Research Statement, Pascual Restrepo, April 2022

My research explores the **implications of technological change for inequality and productivity**.

One part of my research explores **the origins of technology.** why do we develop and adopt the technologies we have? Why are some jobs automated while others are complemented by technology? Is the process of development and adoption of technologies efficient? In my work with Daron Acemoglu (MIT), we have shown that part of the current wave of automation is due to adverse demographic trends, as aging countries such as Japan and Germany develop automation technologies optimized for their demographic structure and export them to the rest of the world.[1] Our work has also explored how tax systems and labor market distortions might generate incentives for excessive automation.[2]

The second branch of my research explores **the effects of technology on inequality and productivity.** In work with Daron Acemoglu, we have developed a *task framework* where automation technologies reorganize the production process and diminishes the role of workers with some skills at the same time as it generates new roles for capital and workers with other skills.[3] We have shown theoretically and documented empirically that this reorganization might contribute to inequality and stagnant wages, despite bringing small productivity gains.[4] Our framework also emphasizes that automation and other forms of technological change can coexist in the long run and generate balanced growth if the economy creates new tasks and roles for workers, as seen historically.[5] Finally, in recent work with Ben Moll (LSE) and Lukasz Rachel (LSE), we study how technology affects the dynamics of wealth accumulation. We show that automation technologies can permanently raise asset returns and via this channel have important distributional consequences, both for wages and capital ownership.[6]

My ongoing work extends this agenda in several directions:

1. The role of firms: The adoption of automation technologies concentrates in large

[1]Demographics and Automation, (*Review of Economic Studies*, 2022).

[2]Does the US Tax Code Favor Automation? (*Brookings Papers in Economic Activity*, 2020).

[3]Automation and New Tasks: How Technology Displaces and Reinstates Labor, (*Journal of Economic Perspectives*, 2019).

[4]Robots and Jobs: Evidence from US local labor markets, (*Journal of Political Economy*, 2019) and Tasks, Automation, and the Rise in US Wage Inequality (forthcoming, *Econometrica*).

[5]The Race Between Man and Machine: Implications of Technology for Growth, Factor Shares and Unemployment (*American Economic Review*, 2018).

[6]Uneven Growth: Automation's Impact on Income and Wealth Inequality (Conditionally accepted, *Econometrica*).

firms. This uneven adoption affects the way in which these technologies contribute to aggregate productivity and shape market structure. In joint work with the US Census Economic Studies group, we have gathered data on the adoption of artificial intelligence, specialized equipment and software, and robotics for over 200,000 firms across all economic sectors using a new module introduced in the 2019 *Annual Business Survey*. Using these data, we plan to work on a series of projects studying the determinants and motivations driving the adoption of these technologies, as well as the bottlenecks limiting their use by smaller firms across a wider range of sectors.[7] In ongoing work with Joachim Hubmer (Penn), we leverage some of the findings from these data to quantify the contribution of the uneven adoption of automation technologies to various trends in the US manufacturing sector: the rise in productivity dispersion; the expansion of large firms at the expense of their competitors; and the decline in the sectoral labor share that has coincided with rising labor shares for the median firm.[8]

2. The dynamics of adjustment: Globalization, economic reforms, and rapid technological change can bring large disruptions in the short run but lift all boats in the long run. In work with Nils Lehr (PhD student from BU), we revisit the role of gradualism as a potential policy tool that might dampen the adverse distributional consequences of these transitions. We develop a theory to clarify why very rapid technological change might generate excessively high levels of inequality during a period of adjustment. This justifies policies designed to induce a more gradual transition, potentially at the expense of short-run productivity gains, to balance efficiency and equity concerns. Using this framework, we plan to quantify the benefits of gradualism in various empirical applications.

3. Task displacement and allocative efficiency: In an efficient economy, technology raises productivity even if it displaces workers from some of their tasks. However, when there are labor market distortions, automation and offshoring might worsen allocative efficiency by displacing workers from high to low marginal product tasks. In work with Daron Acemoglu, we develop a framework to study the interplay of automation and offshoring with labor market distortions. The framework clarifies that the effects of automation and offshoring on allocative efficiency depend on whether workers earn rents at automatable and offshorable tasks, which can be verified empirically. Due to their adverse allocative effects, offshoring and automation might bring small welfare and productivity gains.

[7] Automation and the Workforce: A Firm-Level View from the 2019 Annual Business Survey (prepared for the *NBER/CRIW conference on Technology, Productivity, and Economic Growth*, 2022)

[8] Not a Typical Firm: The Joint Dynamics of Firms, Labor Shares, and Capital-Labor Substitution (NBER Working Paper No. 28579, 2021).