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Boosting Dutch Labor Productivity: Diagnostic and Policy Options

Shinya Kotera

SIP/2025/120

IMF Selected Issues Papers are prepared by IMF staff as background documentation for periodic consultations with member countries. It is based on the information available at the time it was completed on June 30, 2025. This paper is also published separately as IMF Country Report No 25/198.

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Boosting Dutch Labor Productivity: Diagnostic and Policy Options, Kingdom of The Netherlands—The Netherlands

Prepared by Shinya Kotera

Authorized for distribution by Fabian Bornhorst
September 2025

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ABSTRACT: Although the level of Dutch labor productivity is high, its growth faces challenges. From an employment perspective, productivity can be boosted by improving education outcomes, strengthening vocational training, and reducing labor market duality. Maintaining high skills across generations amid population aging and better integrating migrants are also crucial. From a firm perspective, promoting business dynamics and encouraging productivity-enhancing investment will be vital. In this respect, continued progress on the EU single market and addressing investment bottlenecks such as labor shortages, electricity grid, and policy uncertainty will be essential. Encouraging R&D activities and promoting productivity spillovers will further benefit productivity growth.

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Boosting Dutch Labor Productivity: Diagnostic and Policy Options

Kingdom of The Netherlands—The Netherlands

Prepared by Shinya Kotera[1]

[1] The author would like to thank helpful comments from Mark Horton, Fabian Bornhorst, Nina Budina, Karen Coulibaly, Alla Myrvoda, and Saioa Armendariz, as well as seminar participants from the Dutch authorities.

INTERNATIONAL MONETARY FUND

KINGDOM OF THE NETHERLANDS—THE NETHERLANDS

SELECTED ISSUES

June 30, 2025

Approved By
European Department

Prepared By Shinya Kotera (EUR)

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BOX

BOOSTING DUTCH LABOR PRODUCTIVITY: DIAGNOSTIC AND POLICY OPTIONS[1]

Despite having one of the highest labor productivity levels globally, the Netherlands faces challenges in enhancing productivity growth. The analysis highlights the potential to boost productivity through reforms targeting workers and firms. Improving education outcomes and enhancing vocational training, especially in SMEs, will help fully utilize the potential of Dutch workers. Given lower productivity of the self-employed, efforts to reduce labor market duality should continue. Amid population aging, maintaining high skills across generations and effectively integrating migrants into the labor market are crucial. Additionally, in light of increased resource misallocation, promoting business dynamics and encouraging productivity-enhancing investment will be vital for Dutch firms. In this respect, continuing to push for the completion of the EU single market and addressing factors affecting investment activities (e.g., electricity grid, labor shortage, and policy uncertainty) will be critical. Promoting productivity spillovers both domestically and internationally, as well as encouraging SMEs to engage in more R&D activities, will also benefit productivity growth.

A. Context

1. Boosting labor productivity will be a critical source for future growth in the Netherlands. Given the expected stagnation of labor supply due to population aging and limited room to increase the employment rate, more attention is being paid to enhancing labor productivity (Figure 1, upper right). This urgency is reflected in several recent studies on labor productivity (e.g., Bettendorf & Polder (2025), Wache et al. (2025), DNB (2025)). This paper combines these findings with additional analysis to provide policy options to boost labor productivity in the Netherlands. The paper discusses productivity from the macroeconomic (Section B), employment (Section C) and firm (Section D) perspective, before summarizing policy considerations.

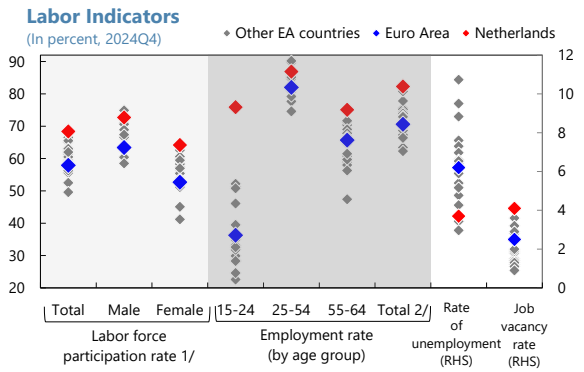
2. While the level of labor productivity in the Netherlands is among the highest globally, its growth has been declining and is now lower than that of its peers. Comparing labor productivity levels (per hour worked) among OECD countries shows that the Netherlands surpasses the Euro Area and is comparable to the United States and Germany (Figure 1, upper right). However, its growth rate is lower than that of other countries with similar productivity levels. Both labor productivity and TFP growth rates in the Netherlands declined after the global financial crisis, and they experienced disappointing productivity growth during 2013–19 despite high real GDP growth (Figure 1, lower left). The slowdown in productivity growth during this period can be attributed to (i) mining (phasing out of gas extraction),[2] (ii) manufacturing (slowdown in chemicals and electrical engineering manufacturing), and (iii) transport and storage (more labor inputs for parcel transportation due to the rise of online ordering) (De Vries and van Leeuwen, 2024 and 2025). Although the relatively large negative impact from mining is unique to the Netherlands, the

[1] Prepared by Shinya Kotera (EUR).

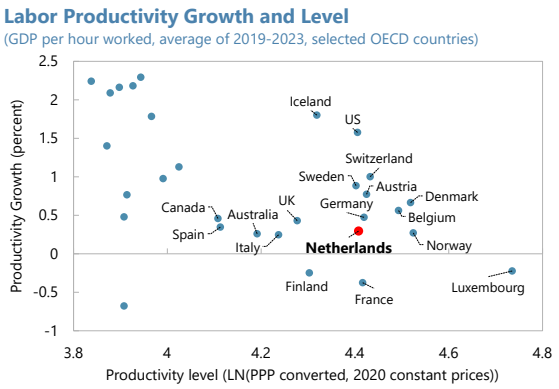
[2] The phasing out of gas extraction started in 2014, turned off in October 2023, and permanently closed in 2024.

productivity growth rate excluding mining and non-market sectors indicates that the Netherlands is still slightly lower than the median of peer countries (Figure 1, lower right).

