4 presented by the ERG fails to capture these effects and provides no sound basis to the estimate of the potential change in consumer surplus as a result of moving to BaK by guessing usage and price. In our view, this diagram should be discarded.

Question 9: Mandatory BaK would introduce subsidies and market distortions between domains

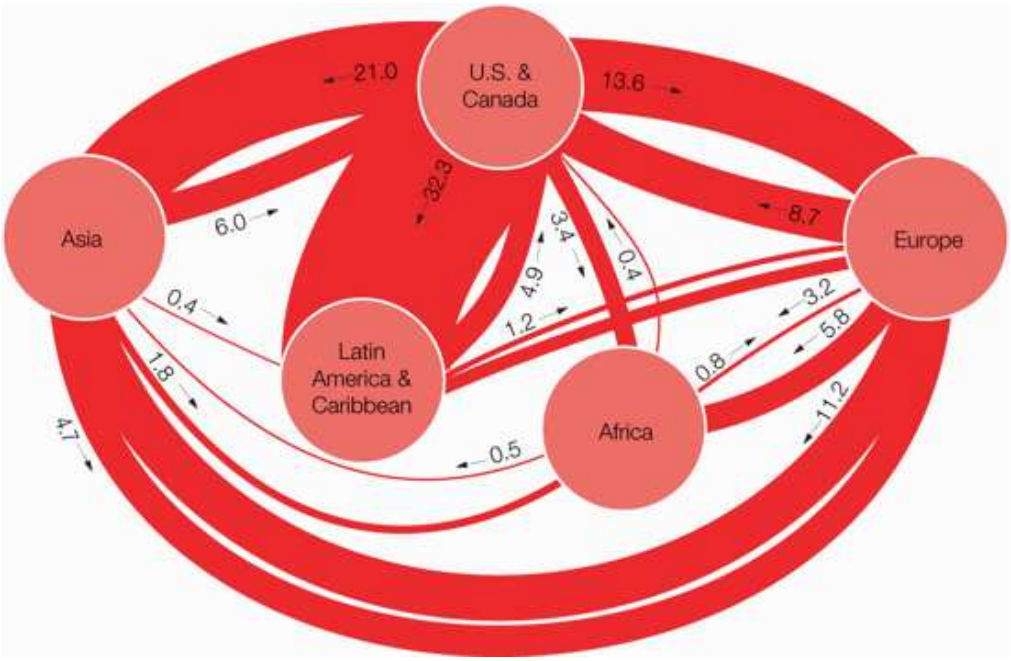
Question 9 *(Section 6.1)*: *Do you agree with the conclusion that operators/users in the BaK domain will subsidise traffic coming from outside the domain (regardless of the legal aspect)? Are there any mechanisms to prevent this and how will they work in your view, in particular to avoid arbitrage?*

This question reinforces our position that imposed BaK in a mandatory interconnection system leads to litigations and will increase the regulatory uncertainty as well as the workload of NRAs.

If BaK countries must pay a termination charge to non-BaK countries and not receive any payment in return for termination, then there will be a subsidy from BaK countries to non-BaK countries. An analysis of global traffic flows demonstrates that traffic flows from non-BaK countries to Europe are not insignificant contrary to what the ERG

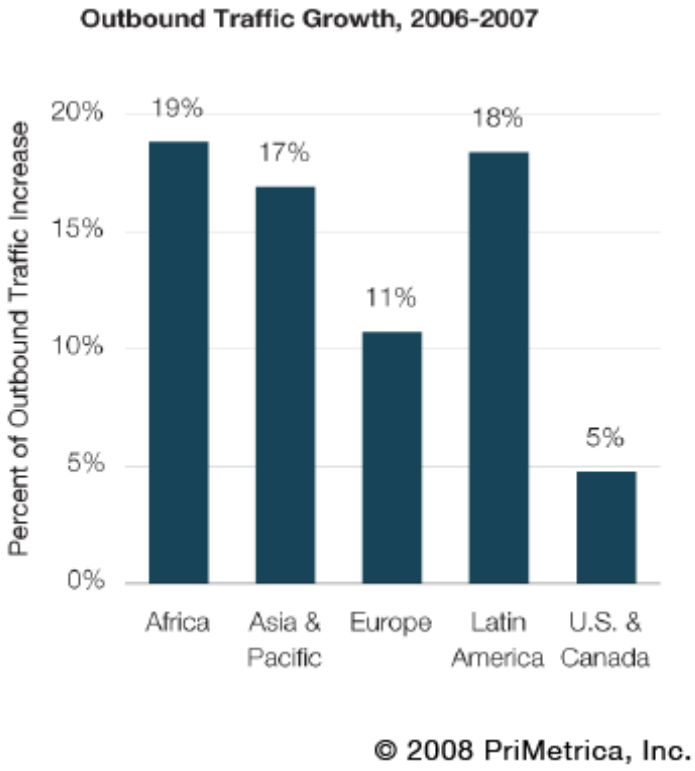
suggests. The diagram below, figure 1, shows that in 2007, 6.7 billion minutes were terminated in Europe originating in Latin America, Africa and Asia compared to 13.6 billion minutes originating in the US. Allowing for the fact that some of the 4.7 billion minutes from Asia will have originated in Hong Kong and Singapore; it is still true to say that a significant volume of interregional traffic originating in non-BaK countries outside of Europe terminates in Europe. The graph below, figure 2; clearly shows that outbound traffic from non-BaK countries has the highest growth rates for 2009 suggesting that the termination of traffic from non-BaK countries is not an issue that European NRAs can ignore.

Figure 1: Interregional Traffic Flows, 2007



Notes: These interregional traffic flows total 108.9 billion minutes of the total global traffic of 256.6 billion minutes. Interregional routes below 100 million minutes are not shown. Data reflects TDM traffic only.

Figure 2



Source: TeleGeography Research
© 2008 PriMetrica, Inc.

Question 10: Migration

Question 10 *(Section 6.3)*: *Do you see any implementation problems for a migration period towards BaK? How could such problems be addressed?*

The question of subsidizing countries out of the borders of BaK would be even more critical if it happened within Europe. The discussed in the answer to question 5 will become even worse if there were a hybrid system in Europe.
In a nutshell, a hybrid system would exacerbate the problems resulting from mandatory BaK, and therefore should not be considered.

