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White Paper

Policy and regulatory decision-making under uncertainty

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Policy and regulatory decisions involve more uncertainty than we would care to admit. In terms of prominent 'macro' events, in the past two decades alone we have witnessed the global financial crisis, Covid-19, and the Russian invasion of Ukraine, with its associated disruption of energy markets.

The complexity of many regulated industries is also rising. This is in part due to interventions that have encouraged market entry by a host of players. However, technological changes brought about by the internet are also a factor.

Uncertainty and complexity both make forecasting more difficult. However, virtually every regulatory decision involves comparing anticipated futures and choosing the action that leads to the best-predicted outcome. Wise decision-makers also anticipate the possibility that both events and the response to the initial decision may necessitate 'error correction'.

Uncertainty, if not adequately considered, may also impact regulatory stability and potentially regulatory independence. The abrupt increase in wholesale energy prices has undermined retail competition in the energy market and rendered the existing retail price cap unsustainable. The government is now directly involved in determining retail energy prices, and there are calls for fundamental changes to market structure.

This white paper considers five broad ways of improving decision-making under uncertainty: delegation, experiments, forecasting, waiting, and contingency planning and error correction.

"Prediction is very difficult, especially if it's about the future"
Niels Bohr

Delegation

If someone else is better informed or has a greater incentive, it may be better to let them take decisions. Businesses routinely consider questions of 'delegation', outsourcing elements of production and associated decision-making processes and delegating others internally.

Regulators should consider delegating prediction to market participants and, in some instances, choosing to work with policymakers who are more directly politically accountable and have access to a wider range of policy instruments.

An example of delegation of this process is the shift from the administrative awarding of spectrum to assignment by auction. This shift in effect delegates prediction regarding demand for and willingness to pay for spectrum to bidders.

Indicators of when a decision should be elevated to the 'political' level include when its primary impacts are far removed from a regulator's duties and/or when a broader set of policy instruments, including potential fiscal measures, are needed for an optimal decision.

Experiments

All decisions are, in a sense, experiments, and over time we may be able to learn from them. But it may also be possible to conduct trials to better understand the response (one source of uncertainty) and make a better-informed decision.

Technology companies routinely engage in so-called A/B testing to see what works best, whilst vaccine and drug companies seek volunteers for trials. Regulators and policymakers should consider experiments that can reduce uncertainty. Ofcom, for example, waived certain requirements on Openreach to enable a trail of copper-switch-off in Salisbury.

Forecasting

Virtually all decisions involve taking a view of the future (implicitly or explicitly), and this may include a quantitative forecast.

Some things are more predictable than others, and what appears to be an established trend may, perhaps necessarily, break down at some point (for example, Moore's law is approaching atomic limits).

Forecasting may also become more difficult as competition is introduced into a market. In fixed broadband, the UK market now has well over 100 players deploying FTTP, ranging from giants such as Openreach and Virgin to various locally focused players. The heterogeneity and fragmentation of these players make market dynamics much harder to predict, certainly when compared to the relatively stable market of (broadly) two infrastructure players and a handful of ISPs that was in place for much of the last two decades.

In media, linear TV now competes with multiple video-on-demand services and, more broadly, competes for attention with a vast array of attractions online. New intermediaries, such as smart TVs, are also entering the market. Viewing patterns, commissioning markets, and advertising revenues are all in a state of rapid flux.

Thus, regulated markets are arguably becoming more 'chaotic' in the technical sense of being very difficult (or even impossible) to predict beyond the short term.

This has various regulatory implications. Regulators have long been concerned about risk for market participants – the 'fair bet' principle[1] in pricing regulation for new services is one example. However, if markets are chaotic, regulators will need to focus more on the risks inherent in their own decisions. Their 'base case' forecasts may have large margins of error. However, in some cases, it may simply not be possible to generate informative forecasts. Indeed, forecasts may be misleading, suggesting more confidence about the future than is appropriate.

There are steps one can take to ensure that forecasts are better and more informative:

- Be explicit about uncertainty around the central estimate. The Bank of England, for example, uses 'fan charts'.[2] Once accumulated data permits, assess whether the assumed uncertainty was reasonable.
- Compare past projections to outcomes and future projections to past projections – is there any systematic bias?
- Uncertainty might be narrowed by shifting from forecasting demand in isolation to considering whether demand and supply jointly make sense, taking into account cost and willingness to pay. An example where this is not currently done is in mobile data growth projections (which feed into estimates of spectrum demand). There is often no consideration of whether consumers would be willing to pay for the data projected.
- If feasible, compare competing forecasts – are some forecasters better than others, and what features of the forecasting approach are superior?[3]

- A forecast is an input to decision-making, and a decision based on a central forecast may not be optimal if the costs of errors are asymmetric around the central estimate. An example is estimating the cost of capital. If under-investment is more socially costly than higher prices and potentially excessive investment, it may be better to err on the upside in estimating the cost of capital.[4]

Ultimately, an overall judgement is required. Not only will transparency over the role of forecasts and judgement[5] promote sound decision-making, it can also contribute to predictability for industry and ex-post evaluation and error correction if required.