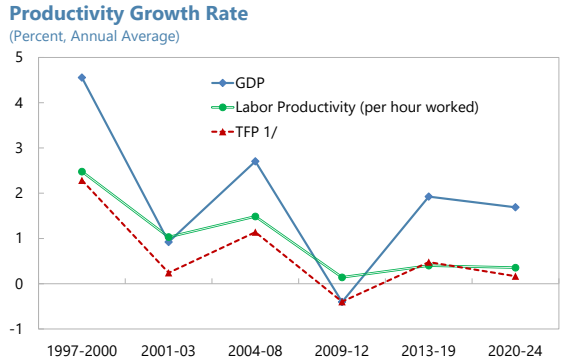
Figure 1. Context



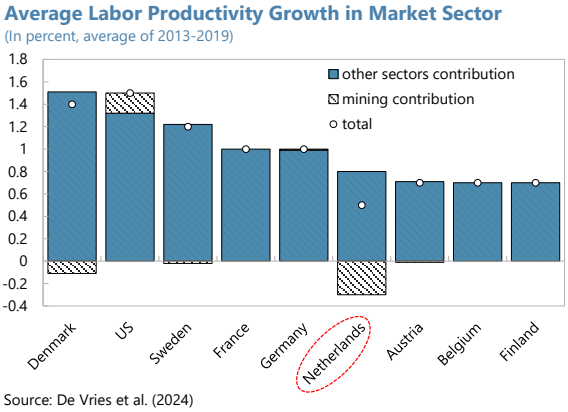
Sources: Haver Analytics; and IMF calculations.
1/ Among people aged 15 years and older. 2/ Among people aged 15-64 years.



Sources: OECD and IMF staff calculations.



Source: Haver Analytics
1/ Estimates from AMECO



Source: De Vries et al. (2024)

B. Macro Level Perspective

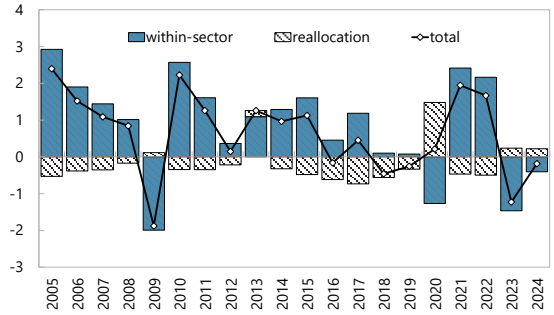
3. Aggregate productivity growth is analyzed from a sectoral perspective. Following Ando (2020), aggregate labor productivity can be decomposed into within-sector labor productivity growth and the reallocation of each sector's labor share (share in total hours worked). The former captures sectoral efficiency gains, and the latter reflects structural changes within the economy. Positive reallocation effects occur when more resources are allocated to higher productivity sectors (or fewer resources to lower productivity sectors).

4. Recent labor productivity growth (2019–23) was mainly driven by within-sector growth, and its contribution was relatively lower than peers. The decomposition shows that until 2019, within-sector productivity growth was the main contributor to overall productivity growth, while the reallocation effect had a slight negative impact (Figure 2, upper left). The trend after the pandemic is hard to discern due to large fluctuations in both productivity growth and its contributions. However, based on the average from 2019–23, around 80 percent of the total growth in that period can be attributed to within-sector productivity growth. Compared with peer countries,

the Netherlands ranks fifth out of seven in terms of both total growth and within-sector contributions (Figure 2, upper right). During this period, overall growth was supported by market services and high-tech knowledge-intensive services (Figure 2, middle). Conversely, other knowledge-intensive services (public, education, and social work), mining, and financial sectors hindered productivity growth. In manufacturing, high to medium technology sectors improved their efficiency, while medium to low technology sectors stagnated.

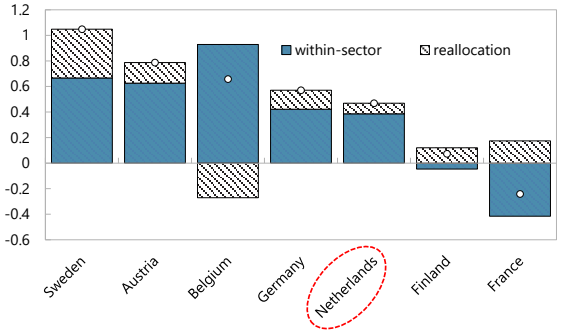
Figure 2. Labor Productivity Growth Decomposition

Labor Productivity Growth
(Percent, GVA per hour worked)



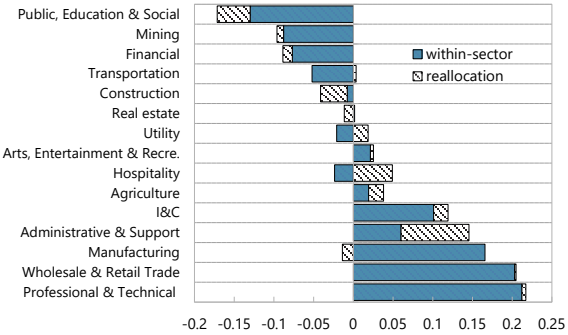
Sources: Haver Analytics and IMF staff calculations.
Note: Decomposition based on 20 sectors except 2024 (10 sectors).

Labor Productivity Growth
(GVA per hour worked, 2019-2023 growth average, percentage points)



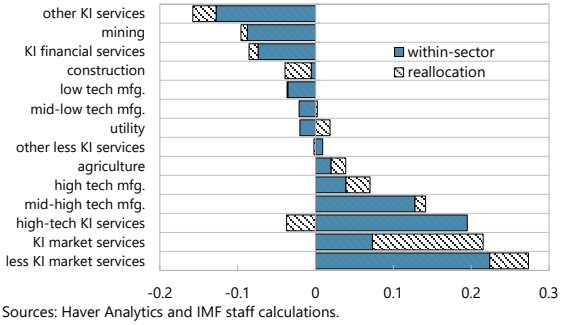
Sources: Haver Analytics and IMF staff calculations.

Contributions to Labor Productivity Growth by Sector
(GVA per hour worked, 2019-2023 average, percentage points)



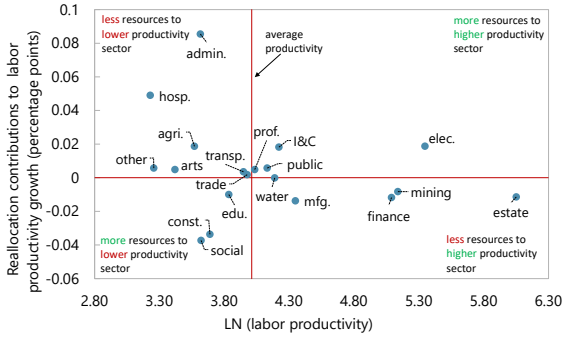
Sources: Haver Analytics and IMF staff calculations.