Question 11: Missing issues

Question 11 (Section 7): *Does the draft CP miss any other relevant issues?*

1 - The general economy of interconnection should be considered

The issue under consideration is the phenomenon of convergence on a multi-service IP network, so not only voice but also data should be considered in the general economy of interconnection.
The current economics for broadband development are not sustainable. While traffic is exploding (+40% per year), capacity upgrades generate increasing costs but the retail and wholesale tariffs remain flat. In such a context it will be uneconomic to sustain such a high level of investment, if operators are forced to offer access to their networks below cost.

Interconnection pricing policies do have an important impact for investors and consumers. While interconnection rates favour investment and network development, they also allow market-oriented and segmented customer propositions. Low interconnection rates favour the development of flat and uniform propositions.

The significant growth in mobile penetration in Europe has been catalysed by termination revenues and so it is crucial to consider how some of this success can be applied to the development of broadband networks. As voice and data evolve, both from demand-side and supply-side points of view, it may be possible to envisage an interconnection charging model which applies to both voice and data.

In such a way all the interconnected operators would be charged for the voice and data traffic they generate. Any inefficient traffic with content of no or negative value would not be originated in the first place so that networks evolve with the efficient levels of traffic.

We strongly suggest the ERG to develop a holistic view of the question of data interconnection and the allocation of network costs between customers and editors, which are key for the development of Next Generation Networks.

2 - There is no demonstration of legal background for implementing BaK

In the ERG Consultation Document on Regulatory Principles of IP-IC/NGN Core, in 2008, it was mentioned on page 19 “The possibility to implement Bill & Keep under the current regulatory framework could be explored further by ERG.”
This remains an outstanding issue which the ERG cannot continue to ignore. The European Framework does not allow for the imposition of measures that require an operator to offer a service below cost.

The COMMISSION RECOMMENDATION of 7.5.2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU states in that respect:

- In Whereas 8, in order to achieve the objectives of users’ maximum benefit in terms of choice, price and quality of services, with no distortion or restriction of competition, the termination rates should be brought down to the costs of an efficient operator, recognizing

that there is a cost for ensuring the termination of the call and that it must be covered by a termination rate.

- Article 1 of the Recommendation is to base the termination rates on the costs incurred by an efficient operator.

In the attached Explanatory Note of the Recommendation, it is mentioned on page 30
" There is no record of Bill and Keep being imposed by a regulatory authority.
It generally results from voluntary agreement between interested parties, which in certain circumstances choose to set these fees at zero, particularly where the net financial settlements are equal to or close to zero."
And:
"…Nevertheless, one should note that setting the price of any service at zero may cause distortionary behaviour, bring arbitrage opportunities, lead to inefficient traffic routing and inefficient network utilisation. For instance, a potentially problematic issue might be inefficient routing of traffic from operators not participating in the Bill and Keep scheme.
However, a significant reduction of termination rates from current levels might create appropriate incentives for voluntary inter-operator agreements and consequently Bill and Keep type arrangements could evolve naturally….However, other levels of reciprocal termination rates may be applied.
Moreover, it may be expected that the outcome of reciprocal arrangements would depend on the level of traffic flows between two interconnecting networks. A net recipient of traffic would likely prefer a higher termination rate and vice versa. Thus, efficient termination rates do not necessarily have to result from the imposition of reciprocity".

3 – Security and quality are not addressed

Security and quality are fundamental issues for NGN-IP interconnection which are not addressed in the consultation, although it is very likely that BaK will lead to non formal, non contractual arrangements, dramatically lowering the general level of control on network security and quality.

2 – Additional comments on the text of the consultation

I - The statement that "BaK is the most promising alternative to CPNP with support in the relevant literature" is unfounded

Page 5 and page 12, the "draft CP specifically assesses BaK as an alternative to the current CPNP interconnection regime. The reason for this is that BaK (or a variant of it) is the most promising alternative to CPNP with support in the relevant literature." In the footer ERG refers to DeGraba (2000); Littlechild (2006); Marcus (2006); Harbord/Pagnozzi (2008) and WIK-Consult (2008).

This statement is unfounded. See Annex 1: " The Economics of Bill-and-keep" by Pr. Robin Mason

II - The comparison between US and EU and the methodology used are highly questionable

The major argument used by ERG to promote BaK is illustrated in figure 2 (page 25) which indicates that the MOU per capita (resp. the voice revenue per minute) for the 3 BaK countries is much greater than for CPNP countries.

The comparison is highly questionable. See Annex 2:"About comparison between US and EU".

ANNEX 1: The Economics of Bill-and-Keep

Robin Mason

1. This note reviews the arguments that have been put forward in support of bill-and-keep (BAK) as the basis for termination charges between mobile operators in Europe.[5] It shows that there is currently no evidence to depart from cost-based regulation.

Basic economic principles

2. Economic theory shows that, in the absence of any complicating factors (see below), it is efficient to price a product or service at its appropriate cost. Pricing in this way minimizes any welfare losses that can arise through unexploited gains from trade. It also sends the correct signals to consumers and producers of the product/service, so that decisions about e.g., whether to invest and start production are efficient.

3. In the context of termination of voice calls, when the caller pays for making a call (the "calling party pays", or CPP principle),[6] efficiency requires the calling price to be set equal to the total cost of the call; and the termination charge to be set at the cost of termination. By doing so, callers face (all other things equal) the correct incentive when deciding whether to make a call.

4. In contrast, if the termination charge is above cost, then calling prices will be too high and customers will make too few calls. All other things equal, operators will have an incentive to acquire customers who make fewer calls than they receive, and/or who make more on-net calls than off-net calls. The result is inefficiencies in traffic flows.

[6] In the majority of countries, CPP obtains. The converse, the "receiving party pays" (RPP) principle, is used in North America and a few Asian countries.

5. On the other hand, if the termination charge is below cost, then calling prices will be too low and customers will make too many calls. All other things equal, operators will have an incentive to acquire customers who make more calls than they receive, and/or who make more off-net calls than on-net calls. Again, inefficiencies in traffic flows will result.[7]

6. Economic theory does allow for departure from cost-based pricing. This can happen because of:
    a. Market power in related markets, which means that other prices depart from cost.
    b. Externalities.

