**Roundtable discussion "European Chips Act", 11 May 2022**
**Dutch Parliamentary Committee on Economic Affairs and Climate Policy**
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Stiftung Neue Verantwortung e.V. (SNV) is an independent, non-party, non-profit tech-policy think tank in Berlin, Germany. We thank the Dutch Parliament for inviting us to this roundtable discussion. You can find our analysis of the global semiconductor value chain and Europe's competitiveness on our website. Following are some of the key aspects that policy makers should consider when evaluating the EU Chips Act.

**Semiconductor manufacturing is highly diversified. The EU should invest in much more than just the "cutting-edge mega-fab".** Certain chips, such as processors in smartphones, servers and laptops benefit from "node shrinkage" or "More Moore Scaling" – being able to squeeze more transistors onto a square millimeter with each new manufacturing technology. As an example, Intel's 14nm manufacturing process from 2014 can manufacture three times more transistors onto a square millimeter than their previous 22nm process from 2012. Since many years node shrinkage ensured that the next generation of chips would be more powerful by utilizing significantly more transistors while decreasing power consumption. This is why companies that design mobile chipsets in smartphones (Apple, Samsung, MediaTek), artificial intelligence accelerators (Nvidia) or general-purpose processors (AMD, Intel) are quickly adopting new process technologies for their next chip generation.

Yet, it is important to understand that the process technology, the necessary materials and the design process differ greatly depending on the type of chip one wants to produce: most analog semiconductors, such as chips to charge an electric vehicle, to send/receive data over radio waves (5G/6G) or control an electric motor, *do not depend* on node shrinkage. But instead rely on new materials (such as silicon-carbide or gallium-nitride) and different manufacturing technologies. Thus, comparing a cutting-edge 5nm fab for processors and mobile chipsets with a 90nm fab for silicon-carbide (SiC) power semiconductors or gallium-nitride (GaN) radio frequency applications, is comparing apples with pears. Both are indispensable for a modern car or smartphone. European companies have strong positions in compound semiconductor manufacturing (such as SiC or GaN) that should be further strengthened through financial incentives. As an example, the New York state subsidized a $1 billion SiC fab with $500 million, or roughly 50%, in 2019 to ensure US competitiveness in SiC manufacturing.

**Europe's industries, such as automotive OEMs and medical device manufacturers, will continue to depend on older manufacture technologies – "mature nodes" – even in 2030.** Even if it is technically possible to design a new chip on a cutting-edge manufacturing process there are many reasons why companies will continue to rely on older, "mature" fabs. First, chip design costs are drastically increasing with more advanced manufacturing processes. As an example, chip design costs are around $50 million on a 28nm node but $174 million on a 10nm node. That makes it economically less viable to design low-volume chips on advanced nodes. Second, as mentioned before, not all types of chips can be manufactured on cutting-edge process nodes but especially analog semiconductors depend on more mature and thus better understood and refined process technologies. Looking at the automotive sector, the estimate is that even in 2030 up to 50% of the semiconductor content in a car will be based on "mature nodes". This has also geopolitical implications: China is, by far, investing the most in mature fabs compared to all other regions. Thus, in the future, especially for mature manufacturing technologies, Europe will be even *more dependent* on manufacturing capacity within China than today. Europe should therefor also develop subsidy strategies for mature manufacturing technologies.

**More fabs in Europe will not make us more resilient – international partnerships will.** Europe currently has less than 7% of global fab capacity and would do well to invest in domestic fabs to strengthen its technological competitiveness. But more domestic fabs do not protect us from future chip shortages. For one, semiconductor manufacturing depends on hundreds of different chemicals and materials that are mainly sourced from outside the EU, especially Japan and the US. Also, *even if* Europe doubles its share of manufacturing within this decade, European end-customer industries will still predominantly rely on manufacturing capacity within Asia, especially Taiwan, South Korea and China. Thus, to ensure security of supply, Europe should strengthen its international partnerships especially with countries such as Taiwan, Japan, South Korea and Singapore – as mentioned in the EU strategy for cooperation in the Indo-Pacific.

**Governments should map, not monitor, the global semiconductor value chain.** In its *pillar 3* the EU Chips Act talks about the need for Europe to monitor "*the supply of semiconductors, estimate demand, anticipate shortages*" (EU Chips Act, page 63). While governments should push the semiconductor industry toward more transparency, they should leave the necessarily detailed monitoring (of a large number of metrics) of the supply chain to the industry itself. First, governments would rely on company data to assess the value chain and will thus always lag in speed and responsiveness compared to industry-driven analysis. Second, there already is a plethora of semiconductor market analysts that collectively were not able to anticipate the shortages – closely monitoring the supply chain does not seem to lead to being able to foresee shortages. Third, since governments are not part of the semiconductor industry their room for maneuver is very limited, especially short- to mid-term to ensure security of supply or alleviate future shortages.

That said, instead of trying to closely monitor inventory levels, forecast demand or anticipate shortages, **governments should invest in their own knowledge about this global value chain** for critical policy tools, such as foreign direct investment screening, export restrictions or sanctions. Mapping this global value chain to identify interdependencies, chokepoints, technology leadership and market dynamics would be an analytical base for many of those policy tools. This is currently often done in isolation and from scratch by the responsible ministerial units in the member states and the European Commission. This is neither effective, nor efficient, nor sustainable in increasingly complex and intertwined emerging and foundational technology ecosystems. If Europe is willing to spend €43 billion to strengthen the semiconductor ecosystem, policy makers would do well to also invest in their own resources to better understand and map this ecosystem.

**Priority-rated orders, common purchasing and export bans will not help us during chip shortages.** Pillar 3 in the EU Chips Act argues to utilize a crisis toolbox, including export bans, priority-rated orders and common purchasing, to respond to future chip shortages. While these mechanisms might work well in other supply chains (such as vaccines), they are unfit for the semiconductor supply chain. As an example, even with a priority-rated order in place, it would still take 4-6 months of manufacturing time until a chip leaves the fab – in a best-case scenario. This does not account for the time the fab would need to reschedule its manufacturing to accommodate for the priority-rated order. Once there is a shortage governments' room for maneuver is extremely limited. Thus, governments should instead (a) push the semiconductor industry to become more transparent and (b) work with end-customer industries on standards and best practices to be better prepared for future disruptions in the semiconductor supply chain through strategies such as multi-sourcing, strategic inventory and long-term orders.

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