Contributions to Labor Productivity Growth by Sector
(GVA per hour worked, 2019-2023 average, percentage points)



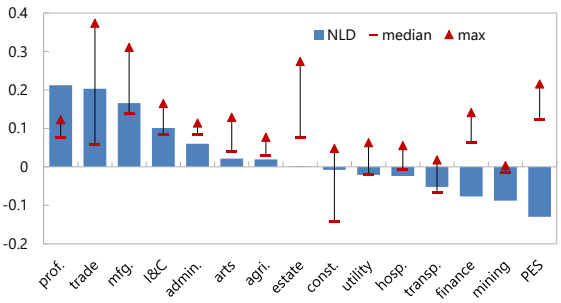
Sources: Haver Analytics and IMF staff calculations.
Note: Knowledge-Intensive (**KI**) Services and high-low technology manufacturing are based on the definition by Eurostat.

Reallocation Contributions to Labor Productivity Growth
(2019-2023 average, GVA per hour worked)



Sources: Haver Analytics and IMF staff calculations.

Within-Sector Contribution to Productivity Growth
(2019-2023 average, percentage points, comparison to 6 peer countries 1/)



Sources: Haver Analytics and IMF staff calculations.
1/ Median and Max are based on 6 peer countries (AUT, BEL, DEU, FIN, FRA, SWE)

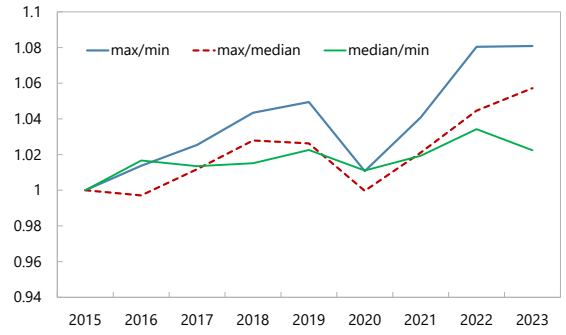
Note: agri. = agriculture, mfg.= manufacturing, elec. = electricity, utility = electricity & water, const. = construction, trade= wholesale & retail trade, tranp.= transportation & storage, hosp. = hospitality (accommodation & food service), I&C=information & communication, estate = real estate, prof. = professional, scientific & technical activities, admin.= administrative & support service, PES=public, education & social work, edu. = education, arts=arts, entertainment & recreation.

5. Allocating more resources to high-productivity sectors benefits productivity but may not respond to the evolving needs of society. Figure 2 (lower left) details reallocation effects by sector. Both the upper-right and upper-left quadrants indicate a positive contribution to aggregate productivity growth. The upper-right represents higher-than-average productivity sectors with increased labor share, while the upper-left represents lower productivity sectors with decreased labor share. The opposite holds for the lower-right and lower-left quadrants. Thus, positive allocation effects are observed in administrative & support services and the hospitality sector, while negative effects are seen in health & social and construction sectors. From a productivity standpoint, allocating more resources to higher productivity sectors (or fewer to lower productivity sectors) is desirable, but this may not necessarily be responding to evolving needs. As argued by Erken (2024), allocating more resources to health and education may be socially desirable (especially given population aging), even if these sectors have lower productivity levels.

6. Comparing the within sector productivity growth with peers suggests that the Netherlands has room to achieve higher productivity growth. Given the difficulties of assessing the reallocation contribution, Figure 2 (lower right) focuses the within sector productivity contributions in the Netherlands and 6 peer countries.[3] Compared with peers, the Netherlands performed better than the median in 6 out of 15 sectors but lower than the top-runner in all sectors but one (i.e., professional, scientific and technical activities). Compared with the top performer, the relatively larger gap is observed in 1) public, education, and social (PES), 2) finance, 3) real estate, 4) trade, and 5) manufacturing. As the non-commercial sector (public, education, and real estate) faces productivity measurement issues because value added cannot be measured directly (De Vries and van Leeuwen, 2024), it does not efficiently contribute to overall growth despite some resource allocation. Comparing with the sector-wise productivity levels with the euro area, more effort for productivity improvement could be focused on information & communication as well as other services (DNB, 2025). Simply achieving the top-performer level of within-sector contributions could have raised Dutch productivity growth by 1.7 ppt (excluding mining), which implies that the Netherland still have potential to achieve higher productivity growth.

7. In addition to sectoral drivers, monitoring regional productivity developments is essential to promote regional balance. While the focus of this paper is at the country level, there are important regional productivity differences. Over the past eight years, labor productivity dispersion among provinces has increased moderately (Figure 3). While the productivity level of the top runner (Noord-Holland) is increasing, some provinces (e.g., Drenthe and Zuid-Holland) have

Figure 3. Labor Productivity Dispersion Among Provinces
(12 provinces, GDP per hour worked, 2015=1)



Sources: CBS and IMF staff estimations.

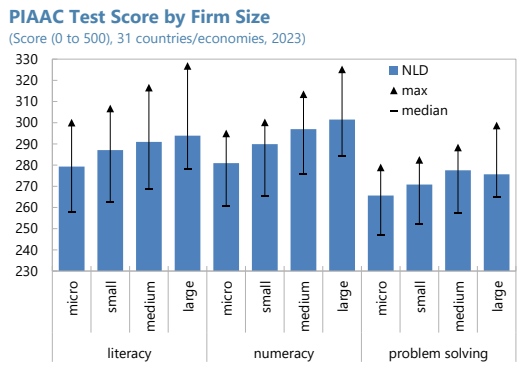
[3] The peer countries are Austria, Belgium, Germany, Finland, France, and Sweden, and these countries are selected based on the productivity level (see Figure 1, upper right).

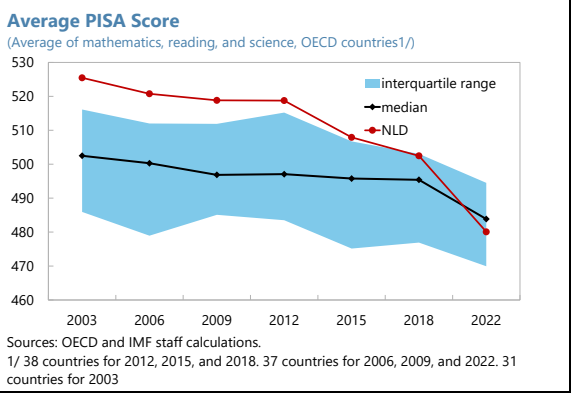
experienced negative productivity growth.[4] Although the current dispersion may not be necessarily elevated compared with other countries, there is a high risk of further widening in the future (PWC, 2025).[5] Closely monitoring the drivers and bottlenecks of regional productivity growth and leveraging regional innovation systems and other supporting measures can help promote regional growth and equity (OECD, 2020).