7. The theory of the second-best indicates that when there are inefficiencies elsewhere-for example, if retail prices depart from cost-then it may be socially optimal to deviate from cost-based pricing for a particular product or service. In the context of termination, this suggests that if e.g., retail prices depart systematically from cost, then it may be optimal (in a second-best sense) to set the termination charge away from cost.

8. The practical significance of this theoretical point is doubtful. In Europe, retail markets for mobile voice calls are, on the whole, deemed to be effectively competitive. Any concerns about a lack of effective competition in voice calls from fixed networks have been tackled directly using carrier selection and access obligations on incumbent fixed networks. Consequently, this aspect has not been used by NRAs as the basis to set termination charges different from cost.

9. In short, it does not appear that market power in related markets should or does lead to termination charges that deviate from cost.

10. When externalities are present, market outcomes are likely to be inefficient. Moreover, when termination charges are regulated (because of other market

[7] Operators may respond to this situation by adjusting both calling and receiving prices. I deal with this general issue below, in paragraphs 12ff on call externalities.

failures, such as market power), the socially-efficient regulated charge should reflect the presence of externalities. There are two types of externalities that are relevant:

a. Network externalities.
b. Call externalities.

Network externalities are defined to be the discrepancy between an individual's private benefit from subscribing to a communications network, and the wider benefits that others derive from contacting and being contacted by them, and from the ability to contact and be contacted by them. Call externalities exist when the total value of a call is not equal to the value enjoyed individually by the caller and receiver.

11. Most National Regulatory Authorities (NRAs) in Europe have focused on network externalities as quantitatively the most important form of externality. For example, the UK NRA, Ofcom, considers only network externalities in its latest Statement on mobile call termination.[8]

12. In the presence of network externalities, the socially optimal termination charge is above cost. By increasing the termination charge above cost, it becomes more profitable for an operator to attract or retain subscribers to its network. This is because when those subscribers receive calls, the terminating operator will receive more revenue than it would otherwise do. Consequently, that operator is more willing to compete to obtain that subscriber e.g., by cutting retail prices of calls and subscription. In this way, more subscribers are attracted to join networks.[9]

13. Call externalities can be positive or negative. Consider first the case when they are positive. Callers and receivers consume the optimal level of calls when

[8] Ofcom (2007): *Mobile call termination: Statement*, 27 March.

[9] This argument relies on the "waterbed effect". This effect arises when any profits earned by operators in one part of their business are competed away elsewhere. In the context of termination, a complete waterbed effect would mean that any increase in the termination charge is passed through entirely to reductions in the retail prices set by operators competing for subscribers. Genakos and Valletti (2008) is the only existing empirical study of the waterbed effect, in mobile telephony. They conclude that "although the waterbed is shown to be high, our analysis also provides evidence that it is not full: accounting measures of profits are positively related to [termination rates]." See Genakos, Christos and Tommaso Valletti (2008): "Testing the 'waterbed' effect in mobile telecommunications", *Mimeo*.

they jointly pay a per-minute price equal to the marginal cost of that minute. Efficiency then requires that each side of a call pays a proportion of this price equal to the proportion of the value received from that minute. So, when the receiver enjoys most of the benefits from a call (i.e., there are large call externalities), s/he should pay most of the cost of that call. When origination costs are larger than termination costs, the efficient outcome is that the price to the caller is low, the price to the receiver high, and consequently the termination charge is low. Conversely if the *caller* enjoys most of the benefit of a call, then the termination charge should be high.[10] The same outcome applies to an even larger extent when call externalities are negative.

14. In order for call externalities to imply an optimal termination charge of exactly zero (i.e., BAK), it must be that the benefits to the caller and receiver from each call are split exactly in the same proportion as the costs of origination and termination. (For example, when origination and termination costs are around the same, this requires that the benefits to a caller and a receiver are around the same.) Outside of this case, BAK is an inefficient way to set termination charges.

15. Some argue that BAK can be a good approximation to efficiency: for example, DeGraba (2003) states, "I concentrate on bill and keep, not because a zero intercarrier compensation rate is likely to give rise to theoretically optimal usage levels, but because the optimal rate may be very close to zero": (p. 209). Again, this statement can be true only if call externalities are found empirically to be (a) always positive; and (b) sufficiently large (relative to costs).

16. Others argue about call externalities from first principles.

[10] Suppose that the total value of a call is *v*, which is split between the caller and receiver in the proportions *t* and *1-t*. Suppose that the cost of origination is c_O and the cost of termination is c_T. Finally, suppose that retail competition is such that the calling and receiving prices are driven down to effective costs. Then it is simple to show (see DeGraba, 2003) that the efficient termination charge is

$$t\, c_T - (1\text{-}t)\, c_O.$$

This is low when *t* is low and c_O relatively large; indeed, the efficient termination charge may be negative. It is high when *t* is high and c_T relatively small. See [10] DeGraba, P. (2003) "Efficient Intercarrier Compensation for Competing Networks when Customers Share the Value of a Call," *Journal of Economics and Management Strategy*, 12, 207-230.

a. A common argument is that there must be *some* benefit to receivers; otherwise they would not answer any calls.
b. The converse argument is that if an individual receives a large benefit from a call, then it has an incentive to initiate the call. In other words, call externalities cannot be too large, because if they were, no one would be receivers: everyone would be callers.
c. It is almost certainly not the case that the value of each call is shared equally: think, for example, of unwanted direct marketing calls.
d. For many calls, there is an inherent asymmetry between the receiver and the caller: the caller knows the identity of the receiver, while the receiver is uninformed about the caller. With risk averse individuals, this suggests that the benefit of a call to the receiver will be lower than to the caller.
e. Even if call externalities are large; they may well be internalized, at least partially, by the individuals involved in a call.