Waiting

A reliable forecast of the future is the future, so waiting may be justified even if deciding now is expected to bring net benefits. For a decision now to be optimal, not only must the expected value exceed the expected cost but the net benefit must exceed the value of waiting.

Waiting can be valuable if uncertainty may be resolved and otherwise sunk costs can be avoided or deferred. For example, before electrifying a railroad, one might wait to see if batteries or fuel cells could allow electrification without building new track infrastructure. Waiting may also be justified even if the level of uncertainty does not diminish, such as with the prices of oil and gas (even if the likelihood that it does go up or down in the next period remains unchanged).

The private sector frequently defers already-valuable investments that could be even more valuable tomorrow, or not valuable, depending on uncertain developments. Policymakers and regulators should mimic this value-maximising behaviour.

Contingency planning and 'error correction'

Scenario planning can help to anticipate alternative outcomes, and developments can be monitored and 'error correction' implemented.

A process of scenario planning forces participants to think through multiple potential futures, rather than becoming fixated on one particular future. It also allows consideration of signals that one potential future was becoming more likely over time. Scenario planning may also prompt contingency planning – anticipating a possible undesirable or unintended outcome and outlining in advance what action could be taken.

'Error correction' may also be specific and formulaic; for example, an 'RPI-X' price control utilises actual inflation outcomes to adjust prices, rather than relying on a forecast. There is a parallel here with commercial contracts, which often feature contingent clauses. Building 'error correction' into policy and regulatory decisions and design could be taken further.

For example, telecommunications markets are periodically reviewed to recalibrate regulation based on the extent of competition. However, given the pace of development of infrastructure-based competition in geographic segments of the market, an assessment of competition at a point in time is likely to rapidly become obsolete and would result in either too much or too little regulation in different areas. Regulation could be based on a forecast, but competitors can and do change their plans.

An alternative approach would be to define the thresholds for changing regulation conditional on competition in advance and 'automatically' update regulation as competition develops. Five-yearly reviews could then be used to review experience and revisit the thresholds if required, rather than involving an appraisal of competitive developments.

Abandonment

In the private sector, it is common practice to abandon or sell off services and investments that do not prove profitable. Thresholds of success for continuation may also be set out in advance, and shareholders will sell off shares in a business that does not cut its losses. The transparency of purpose (profit) and incentives support abandonment where justified.

With regulation and public policy, desired outcomes are typically less well-defined and measured and reputation and remuneration is less directly tied to outcomes. There is also a tendency to inertia, to argue that as costs have already been sunk, it is better to carry on than reassess the payoff from further investment versus abandonment.

Whilst it is neither possible nor desirable to seek to mimic the private sector in relation to abandonment (public policy and regulation are after all focused on areas where there is market failure and where there may be multiple competing and hard-to-measure objectives), it is possible to do better.

Transparent forecasts and scenario planning, coupled with contingency planning, including ex-ante triggers for reappraisal or abandonment, could be laid out. There may then be less of a tendency to blame policymakers ex-post when things don't work out, but rather to accept that the plan was sound but circumstances have changed.

Conclusion

Policy and regulatory decisions depend on a view of the future – what do we expect to happen and how will it change if policy is changed?

How should we make decisions under uncertainty, and how can we do better? There are many things we can do, some with parallels in the private sector, others that differ.

First, consider who is best placed to decide what. Can elements of a problem be given to those with better information and incentives or a different set of objectives and policy instruments?

Second, consider the option of experiments – is it possible to trial different approaches and learn from experience?

Third, forecast what you need to forecast, but take steps to improve forecasting and make it more informative:

- Estimate the level of uncertainty inherent to the forecast and consider whether the costs of policy errors are asymmetric around the expected outcome or not.
- Learn from repeated forecast efforts (have they proved consistently biased in the past?)
- Utilise information from competing forecasts (which forecasters and what approaches work best?)
- Carry out a sense check where forecasts involve supply or demand in terms of consistency of cost and willingness to pay.
- Be transparent and publish sufficient detail so that any forecast can be replicated and tested by others.

Fourth, consider alternative scenarios and contingency, both to test the robustness of a decision based on a central forecast and as a guide to building in review or triggering for change. Making decisions contingent on developments may reduce the need for accurate forecasts.

Fifth, consider the value of waiting (the future is the best predictor of the future). Could more value be achieved by allowing for the costs of delay and utilising better information in future? Could work be undertaken to resolve uncertainties?

[1] This says that to encourage potentially risky investment, the regulator should forebear (for a period) from regulating even supernormal profits, to balance the ex-ante risk that the investor might instead have suffered losses
[2] https://www.bankofengland.co.uk/quarterly-bulletin/2005/q3/assessing-the-mpcs-fan-charts
[3] https://cepr.org/voxeu/columns/macroeconomic-model-comparisons-and-forecast-competitions
[4] Where industry, for example in telecommunications) decides how much to invest as opposed to those regulated sectors where investment plans are agreed.
[5] In the case of the Bank of England Monetary Policy Committee the decision regarding interest rate changes, whilst dependent on multiple forecasts, is based on a vote.

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