C. Employment Level Perspective

8. Dutch workers have relatively higher skill levels compared with OECD countries, although declining educational outcomes raise concerns. According to PIAAC (Program for the International Assessment of Adult Competencies), which surveys individuals aged 16–65 on key information processing skills, Dutch workers scored higher marks than those in other OECD countries (Figure 4, left).[6] The Netherlands ranked between second (numeracy in medium firms) and ninth (problem solving in large firms) and fourth based on average scores among the 31 countries and economies. The skill level of workers tends to be lower in smaller firms across all three categories, although this is a global trend. Furthermore, according to Eurostat, the share of workers with above-basic digital skills in the Netherlands is among the highest across all employment categories in 27 European countries. However, according to the Program for International Student Assessment (PISA), which measures students' (aged 15) ability to use their reading, mathematics, and science knowledge and skills, the score for the Netherlands has shown a declining trend (Figure 4, right). Based on the average PISA scores, the Netherlands ranked fifth in 2006 and 22nd in 2022. In 2022, 72 percent of Dutch students were in schools where principals reported instructional issues due to staff shortages and 46 percent were in schools with inadequately qualified staff; these ratios were 36 and 24 percent in 2018 (OECD, 2023b). This raises concerns about the skill levels of Dutch workers in the future, when the current younger generation starts to enter the labor market.

Figure 4. Skill Level





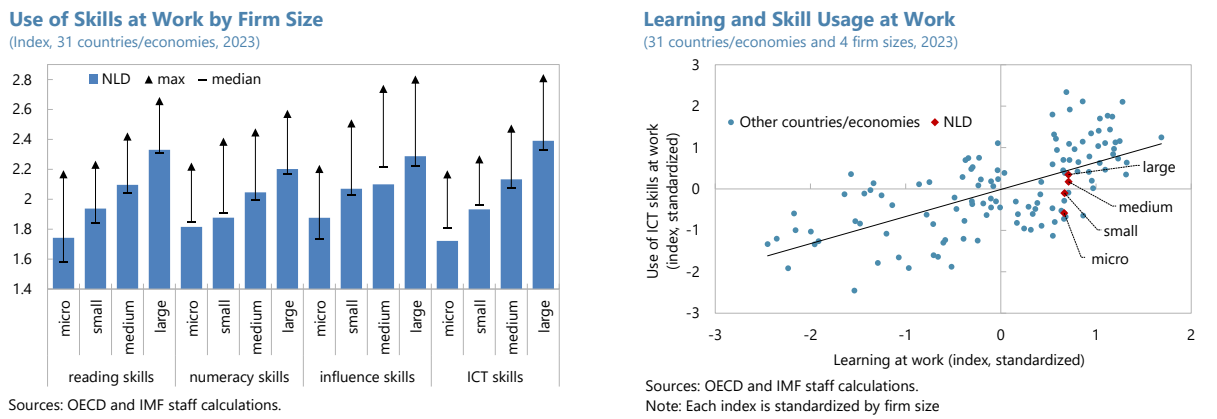
[4] Although the productivity level for Groningen province is not the lowest, it declined by 23 percent from 2015 to 2023 due to gas field closure. Using data with granular regional classification from 1995 to 2021, Raspe and Sande (2024) found that the group of lagging regions is considerably larger than the group of regions that have caught up.

[5] According to the data from OECD (2023a), labor productivity dispersion (ratio of max to min) among TL3 regions in the Netherlands is 1.6, while the median for 23 OECD countries is 1.8.

[6] 31 OECD and its partner countries/economies. PIAAC data includes 27 OECD countries, 2 sub-national entities (Flemish region for Belgium and England for the UK), and 2 partner countries (Croatia and Singapore).

9. Dutch workers may not fully utilize their skills at work, in particular in small firms, which might call for improved vocational training and capital deepening. Although the skill level of Dutch workers is relatively high, their indexes of use of skills at work (from PIAAC) stood around the median of OECD countries (Figure 5, left). Among the selected four indicators, the Netherlands ranked between 10th (reading in micro firms) and 22nd (numeracy in micro firms), with an average ranking of 15th place out of 31 countries and economies. Relative to other countries, numeric and ICT skills usage was particularly lower for Dutch workers in micro and small firms. Based on the data across countries and firm sizes, higher learning opportunities correlate with higher ICT skill usage, but the skill usage in the Netherlands tends to be lower than what the learning opportunities imply, especially for workers in smaller firms (Figure 5, right).[7] According to the EU-LFS, the participation rate of adult learning in the Netherlands is among the highest in EU countries, although CBS data indicate that workers in smaller firms are significantly less likely to participate in training and education. These findings suggest the importance of improving the quality of vocational training as well as supporting access to training in smaller companies. As discussed in the next section, deepening capital stocks (e.g., ICT equipment and software) to support operations could also help utilize workers' skills.

Figure 5. Use of Skills at Work



Note: The index of use of reading skills at work ranges from -3 to 7, the index of use of numeracy skills at work ranges from 1 to 6, the index of use of influencing skills at work ranges from 1 to 5, and the index of use of ICT skills at work ranges from 1 to 5.

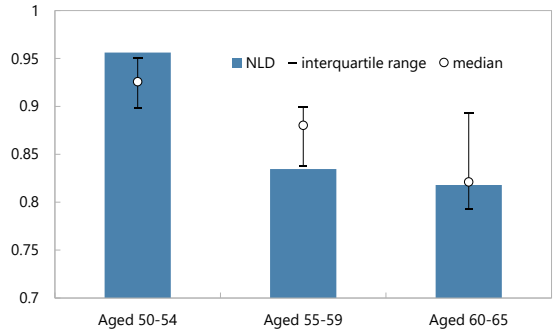
10. Given population aging, older workers should be encouraged to keep their skill levels and usage high. Empirical analysis for European countries suggests that workforce aging will reduce labor productivity growth (Aiyar et al., 2016). While it is a global trend that older workers use ICT skills less compared to young and middle-aged workers, the magnitude of this decline is higher for Dutch older workers than in countries, especially those aged 55–65 (Figure 6). This suggests the importance of supporting lifelong learning, which would help support longer working lives by increasing potential and improving mobility and employability (OECD, 2018), as well as adapting technological innovation to favor both young and older workers.