17. The arguments have some merit, but are no substitute for empirical evidence about the size of call externalities. As far as I know, there is no direct evidence. Some claim that there is indirect evidence; for example, that off-net/on-net price discrimination is indicative of call externalities: see Harbord and Pagnozzi (2008). This is not the case, however: off-net/on-net price discrimination, when it occurs, can be explained without resorting to call externalities There are some studies of social networks and mobile network choice that suggest that call externalities are internalized to some extent by reciprocal arrangements between individuals.[11]

[11] For example, Taylor (2002) finds that "a call in one direction stimulates something like one-half to two-thirds of a call in return", in a study of the US long distance telephony market. See Taylor, L.D. (2002): "Customer Demand Analysis". Handbook of Telecommunications Economics, Volume 1, Edited by M.E. Cave et al. Chapter 4. Birke and Swann (2005, 2007) find that international students who are friends tend to choose the same mobile network operator; the same co-ordination happens within families. See Birke, D. and G. M. P. Swann (2005) "Social Networks and Choice of Mobile Phone Operator," mimeo, Nottingham University Business School. Birke,D.andG.M.P.Swann (2006)"Network Effects and the Choice of Mobile Phone Operator," Journal of Evolutionary Economics, 16(1-2), 65-84. Birke, D. and G. M. P. Swann (2007) "Network Effects, Network Structure and Consumer Interaction in Mobile Telecommunications in Europe and Asia," mimeo, Nottingham University Business School.

18. In short, there is virtually no evidence currently about the size or significance of call externalities. Consequently, BAK has no empirical support. In the absence of this evidence, termination charges should be set at cost.

Other arguments for BAK

19. Some proponents of BAK have used other arguments.
    a. Some have argued that a move to the receiver pays principle (RPP) would remove the incentive and ability of operators to charge excessively for termination. Furthermore, in order to implement RPP, a move to BAK for termination should be mandated. See e.g., Littlechild (2006).[12]
    b. It has been suggested that a non-zero termination charge can encourage inefficient price discrimination by operators: see Harbord and Pagnozzi (2008).[13]
    c. Recent work has suggested that incumbent operators can use high termination charges to deter entry: Calzada and Valletti (2008).[14]
    d. Valletti and Cambini (2005)[15] argue that operators may set termination charges above cost in order to soften competition that occurs through investments.
    e. Others point to the simplicity of the scheme: rather than undertaking a lengthy and involved study of operators' costs in order to set termination charges, NRAs can simply mandate a zero charge and be done. See e.g., Littlechild (2006).

20. None of these arguments is sound, for reasons that I now give.

[12] Littlechild, S. (2006) "Mobile Termination Charges: Calling Party Pays versus Receiving Party Pays," *Telecommunications Policy*, 30(5-6), 242-277.
[13] Harbord, David and Marco Pagnozzi (2008) "On-Net/Off-Net Price Discrimination and'Bill-and-Keep' vs. 'Cost-Based' Regulation of Mobile Termination Rates" Paper prepared for H3G.
[14] Calzada, J. and T. Valletti (2008) "Network Competition and Entry Deterrence," *Economic Journal*, forthcoming.
[15] Valletti, T. and C. Cambini (2005) "Investments and Network Competition," *RAND Journal of Economics*, 36, 446-467.

RPP

21. The main argument of Littlechild (2006) is that the receiver pays principle (RPP) is preferable to the caller pays principle (CPP), since the former has benefits for competition. This is because under RPP, each operator is in full control of all prices charged to its customers. Termination charges are then subject to competition; competition drives all prices down to their efficient levels.

22. BAK is, strictly speaking, incidental in Littlechild's argument; indeed, it is unclear whether it is relevant at all. Littlechild advocates moving to RPP by mandating BAK for termination. At the same time, he points out that operators may choose not to adopt RPP, even if BAK were mandated: "'bill and keep' would not mandate paying for incoming calls as with RPP" (p. 274). Since according to Littlechild, there is no necessary relationship between BAK and RPP, his analysis cannot support BAK on its own merits.

23. Even as a case for RPP, Littlechild's analysis is limited. There are 47 countries in Littlechild's dataset. None of these countries moved from a CPP system to a system of BAK. In contrast, ten countries moved from an RPP system to a CPP system. It is highly doubtful, therefore, that this dataset can support the conclusions that Littlechild tries to draw from it.

Price discrimination

24. Harbord and Pagnozzi (2008) claim that a non-zero termination charge exacerbates operators' incentives to engage in inefficient price discrimination. For example, they state that "welfare-optimal termination charges should be below the marginal costs of termination for both fixed-to-mobile and mobile-to-mobile calls, in order to reduce incentives for on-net/off-net price discrimination."

25. The basis for this argument is the observation that, in the Jeon, Laffont and Tirole[16] model (where the termination charge is taken as given), the on-net/off-net price differential is equal to the difference between the termination charge and the marginal cost of termination. Hence, with a higher termination charge, the price differential is greater. Of course, this is just a repetition of the observation made by Jeon, Laffont and Tirole. It says nothing about how the termination charge will be set by unregulated operators. As Armstrong and Wright (2008)[17] show, mobile network operators (MNOs) will set a reciprocal termination charge that is too low. Again, any problem lies with on-net/off-net price discrimination, and not with the setting of termination charges.

Entry deterrence

26. Harbord and Pagnozzi state that "A move to "bill-and-keep" for mobile-to-mobile termination … would … help to eliminate barriers to entry caused by 'tariff-mediated' network effects…" (p. 6).[18] They base this statement on recent work by Calzada and Valletti (2008), who have suggested that incumbent MNOs may use excessively high termination charges in order to deter entry by other mobile networks.[19]

27. In Calzada and Valletti's model, MNOs have market power and so earn positive rents.[20] In equilibrium, the market is not fully saturated; hence profits from termination are not fully competed away to attract subscribers. The reciprocal termination charge that maximizes the MNOs' profits is below cost, if competition is in prices[21]; or at cost, if competition is in utilities. But this

[16] Jeon, Doh-Shin, Jean-Jacques Laffont and Jean Tirole (2004): "On the 'Receiver-Pays' Principle", *RAND Journal of Economics*, 35(1), 85-110.
[17] Armstrong, Mark and Julian Wright (2008): "Mobile Call Termination", *Economic Journal* (forthcoming).
[18] "Tariff-mediated network effects" arise when there is a difference between the prices of on-net and off-net calls.
[19] Harbord and Pagnozzi also cite Hoernig, Steffen (2007) "On-Net and Off-Net Pricing on Asymmetric Telecommunications Networks," *Information Economics & Policy*, 19(2), 171-188, which presents a similar analysis.
[20] The market power comes from the assumption of product differentiation implicit in their specification of demand.
[21] This is the standard result from the set-up of Laffont, Rey and Tirole (1998b), with the subsequent correction by Gans and King (2001). Laffont, J.-J., P. Rey and J. Tirole (1998b): "Network Competition: II. Price Discrimination," *RAND Journal of Economics*, 29(1), 38-56. Gans, J. and S.

termination charge allows MNOs to earn profits; and these profits can attract new entrants to the industry. Hence, Calzada and Valletti argue, incumbents may choose to distort the termination charge to reduce their profits and make entry less attractive.

