

Written evidence submitted by Dr Hermann Hauser (BFA0018)

Dear Mr Tugendhat,

Thank you for your letter inviting me to give a perspective on the proposed acquisition of ARM Holdings by the US firm Nvidia.

Here are my perspectives with respect to your questions:

- What do you believe Nvidia's motivations are for its acquisition of ARM? To what extent is there a risk of asset stripping by Nvidia?

Nvidia has an opportunity to become the quasi monopoly supplier of microprocessors to the world. Intel, the incumbent leader in PC and data centre microprocessors is stumbling, having missed the 10nm semiconductor node. This opens up an opportunity for Nvidia to use 10nm, 7nm, and 5nm designs based on ARM to overtake Intel and beat them at their own game. ARM has a 95% market share of processors in the mobile phone market, Apple have just adopted the ARM processor instead of the Intel architecture for their iMacs which is proof that ARM architecture can also gain market share in the PC space.

The real prize, however is the server market which is the most lucrative market segment for Intel, and ARM, because of its lower power consumption, is beginning to challenge Intel in this segment as well. This will give Nvidia a dominant position in all processor segments and create another US technology monopoly which has created so much angst in Britain when the country worries about the surreptitiously controlling influence Google, Facebook, Netflix and Amazon have on the UK economy.

But there is also a more negative motivation in this acquisition which is to deny many of Nvidia's competitors among the 500+ licensees of ARM access to the latest version of the ARM designs. It is extremely unlikely that Nvidia will allow ARM to produce a design for the server market to attack Intel in its last remaining stronghold and then licence it to all their competitors. It just does not make business sense and that is why so many of the licensees are against the deal.

Nvidia's objective is to destroy the existing even-handed license business of ARM to get an unfair preferential access to ARM technology and hurt their competitors, including UK companies at the same time. As Nvidia is the world's most valuable semiconductor company it has the firepower to do so.

- Do your concerns over this proposed transaction differ from those relating to the previous acquisition of Arm by Japanese company Softbank? If so, how do these concerns differ?

I voted against the original acquisition by Softbank not because I did not believe in Mr Son's good intentions to retain the ARM business model, which indeed he did, but because I foresaw exactly what is happening now: Once ARM is foreign owned

Britain will find it much harder to preserve ARM's independence which is the essence of its value to the country.

As Softbank is a financial investor it had no problem with ARM being the Switzerland of the semiconductor industry.

Nvidia is one of the ARM licensees competing with many of its 500+ licensees. There is therefore an intrinsic problem with Nvidia retaining the even-handed treatment of all their competitor licensees. It clearly will not be in their interest and unless the government can obtain legally binding undertakings to the contrary it will not happen.

- Do you have any concerns about this recent deal that relate to national security specifically? Is there any case for Government intervention in this transaction on national security grounds?

Technology Sovereignty is fast becoming the defining issue of the decade. Countries used to perceive sovereignty mainly in terms of defending its borders. Given the importance of our IT infrastructure which is correctly compared with our water and electricity infrastructure, it clearly relates to national security as well as the basic functioning of our society. Microprocessors are clearly a key component of our IT infrastructure. I believe every country has to ask itself 3 questions when it comes to Technology Sovereignty:

1. Do we have the critical technology in our nation.
2. If not, do we have several suppliers from different stable reliable countries.
3. If still not, do we have unfettered guaranteed long-term (at least 5 years) access to monopoly or oligopoly suppliers from a single country (often US or China)

If the answer to all three of them is NO, we have to act and do WHATEVER IT TAKES until the answer to one of them is YES. If we do not then we must be comfortable with the fact that we become dependent on another nation, however friendly at present, who can determine whether we have the right to use our own IT infrastructure or not. Would we allow this to happen to our water or electricity infrastructure? Probably not.

Sadly, the Nvidia take-over of ARM would mean that the answer to all 3 questions would be NO.

- Does the acquisition of ARM by Nvidia risk limiting the UK's access to the technologies produced by ARM or ARM's IP or R&D capability?

YES, because of US export regulations. This would mean that the decision whom ARM is allowed to sell to, including UK companies, will be made in the White house or not in Downing Street.

Nvidia has argued, incorrectly, that because ARM's IP originates in the UK it is still under UK control. As the stated intention of Nvidia is to include some of their GPU IP

into the licensing offering of ARM this will soon no longer be true and it would be naïve to assume that Nvidia will not want to contribute to the ARM architecture with its silicon valley R&D capability unless again they give legally binding undertakings to the contrary. This would contaminate the ARM IP to the extent that it would fully fall under the US export regulation.

- What are the possible implications of this deal for the UK's economic and technological sovereignty?

There are severe implications to UK's economic and technological sovereignty. Not only do we lose one of the few remaining weapons at our disposal in global trade negotiations, but we are handing it to one of the two adversaries in the US – China trade war with the realistic consequence that Britain becomes collateral damage in this war.

Rather than taking the opportunity to be an honest go-between in the China-US conflict we become a trade weapon ourselves, with Downing street playing a spectator role rather than a mediator.

- What are the implications of Nvidia's acquisition of ARM for the UK's position within the global semiconductor industry?

The UK enjoys an unusual position with ARM as the Switzerland of the semiconductor industry. There is not a single important semiconductor company in this world which does not have an ARM license. This is a very powerful position to be in. Until the US began using technology access as a weapon, we never realised how powerful this could be as it never occurred to us to use technology in this way.

However, this is the new political and economic reality and we have to accept these new rules. So let us not surrender one of the few assets we still have.

- What conditions should the UK Government place on the deal or assurances should it seek, to ensure that the acquisition does not undermine the UK's sovereignty or security interests?

1. Legally binding undertaking to secure and expand ARM jobs in the UK.
2. Legally binding undertaking to retain the even-handed ARM licensing model without giving Nvidia preferential treatment.
3. Legally binding undertaking that ARM IP will not be contaminated with US IP to the extent that it falls under US export regulations.

- Should the acquisition proceed, what impact might any future escalation of US-China tensions have on the future of ARM?

Arm will become a valuable pawn in the war.

- Are there any other matters which you wish to bring to our attention?

I have no shares or other interest in ARM as I had to sell them all to Softbank. I can therefore freely speak my mind. ARM employees will receive \$1.5bn in shares as part of this transaction so it is difficult for them to speak their mind.

The obvious and highly desirable alternative to the Nvidia deal is for the government to use its convening power to lead a syndicate of ARM licensees, UK pension funds and other institutions to take ARM public on the LSE + NYSE or Shanghai Star market and take a golden share so that we are never again in this invidious situation of having to fight to keep our own UK technology assets.

Yours sincerely

Dr Hermann Hauser FRS, FREng, KBE

October 2020