[7] Index of learning at work is constructed based on the workers' opportunities of 1) learning new things, 2) learning by doing, and 3) keeping up to date at work.

11. Labor market duality may be dragging down productivity growth. The share of freelance self-employed (SE) increased over the last two decades in the Netherlands, resulting in a higher SE share and increased fragmentation of the labor market (IMF, 2024a). A regression analysis among provinces shows that labor productivity and the SE share have a statistically significant negative relationship (Figure 7).[8] Bondt (2018) also argued that a rise in SE was one of the reasons for lower productivity growth in the Netherlands between 2008 and 2018. One possible reason for the lower productivity of SE is the lack of sufficient opportunities for skill development, whereas employees often receive company-specific training to enhance their productivity (Bovenberg and Groot, 2022). These findings underscore the importance of tackling labor market duality. In this respect, recent progress, such as reducing false SE, are welcome. Introducing mandatory disability insurance and strengthening pension arrangements for SE are other areas where attention is needed.

Figure 6. Use of ICT Skills at Work for Older Workers

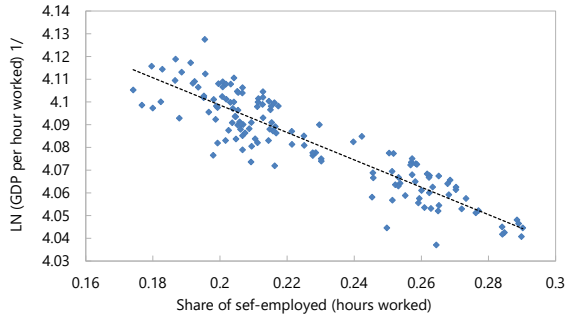
(Relative to workers aged 25-49, 31 economies/countries)



Sources: OECD and IMF staff calculations.

Figure 7. Labor Productivity and Self-employed in Provinces

(2010-2022, 11 provinces)

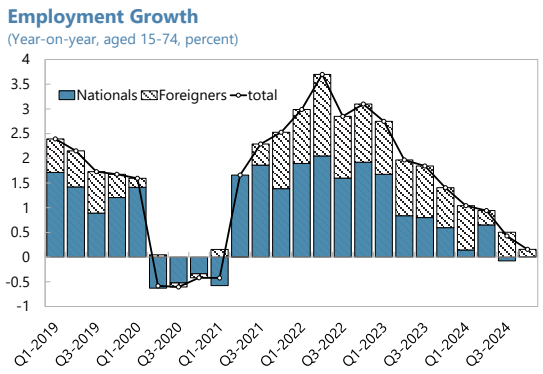


Sources: CBS and IMF staff estimation.
1/ Controlled for years, provinces, and 8 sectoral shares.

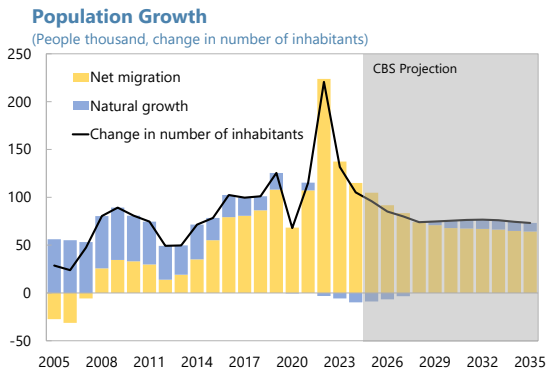
12. Effectively integrating migrants into the labor market offers an important avenue for enhancing labor productivity. Given population aging, recent employment growth has been supported by the increase in foreign workers (Figure 8 upper left). Over the medium-term, the population is projected to grow due to net migration with negative or near zero contributions from natural growth (Figure 8, upper right). Amid the tight labor market, migrant workers could help alleviate labor shortages, but successful integration is key to productivity growth. Simulation analysis by Caselli et al. (2024) suggests that GDP per capita drops if a TFP gap between natives and immigrants persists, but not if that gap gradually closes over time. However, based on PIAAC scores, there seems to be a higher skills gap between natives and foreign born in the Netherlands compared with OECD countries (Figure 8, lower left). Based on the Migrant Integration Policy Index, the Netherlands stands somewhere between the median and 75th percentile among EU27 countries, except for indexes of family reunification and permanent residence, where the Netherlands is below the median (Figure 8, lower right). Overall, this suggests room for better integration policies for the Netherlands. Although the skill levels for future migrants are unknown, efforts to integrate migrants in the most productivity-enhancing ways possible are essential to prevent persistent gaps between natives and migrants.

[8] The regression covers 2010–2022 and 11 provinces (Groningen is excluded due to irregular impacts from gas field closure). Independent variables are self-employed share (hours worked), 8 sectoral shares in each province, year dummies, and province dummies. The coefficient of self-employed is statistically significant at the 5 percent level.

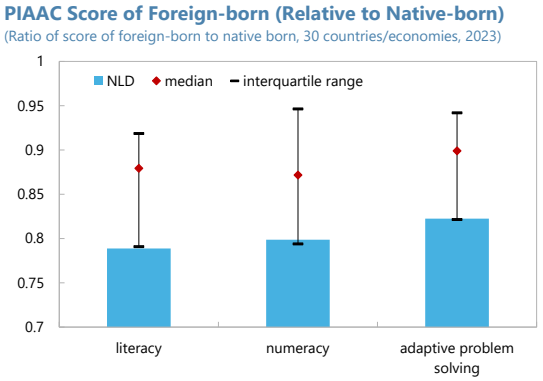
Figure 8. Migrants



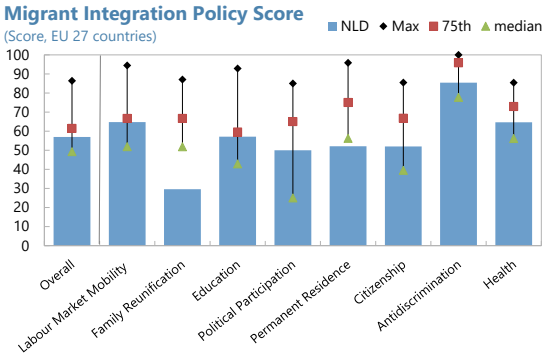
Sources: Haver Analytics, CBS, and IMF staff estimation.