28. There are two very clear provisos to Calzada and Valletti's conclusion. The first is that incumbent MNOs could equally well, in their model, deter entry by *lowering* the termination charge. MNOs' profits decrease whenever the termination charge moves away from the profit-maximizing level. This move could either be upwards, as Calzada and Valletti suppose, or downwards, which they ignore. In short, the entry deterrence story cannot distinguish between a termination charge that is too high, and one that is too low.

29. Secondly, the whole story is built on the presumption that incumbent MNOs can commit to a termination charge that they maintain after entry has occurred. But once entry has occurred, the incumbents will want to change the termination charge. Without some way of committing to maintain the termination charge, this way of deterring entry is ineffective. This is the key point of any entry deterrence story: deterrence has to be credible. As Calzada and Valletti note, in the final sentence of their paper: "It is the assumption of commitment that creates opportunities for strategic behavior." In the absence of any justification for this assumption, the argument has no foundation.

30. In conclusion, Harbord and Pagnozzi are incorrect in asserting that a move to BAK will remove entry barriers. Two assumptions underlie this assertion: first, that incumbent MNOs will set the termination rate too high in order to deter entry; secondly, that the appropriate regulatory approach is then to set the termination charge at zero. The first assumption, while supported by Calzada and Valletti, is flawed, for the reasons outlined in this section. The second assumption is entirely without foundation. Even if Calzada and Valletti's conclusions were robust, the appropriate response would not be BAK: it would be to set the MCT charge at cost. (Neither Calzada and Valletti, nor Hoernig,

King (2001) "Using Bill-and-Keep Interconnect Agreements to Soften Network Competition", *Economics Letters*, 71(3), 413-420.

suggest that BAK is the appropriate regulatory response to possible entry deterrence.)

Termination and investment

31. Valletti and Cambini (2005) examine a situation in which MNOs are able to invest in network quality. They conclude that MNOs have an incentive to set termination rates that are above marginal cost, while efficiency requires a below-cost MCT charge. They observe that "one practical suggestion is to impose a regime based on reciprocal bill-and-keep arrangements" (p. 454). I argue in this section that their analysis does not support this proposal; indeed, Valletti and Cambini concede this point in the same article.

32. Valletti and Cambini extend the model of Laffont, Rey and Tirole (1998a)[22] to consider the effects of investment in network quality by MNOs. To be explicit, Valletti and Cambini allow MNOs to use non-linear prices; but on-net/off-net price discrimination is not allowed. In a multi-stage analysis, MNOs first agree a reciprocal termination charge; then invest in the quality of their networks; and finally choose retail prices. The basic message behind their analysis is that competition in network investment harms MNOs' profits: if they could collude, MNOs would agree to reduce their investments. One way in which the MNOs can achieve this outcome (without explicit collusion), Valletti and Cambini argue, is to set a termination charge that is above cost. More precisely, they establish a "local" result: MNOs' investment levels decrease when the termination charge is increased by a small amount, above the marginal cost of termination. They do not determine the equilibrium termination charge, but use this local result to suggest that there are incentives to set the termination charge too high. They conclude their paper by suggesting that their analysis provides support for bill-and-keep.

33. There are three main issues to highlight about this analysis. First, it depends crucially on the order of moves by MNOs. The termination charge must be set

[22] Laffont, J.-J., P. Rey and J. Tirole (1998a): "Network Competition: I. Overview," *RAND Journal of Economics*, 29(1), 1-37.

before investment takes place. If it is not, then the ability of the termination charge to moderate competition through investment disappears. This particular move order is not especially convincing. Network investment takes many years; negotiation over termination charges can take place very swiftly. Given this, the natural move order to consider is one where investment occurs first, followed by negotiation over the termination charge, and the setting of retail prices last. With this move order, given the rest of Valletti and Cambini's assumptions, MNOs would set the termination rate at cost.[23]

34. The second issue is that, even taking Valletti and Cambini's move order as given, the conclusion that termination charges will be set above cost is not established. Valletti and Cambini's result is local: MNOs would benefit from a small increase in the termination charge above cost. This does not establish that the termination charge will be set above cost. Valletti and Cambini provide a particular example, based on linear demand and quadratic investment costs, to illustrate how the efficient termination charge can be below cost. (They do not show what the equilibrium MCT charge would be under these assumptions.) But this outcome need not hold for more general specifications. It could well be that equilibrium investment declines as termination charges are reduced to zero. This is why they qualify their general statement; "We are in favor of "bill-and-keep" not because the optimal interconnection need be zero (although it may be with low marginal costs), but because it would be easy to put into practice and it would provide higher incentives to invest."

35. Thirdly, Valletti and Cambini (2005) do not allow for on-net/off-net price discrimination. In a companion paper, Cambini and Valletti (2003)24, they allow for this possibility (maintaining the other assumptions of their 2005 paper). They encounter the expected trade-off. As Gans and King (2001) show, in the absence of investment concerns, MNOs would set the unregulated MCT

[23] More precisely, MNOs' profits would be independent of the termination charge, because they are able to use non-linear prices (but cannot price discriminate). See Laffont, Rey and Tirole (1998a). Given this, they are indifferent between setting the termination charge at cost, or at any other level.
[24] Cambini, C. and T. Valletti (2003) "Network competition with price discrimination: 'bill-and-keep' is not so bad after all", *Economics Letters*, 81(2), 205-213.

charge below cost. In the absence of price discrimination but with investment concerns, Valletti and Cambini (2005) argue that MNOs may have an incentive to set the MCT charge above cost. Combining the two conclusions gives a mixed picture in which price-discriminating, investing MNOs may set the termination charge above or below cost, depending on which consideration dominates.

