**BUILDING 5G INFRASTRUCTURE: THE ECONOMIC CONSEQUENCES OF RESTRICTING COMPETITION**

A new global report by Oxford Economics sheds light on the potential costs with regard to price, time, and productivity across eight leading 5G markets

**The next generation of mobile technology, 5G, offers enormous opportunities for countries who facilitate its widespread provision.** 5G has the potential to both reduce costs and unlock new income streams across all sectors of industry, improving productivity levels throughout the global economy.

Globally, the telecommunications network infrastructure market is dominated by three players—Ericsson, Huawei and Nokia. However, the participation of one of these organisations—Huawei—in the rollout of 5G is likely to be constrained by a series of political decisions.

It is broadly agreed that restricting such a significant player from bidding for contracts will lead to higher prices, rollout delays and hence a slower diffusion of associated technological innovation. However, to date, there has been no systematic attempt to quantify the potential scale of these effects. In this context, Huawei has commissioned Oxford Economics to assess the economic cost of restricting competition in the eight markets: Australia, Canada, France, Germany, India, Japan, the United Kingdom, and the United States

To reflect the uncertainty inherent in such a process, we modelled three alternative scenarios. These are termed “low cost”, “central cost”, and “high cost” respectively. All give results relative to our baseline scenario in which no competition restrictions are imposed on the 5G infrastructure market.

**ECONOMIC IMPACTS OF RESTRICTING 5G COMPETITION**

Restricting a key supplier of 5G infrastructure from helping to build a country’s network would increase that country’s 5G investment costs by a total of between 8% and 29% over the next decade (see Fig. 1). Linked to these investment cost increases, the restriction in competition for 5G infrastructure would lead to delays in the network rollout that mean millions fewer people would be covered by the 5G network in 2023. A delay in the rollout of 5G would also result in slower technological innovation and reduced economic growth. In our central cost scenario, this would result in reductions to national GDP in 2035 ranging from $2.8 billion in Australia to $21.9 billion in the US. Across all eight countries in our study, this means GDP per capita would be lower by an average of $100 per person in 2035, compared with a world where there is no such restriction in 5G infrastructure provision. The uncertainty of the economic impact of restrictions on competition is reflected in Fig. 1, which shows the range of estimates between our low cost and high cost scenarios.

1. Economic impacts of restricting a player of Huawei’s size from competing in the 5G infrastructure market

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| **Market** | **Price impact**(% increase in investment costs) | **Reduction in number of people with access to 5G by 2023**(millions) | **Reduction in GDP in 2035**(US$ billions, 2019 prices) |
| **Australia** | 8% to 27% | 0.0 to 3.1 | 0.8 to 8.2 |
| **Canada** | 8% to 24% | 2.2 to 5.7 | 1.0 to 6.7 |
| **France** | 9% to 29% | 2.1 to 5.7 | 2.6 to 15.6 |
| **Germany** | 9% to 29% | 3.8 to 10.0 | 2.4 to 13.8 |
| **Japan** | 9% to 27% | 7.2 to 19.1 | 5.3 to 34.3 |
| **India** | 8% to 27% | 15.9 to 45.3 | 4.7 to 27.8 |
| **United Kingdom** | 9% to 29% | 3.9 to 10.4 | 1.8 to 11.8 |
| **United States** | 8% to 24% | 0.0 to 27.1 | 8.6 to 63.0 |

Note: In Australia and the US, 5G rollout is expected to cover a vast majority of the population over the next 2-3 years with almost no increase in coverage in the following years. In our low cost scenario, the increase in investment costs leads to delays in rollout of a few months, despite which a vast majority of the population receives access by 2023. Source: Oxford Economics

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| our Three 5g rollout scenariosTo capture the uncertainty around the future benefits of 5G and the different market responses to competition restrictions, we modelled three scenarios which are summarised in this table.

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| **Source of uncertainty** | **LOW scenario** | **CENTRAL scenario** | **HIGH scenario** |
| **Potential future benefits of 5G** | 5G, characterised as Enhanced Mobile Broadband (eMBB), provides higher broadband speeds and supports high-bandwidth services such as Augmented Reality (AR) and Virtual Reality (VR) apps. | 5G enables Massive Machine-type Communications (mMTC): i.e. the connection of a very large number of connected devices (one million per sq km), supporting low-power, low-energy devices which enables large-scale IoT deployments across sectors. | 5G is revolutionary, providing Ultra-reliable and Low Latency Communications (URLLC) that enables applications which are heavily dependent on low latency and high reliability, and supports critical applications in transport, healthcare and energy.  |
| **Market reaction to competition restrictions** | We assume that the scope for other 5G infrastructure vendors to exercise their market power and increase prices is limited. | Other vendors are able to increase their prices to some extent but are not fully able to exercise their market power.  | Given the revolutionary impact of 5G, infrastructure vendors can fully exercise their market power and increase prices to the maximum extent.  |

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NOTES ON OUR METHODOLOGY

We used a three-stage modelling framework to assess the economic impact of restricting competition in the provision of 5G network equipment.

**STAGE 1:** To calculate the economic impact of restricting competition, we started by estimating the increase in mobile network operators’ investment costs when major infrastructure provider is restricted from the market. We did this using a range of techniques developed in collaboration with Dr Martin Pesendorfer from the London School of Economics.

**STAGE 2:** We translated the increase in investment costs to delays in rollout using a network rollout model built in collaboration with Dr Edward Oughton (Cambridge Judge Business School). This model translates an increase in investment costs to a reduction in the share of the population covered for each country and scenario by assuming that the overall operators’ capex remains the same. Our baseline—i.e. with no competition restrictions—forecasts for 5G rollout and capex were sourced from the GSM Association.

**STAGE 3:** The increase in investment costs and delays in rollout were translated into lower productivity growth using estimates of the productivity benefits of 5G from various academic and industry studies. These were then fed into the Oxford Economics Global Economic Model to estimate the impact on a range of macroeconomic indicators such as GDP and household consumer spending.

 **Read the full report at www.oxfordeconomics.com/consulting**

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