Sources: CBS; and IMF staff calculations.



Sources: OECD and IMF staff calculations.



Sources: Migrant Integration Policy Index and IMF staff calculations.
Note: 2023 for NLD. 2024 for DEU and FIN. 2019 for other counties.

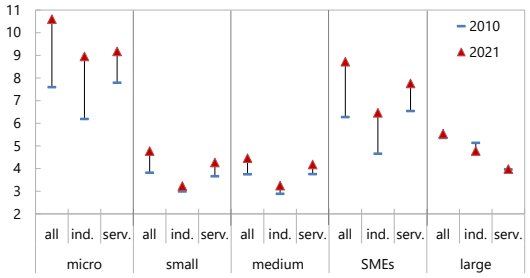
D. Firm Level Perspective

13. Labor productivity dispersion among SMEs has increased as frontier firms have become more productive, implying some degree of resource misallocation. The labor productivity dispersion among firms (ratio of 90th percentile to 10th percentile) increased among SMEs from 2010 to 2021, but remained unchanged for large firms (Figure 9, left). The magnitude of the increased dispersion was particularly high for micro firms (in both industry and services), while increases were also observed in small and medium firms. In addition, the difference in productivity levels was substantial in micro firms, as frontier firms were almost 11 times as productive as laggard firms in 2021. The productivity difference was also significant among large industry firms, while it was relatively muted in small and medium firms. The productivity growth at different percentiles shows a positive correlation between growth rates and labor productivity levels in SMEs (Figure 9, right). Productivity growth is even negative for small and micro firms at the 10th and 20th percentiles. The widening dispersion generally implies less efficient resource allocation, unless aggregate productivity can be raised by reallocating resources to more productive firms.[9]

[9] By estimating marginal revenue product of capital and labor, Bun and de Winter (2019) found rising capital misallocation and stable labor misallocation in 2001–2017, which lowered productivity growth by around 14 ppt.

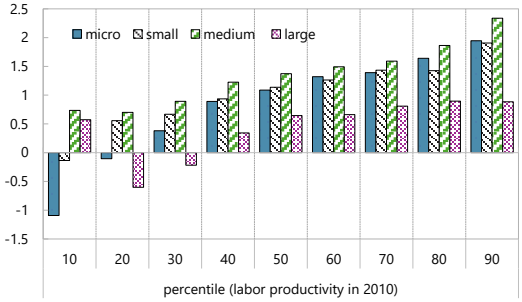
Figure 9. Labor Productivity Dispersion Among Firms

Firm-level Labor Productivity Dispersion (p90/p10)
(Ratio, 90 percentile of the productivity distribution divided by 10 percentile)



Sources: CBS-analyses Staat van het MKB 2024 and IMF staff calculations.
Note: Total (all) covers non-financial business economy (B to J, M, N and S95 of NIC 2008). Industry (ind.) excludes B and service (serv.) excludes S95.

Compound Annual Growth Rate of Labor Productivity
(Percent, changes from 2010 to 2021 by percentile)



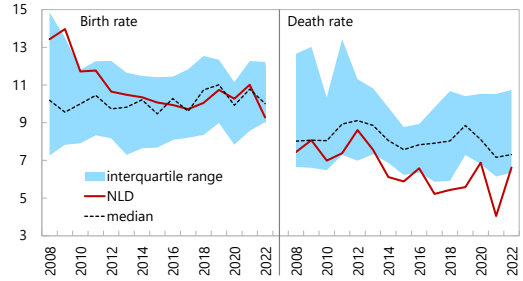
Sources: CBS-analyses Staat van het MKB 2024, Eurostat, and IMF staff calculations.
Note: Deflated by industry level deflator from National Accounts.

Note: Labor productivity is defined by value added per employed persons (full-time equivalent or FTE). Companies with less than 1 FTE on an annual basis and with more than 2 partners are excluded.

14. Business churn, an important factor for productivity growth, is relatively low in the Netherlands, highlighting the need to promote firm dynamism. Encouraging firm dynamism could help improve efficient resource reallocation. According to the analysis by Freeman et al. (2021), firm churn (firm births and deaths) is an important source of productivity growth, particularly in services. However, relative to the EU median, firm dynamics in the Netherlands declined until around 2014 (Figure 10, left). Since then, the birth rate has been around the EU median, while the death rate is at or below the lower edge of the interquartile range.[10] Aggregated sectoral firm productivity growth can be decomposed into the contributions of continuing, new, and closing firms. By excluding continuing firms, Figure 10 (right) focuses on the contributions from business dynamics (new and closing firms), and their contributions show a declining trend. Recent policy measures aimed at supporting firms during and after the pandemic could have disrupted creative destruction. From the cross country analysis, business dynamism has a positive correlation with lower regulatory burdens, efficient insolvency resolution, better access to finance, greater support for innovation, and higher education levels (Calvino et al., 2020). The completion of the European single market could also foster business dynamics (DNB, 2025).

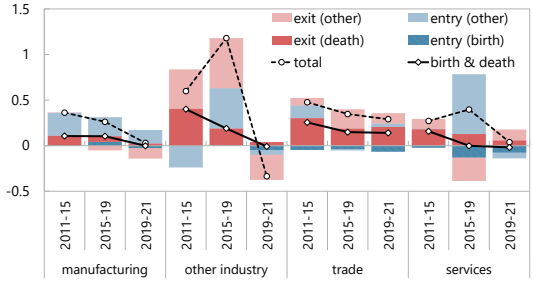
Figure 10. Business Dynamics

Firm Birth and Death Rate
(Percent, economic activities of market producers, EU countries)



Sources: Eurostat and IMF staff calculations.
Note: A break between 2020 and 2021. 19-25 EU countries before 2020 and 27 countries after 2021. Enterprise births/deaths divided by active enterprises.