Simplicity

36. A final reason often put forward for mandating BAK is its simplicity. Littlechild (2006) argues that BAK would be straightforward to introduce, and would avoid the large sums spent in regulatory investigations of termination charges. Valletti and Houpis (2005) state that "[BAK] when applied to the *entire* telecommunications sector (both fixed and mobile) has merit, as it is a structural remedy that could allow the abandonment of continuous and information intensive regulation of a micro-management type." The European Commission, in its Draft Explanatory Note to its Recommendation on the regulatory treatment of fixed and mobile termination rates in the EU, cites BAK as a possible future option for Europe. One justification given is that BAK "obviates the need for regulatory intervention" (p. 24).

37. This is, at best, an extremely partial argument. It is highly unlikely that the benefits of simplicity will outweigh the loss of welfare caused by setting a termination charge that is below cost and therefore inefficient. In its latest assessment of MCT charges, Ofcom estimates that regulation yields an increase in consumer surplus of around £0.9bn (€1.14bn).[25] Littlechild (2006) estimates the total cost of the UK's Competition Commission inquiry in 2003 to be around £25m (€32m). While substantial, it is a small proportion of the total benefit yielded from regulation. Littlechild offers no estimate of the welfare benefit of moving to BAK.

38. Furthermore, if simplicity is the aim, then BAK has no special attraction: the termination charge could just as easily be set at any arbitrary number.

[25] See paragraph A19.39 of *Mobile call termination: Statement*, Ofcom, 27 March 2007.

39. The simplicity argument has one merit: it is simple. Otherwise, there is little to commend it.[26]

A final note on investment

40. The Valletti and Cambini (2005) paper serves to bring attention to the issue of how investment incentives and termination charges interact. In order to understand the relationship, it is important to recognise that investment in network quality takes place over a longer time frame than negotiations about termination charges. Consequently, when operators decide on investment levels, they anticipate what termination charges will be. Investment by a network operator benefits its own subscribers; but is also benefits the subscribers of other networks. Hence there are (potentially) investment externalities. 27 The size of these externalities depends on the charging structure of the operators.

41. Under CPP, the only way in which these externalities can be internalized by operators is through the termination charge. In this context, because the termination charge is set after investment has occurred, it cannot play the (tacit) collusive role suggested by Valletti and Cambini (2005). Instead, the efficient termination charge would be above the marginal cost of termination, in order to reflect the investment externality.

42. The investment externality would not be fully addressed by a move to pure RPP. Under RPP, a network levies a charge for all calls terminated on its network. This charging structure leaves unpriced externalities arising from off-net calls. For these calls, investment by both the originating and terminating networks is relevant. A single price (whether paid by the caller or the receiver) cannot address an externality that arises from the actions of two networks:

[26] See the companion paper for the operational difficulties that would arise were BAK adopted.
[27] The later sections (6 onwards) of Valletti and Cambini (2005) allow for investment externalities; they are not present in the earlier sections.

clearly, two prices are needed. This requires either CPP plus a termination charge; or a mix of caller and receiver charges.28

Robin Mason, 11 March 2009.

[28] The relationship between termination charges and network investment takes on particular relevance in the light of the development of broadband technologies.

ANNEX 2 : About the comparison between US and EU

The major argument used by ERG to promote BaK is illustrated in figure 2 (page 25) which indicates that the MOU per capita (resp. the voice revenue per minute) for the 3 BaK countries is much greater than for CPNP countries. The comparison is highly questionable.

By comparing the values of revenue per minute and the number of minutes of use in the different countries, ERG assumes that the function of consumption of minutes of calls in all these countries is the same; whereas, such an assumption has no reason to be true, insofar as lifestyles and habits vary from country to country.

The presentation of this data and the interpretation made by ERG are questionable inasmuch the analyses are made in too restricted a context. In the following section we will present several elements which illustrate why these figures generate false interpretations:

- Only comparable countries should be compared,
- Adjustment mechanisms are debatable,
- Revenue Per Minute may not be the most efficient reference for comparison,
- Differences in the offers are also related to differences in the demand,
- In US, BaK is not mandatory for mobile.

i) Comparing small countries (<= 1100 km^2) with high population densities (> 6000 / km^{2}2) such as Hong Kong or Singapore with large European countries like Germany, the United Kingdom or France is irrelevant.
The economical characteristics of these small and highly urban countries are quite unalike those encountered in the major European countries. To be a little relevant one should compare Singapore and Hong Kong with the cities of London (4800/km^2, 1600 km^2), Berlin (3800/km^2, 900km^2) or Paris + its 3 bordering departments (8500/km^2, 700 km^2).

ii) Figure 1 (page 24) indicates that the revenue per minute (RPM) is equal to 0.04 euro and the number of minutes of use per inhabitant (MoU) is equal to 600 in the USA. In the next 2 paragraphs we will demonstrate that the calculation of these indicators depends on debatable assumptions that may call into question the significant difference observed between European countries and the USA.

The data from Merrill Lynch Wireless Matrix and their adjustments by the ERG are not convincing. For example, the data for the Mobile market for France published quarterly by Arcep[29] is different to that given by Merrill Lynch.

[29] (http://www.arcep.fr/index.php?id=10135)

Several recent studies attempt to compare RPM and MoU between countries. To make such comparisons, the authors of these studies adjust the data provided by Merrill Lynch in order to enable meaningful comparisons. The main objective of these adjustments is to treat the double counting of some Mobile to Mobile (MTM) calls that arises in BaK countries.
If we look at 3 of these studies made by the ERG (this consultation), Ofcom[30] and Frontiers Economics[31], respectively, one can notice that the procedure to adjust the Merrill Lynch data is different every time.

- The ERG document states that On-Net incoming minutes are counted in BaK countries but not counted in CPNP countries (page 23 "there is some double counting in BaK countries whose traffic is, therefore, overestimated (about 20%). This concerns the fact that in BaK countries on-net incoming minutes are counted and reported, while in CPNP countries these minutes are not counted and reported…".)

- In the Ofcom study (page 3), it is stated that the bias between BaK and CPNP countries concerns all the MTM minutes that are counted twice in BaK countries.

- The Frontier Economics study, considers that only On-Net MTM calls are double counted in BaK countries (see pg 61-62 annex 1 in the Frontier Economics document).

Moreover, contrary to the ERG, Frontier Economics does not limit the MoU adjustment to the double counting of incoming On-Net MTM calls. They also consider another adjustment to transform billed minutes into conversation minutes because the billing rules in the US are different from the billing rules applied in European countries. In the US, all minutes begun are billed. Moreover ringing time and unanswered calls which are free of charge in Europe are chargeable in the US. The adjustment coefficient computed to correct these billing effects is not negligible: it is equal to 83%.

The final adjustment coefficients calculated in these 3 studies are significantly different.
Both Ofcom and ERG estimate at the end, with different mechanisms, that the MoU in BaK countries must be reduced by 20% to account for the double counting of the MTM calls. Frontier Economics estimates with the same mechanism as the one used by ERG that the MoU must be reduced by 29% to correct the double counting effect. They use data from the mobile market in Spain to estimate this coefficient.
By combining the two adjustment coefficients, first to treat double counting and the second to consider non conversational billed minutes, Frontier Economics found an aggregate adjustment coefficient equal to 0.83*0.71~0.6 (60%) that is significantly lower than the adjustment coefficient used by the ERG (80%).

In fact the adjustment coefficient proposed by Frontier Economics to correct the double counting effect in BaK countries is probably closer to reality than the one used by Ofcom or the ERG.

[30] In "Wholesale mobile voice call termination: preliminary consultation on future regulation" (http://www.ofcom.org.uk/consult/condocs/mobilecallterm/annex5.pdf)
[31] In "Assessing the impact of lowering mobile termination rates" (http://www.frontier-economics.com/_library/publications/Frontier%20publication_MTRimpact.pdf)

Let us consider the mobile market data for 3 quarters (2008 Q3, 2008 Q4 and 2009 Q1) published by Arcep in the following table which lists, the total volume of minutes for all traffic (Intl, FTM, MTF and MTM On Net and Off Net).

data are in millions minutes per quarter	2008Q3	2008Q4	2009Q1
IntlTM	687	657	614
[TDM+VOIP]TM	2837	2900	2799
FTM=IntlTM+[TDM+VOIP]TM	3524	3557	3413
MTF	4402	4726	4683
MTM On-Net	12473	13217	13052
MTM Off-Net	6678	7150	7161
MTM=MTM (Off-Net+On-Net)	19151	20367	20213
FTM+MTF+MTM	27077	28650	28309
FTM+MTF+MTM On-Net+2*MTM Off-Net	33755	35800	35470
FTM+MTF+2*MTM	46228	49017	48522
adjust coeff (RPP--> CPP)	0.7302	0.7304	0.7310

From this table, one can calculate the adjustment coefficient for the double counting of On-Net MTM calls in France. It is equal to the ratio (FTM+MTF+MTM On-Net+2*MTM Off-Net)/(FTM+MTF+2*MTM). That is to say it is equal to 73% which comes close to the 71% coefficient computed by Frontier Economics for Spain.

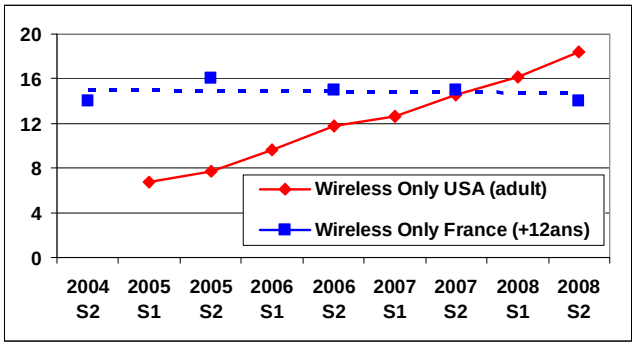
From all the aforementioned observations, it can be reasoned that there is no consensus on how to adjust Merrill Lynch's data to make it comparable from one country to another. According to the given hypotheses, great differences exist between the different available studies on the subject: the correction factor varies from 60% to 80%.

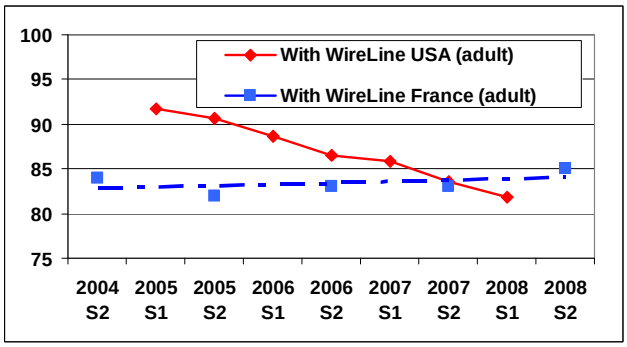
iii) Concerning the adjustment coefficient for double counting of incoming On-Net MTM calls, is not clear what would be the portion of On-Net MTM calls in the US. Several indices suggest that it could be greater than in Spain and France.
An indicator is that a portion of MTM calls will be greater in US than in Europe as MTM calls are unlimited in most of the plans proposed by the mobile operators.
A customer has an incentive to make all the MTM calls he wishes even if these calls are of little value to him. Moreover in the USA, there are several Family plans which group several mobiles (between 2 and 5) and a common basket of minutes. Such offers will surely favour On-Net MTM calls.
Comparing MoU without indicating which minutes are used and when the calls have been made is also quite misleading. Indeed the mobile customer does not have the same utility function for all the reported minutes. This is especially the case in the US where many categories of calls are free in most of the plans proposed by the mobile operators. For example MTM calls are often unlimited. This is also the case for calls made in the night and on the week-end. Most post-paid plans proposed by the largest operators such as ATT and Verizon also include unlimited calls toward all their customers (both fixed and mobile). They extend the concept of cheaper On-Net calls to both their wireline and wireless networks.

Aggregating all the MoU in a single basket independently of the category of the calls and independently of when they are made, is equivalent to linearizing and standardizing the customers' utility for all categories of calls.
In fact the utility function of a customer for a number of MoU probably follows a power law for which a large part of the total utility is provided by a smaller part of its MoU. Under these conditions, doubling or even quadrupling the number of MoU would provide only a modest increase in the total customer utility.

In no case would this MoU doubling or quadrupling provide a doubling or quadrupling of the total consumer utility, as a quick reading of the ERG demonstration might suggest.