Contributions of Firm Dynamics to Productivity Growth
(Percentage point, contributions to annual labor productivity growth)

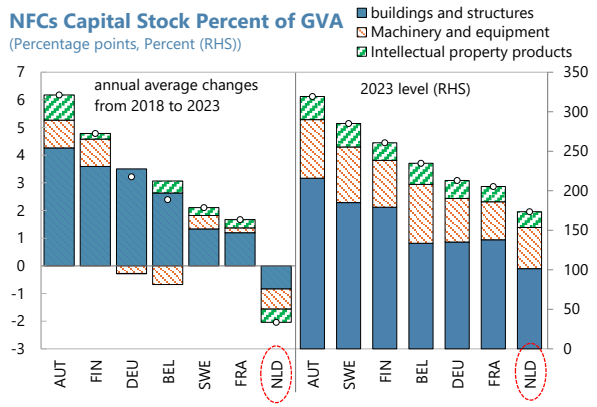


Source: CPB (2025) National Productivity Board 2024 annual report.
Note: NACE codes mfg.: 10-33, other ind.: 35-43, trade: 45-47, services: 49-82+95 entry/exit (other) includes M&A, restructuring, and split-offs.

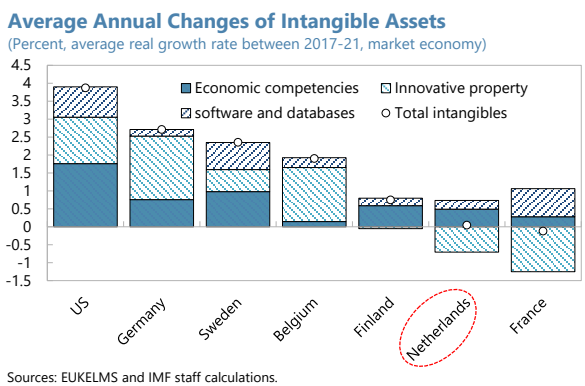
[10] By sector, birth rates are within the interquartile range in most sectors, whereas death rates are below the interquartile range, especially in services (based on the average of 2021 and 2022).

15. Low business investment and capital stock could be bottlenecks for improving labor productivity growth. Despite the critical roles of capital deepening and investment in improving productivity, the Netherlands is lagging behind its peers. National Accounts (NA) data indicate that capital stock for Non-Financial Corporations (NFCs) (as a percent of NFC gross value added) declined from 2018 to 2023 (Figure 11, upper left). The level of capital stock is the lowest among peer countries, although the relatively high gross value added share of firms in the service sector could partially explain this. Estimates from EU KLEMS, which includes intangibles not covered by NA, show a similar picture, as the real growth rate of intangible assets between 2017–21 was almost zero for the Netherlands, while that of other countries grew (Figure 11, upper right).[11] The level of NFC investment (as a percent of NFCs' gross value added) is the second lowest among EU countries, and their investment mainly focuses on replacement rather than capacity expansion or new products/services (Figure 11, lower left and right).

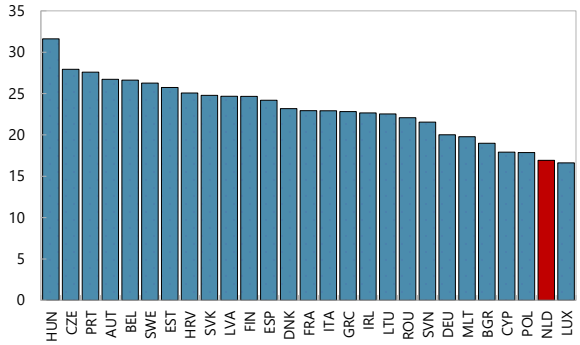
Figure 11. Capital Stock and Investment



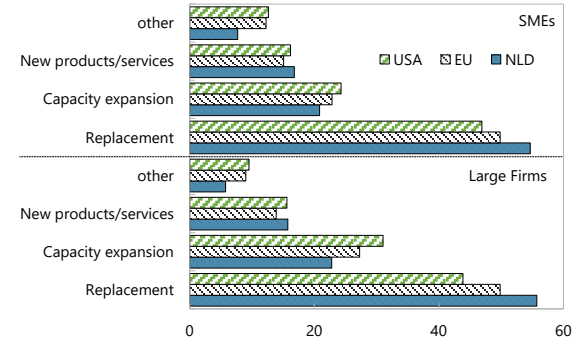
Sources: Eurostat and IMF staff calculations.



Sources: EUKELMS and IMF staff calculations.
Note: Economic competencies include brand, organizational capital, and training. Innovative property include R&D, entertain. & artistic originals, new financial product, and design.



Sources: Eurostat and IMF staff calculations.



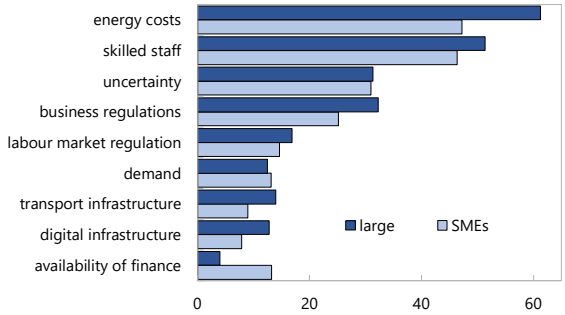
Sources: European Investment Bank and IMF staff calculations.

[11] Intangible assets estimated by EU KLEMS include new financial products, design, organizational capital, brand, and employer provided training.

16. Removing bottlenecks to investment will be critical for promoting productivity-enhancing investment. Figure 11 suggests the need for capital deepening and the need to examine barriers to investment for firms (Figure 12). First, concerns about energy costs could be mitigated by enhancing the electricity grid, as there is a long queue for large scale electricity connections. Second, measures to address labor market shortages (e.g., promoting training and labor mobility toward priority sectors) would help companies to find qualified workers.[12] Third, reducing domestic policy uncertainty and streamlining regulation will be critical to promote an investment friendly business climate. According to a survey targeting the Dutch business community, predictability and stability of government policies and facilitative legislation receive the lowest ratings for the business environment (De Jong et al., 2024).

Figure 12. Long-term Barriers to Investment

(Percent of firms 1/, 2024)



Source: European Investment Bank and IMF staff estimates.
1/ Calculated as 0.5 * (share of firms responding as minor obstacle) + 1 * (share of firms responding as major obstacle)

17. Domestic capital market reforms should improve financial access for SMEs. Availability of funding is critical for firm investment and thus productivity growth. However, SMEs—especially start-ups, innovative companies, and fast-growing firms—have difficulties accessing finance (CBS, 2025), as can also be observed from Figure 12. While Dutch firms have traditionally relied on bank funding, bank loans may not be optimal for certain SMEs due to their initially unprofitable business and inadequate collateral. Therefore, the importance of non-bank financing is increasing.[13] To secure sufficient funds for SMEs, capital market reforms, such as improving valuations, stimulating investor demand for both equity and debt instruments, and simplifying debt issuances, would be beneficial (see Box 2 of IMF (2025) for more details).