The following graphs indicate that there has been an important increase of fixed to mobile substitution in the US in the last year; whereas in European countries, such as France, the trend tends to be exactly the opposite.





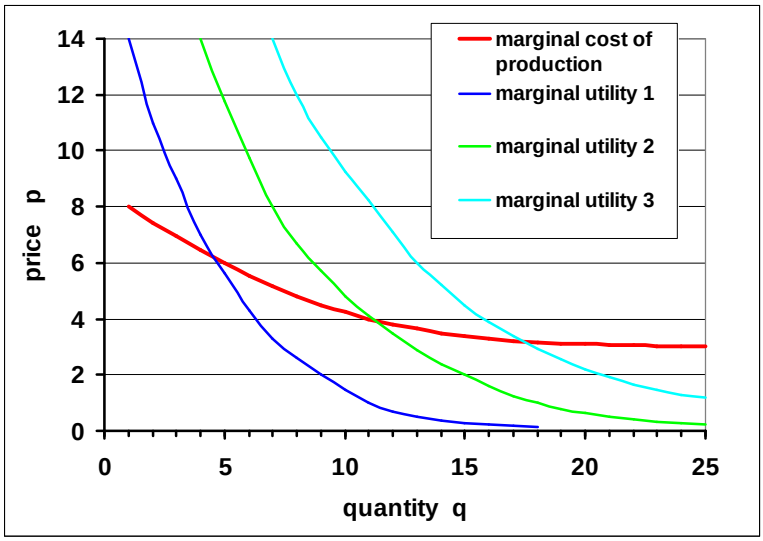
The graph[32] on the left compares the percentage of people who are only wireless in their household in the US compared to France. In France this percentage is constant whereas in the US an important increase can be noted (more than 10% in 4 years). Consequently, an equivalent decrease in the percentage of adults with a wire line in their household in the USA can be observed (graph on the right). In France this percentage is stable.
It is not evident that these numerous abandon of wire lines by US householders will improve their social welfare in the long term. Indeed, these abandon can impair the ability of proposing broadband offers to these households in the near future.

From this evolution in the usage of mobile phones in the US and European countries one can conclude that it is inadequate to compare countries only on the basis of mobile RPM and mobile MoU without considering fixed telephony. If the ratios between the MoU for fixed telephony and the MoU for mobile telephony in all the countries are not the same and if these ratios evolve differently from one country to another, all mobile-only comparison would be incomplete. To be correct the comparison should consider both wireless and wire line MoU simultaneously.

The RPM and MoU values given by Merrill Lynch Global Wireless data for a country are the results from market equilibrium between the supply of operators and the customer demand in that country. Let us recall that market equilibrium occurs when the marginal cost to produce an additional unit is equal to the marginal utility for the customer to get one supplementary unit.

The following figure schematically shows how equilibrium is determined (when the marginal cost of production is equal to the customers' marginal utility).

[32] Data come from the CREDOC study "La diffusion des technologies de l'information et de la communication dans la société française" (2008) http://www.arcep.fr/uploads/tx_gspublication/etude-credoc-2008-101208.pdf and from the study "Wireless Substitution: Early Release of Estimates From the National Health Interview Survey (July-December 2008)"



The red curve in the figure, above, indicates the marginal cost of production of an additional unit for a given value of the capacity: here, this marginal cost is decreasing with the produced quantity. The 3 other curves (in blue, green and cyan) give 3 different marginal utility functions for 3 different kinds of customers.
The figure shows that for an identical supply function (the red curve), different marginal utility functions lead to different equilibria with different values of the total demand. Thus the difference between RPM and MoU in different countries can also be interpreted as the consequence of different marginal utility functions in these countries. To be fair as well as meaningful, the comparison between countries should only focus on the supply function (the different plans) proposed by the operators in these countries. Let us refer to the comparison of mobile tariffs in the UK and the US made by Ofcom[33]. We observe that tariff plans with abundant minutes also exist in the UK. For example there is a 700-minute plan for 30£ (~33.5€) and a 1000-minute plan for 40£ (~44.5€). In the USA, a 450-minutes plan costs 40$ (~27€) and the 900-minute plan costs 60$ (~40€).

The difference observed in the values or RPM in USA and Europe could also be the consequence of intrinsic differences in the functions of demand:
Comparatively speaking, we notice that there is little difference between the abundant plan tariffs in the US and in the UK (approximately 10 to 20% maximum).
So, the explanation of the great difference observed in the values of RPM and MoU between the USA and European countries is not necessarily due to the existence of more attractive plans (with plenty of minutes) in the USA than those that exist in a European country such as the UK. It is more probably the consequence of intrinsic differences in the functions of demand between the US consumers and the European consumers. In the UK, despite the presence of abundant-minute mobile calling plans equivalent to those available in the U.S., consumers prefer (and choose) plans with a smaller amount of minutes if they cost less.

iv) We must also point out that the example of the mobile market in the USA is not representative of the objective advocated by ERG. ERG would like to impose BaK for both fixed and mobile network interconnection. In the USA, BaK is only applied for the

[33] (see http://www.ofcom.org.uk/consult/condocs/mobilecallterm/annex9.pdf)

interconnection between mobile operators[34]. Moreover, BaK in USA is not imposed by the regulator but the result of commercial negotiations.

We observe that most of the plans on the US mobile market (both post-paid and pre-paid) propose an unlimited number of minutes for MTM calls. The differentiation between plans comes from the number of minutes for FTM calls in the plan and from the services provided other than the phone service. With an application of BaK for interconnection between all fixed and mobile networks in Europe, no proof exists that the evolutions on the mobile retail market will lead to the same kind of effects as those that happened in the US. Indeed it would not be possible for an operator to propose plans with unlimited number of minutes for both FTM and MTM calls because that would imply only one plan with fixed fees for the phone service. It must be kept in mind that mobile services other than phone services actually represents only one quarter of the total ARPU (ML Global Wireless Matrix gives ~22% for France, ~26% for USA and ~30% for UK).

[34] One can point out here that in the early 2000s, the FCC tried but failed to impose the B & K for the interconnection between mobile and fixed networks in the United States. FCC also failed a few years later in a new attempt to uniform inter-carrier compensation (also called the Missoula plan).