18. The importance of investing in intangible capital to enhance productivity has been growing. According to estimates by EU KLEMS, intangible investment (e.g., R&D, software, and human and organizational capital) was about 1.2 times higher than tangible investment (excluding residential structures) in the Netherlands in 2021. Analysis using Dutch firm data confirmed the positive and statistically significant impacts of intangibles on productivity growth, especially for laggard enterprises (Borowiecki et al. 2021). A regression analysis indicates that the elasticity of labor productivity with respect to intangible assets tends to be higher for micro and small firms, suggesting the importance of promoting intangible investment for small businesses (Figure13, left).[14]

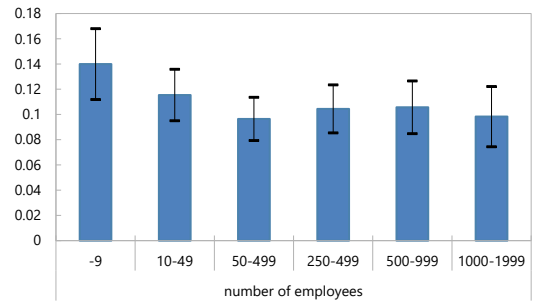
[12] See IMF (2024a) for more detailed measures to address labor market shortages.

[13] According to SMF (2025), the total non-banking financing targeting SMEs increased by 16.4 percent in 2024.

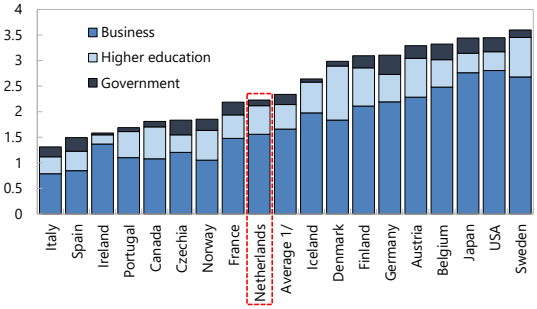
[14] Estimates based on Orbis data (non-financial firms less than 2000 employees). Labor productivity is measured by value added per employee. For some firms, value added data are imputed based on year, sector, and firm size. Both labor productivity and intangible assets (per employee) are deflated. The regression controls for firm size (number of employees), NACE (4-digit level), and year. The estimation period is from 2016 to 2022, and the sample size is 10,810.

19. The Netherlands needs more R&D investment to increase productivity, especially among smaller firms. Figure 13 (right) illustrates R&D expenditure by sector of performance as a percentage of GDP. Both total and business sector R&D expenditures in the Netherlands are slightly lower than the OECD average, suggesting room to increase investment, including fostering growth in the R&D-intensive sector. In addition, R&D activities are concentrated in large firms, as about 70 percent of R&D expenditure (in-house activities) came from large firms in 2022. Although the impact of R&D funding is often greater when supporting small businesses, the existing scheme (e.g., the Research and Development Promotion Act (WBSO)) supports small businesses only to a limited extent (De Ridder, 2024).

Figure 13. Intangibles



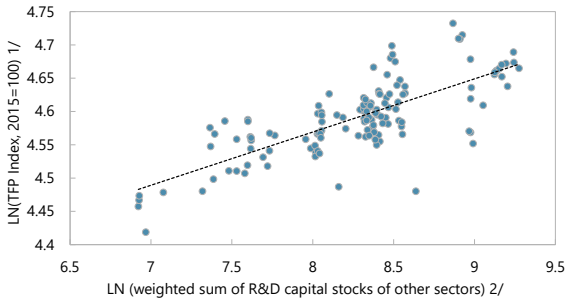
Sources: Orbis and IMF staff estimation.
Note: Controlled firm size (number of employees), NACE (4 digit), and year.



Sources: OECD and IMF staff calculations.
1/ Simple average of 30 OECD countries (including those not shown in the chart).

20. Promoting knowledge diffusion or spillover both domestically and internationally will benefit productivity growth. A simple regression analysis among sectors shows a positive and statistically significant correlation between TFP and other sectors' R&D stock, even after controlling for their own innovative property, suggesting the important role of spillovers (Figure 14).[15] The impacts of knowledge spillovers on firm productivity can be further enhanced if the innovation is more fundamental due to the ease of replication (Dyevre, 2024).

Figure 14. R&D Spillovers and Productivity
(12 sectors, 2010-2020)



Sources: EU KLEMS, Eurostat, and IMF staff estimation.
1/ Controlled own innovative property capital stock, year, and sector.
2/ Weighted by intermediate consumption of each sector.

Other empirical studies have also found the importance of spillovers. Exporters tend to have higher productivity, partly due to interactions and collaborations with foreign partners (learning effects), and domestic firms connected to the export sector receive productivity benefits (Bettendorf and Polder, 2025). Analysis by Wache et al. (2025) suggests a higher effectiveness of horizontal FDI on

[15] The regression covers 2010-2020 and 12 sectors (excluding NACE codes A, B, and N, due to lack of data or irregular movement). Independent variables are TFP (2015=100), sector's own innovative property capital stock, other sectors' R&D stock (weighted by intermediate consumption from the use table), sectoral and year dummies. Capital stock data are chained linked volumes. The coefficient of R&D is statistically significant at the 10 percent level.

productivity (compared to vertical FDI) due to stronger linkages with domestic activities, which facilitate knowledge sharing. The case of Brainport-Eindhoven is a good example with respect to spillovers (see Box 1). These findings underscore the importance of the government's role in promoting investments with high spillovers (e.g., fundamental research), facilitating closer connections among firms, supporting completion of the EU single market, and reducing trade barriers.[16]

Box 1. Case Study of Brainport-Eindhoven[1]

Brainport-Eindhoven is a renowned deeptech ecosystem located in the southern Netherlands. Its region (Noord-Brabant) accounted for over 30 percent of private R&D expenditure in the Netherlands and ranks eighth in business R&D intensity among the 198 NUTS II regions in the EU (CBS, 2022).

The region's transformation into a technological hub is rooted in its historical association with Philips, which grew into a multinational corporation over the course of a century. After World War II, Philips urged the government to establish an engineering institute, leading to the creation of Eindhoven University of Technology. Philips divested its lithographic technology in the 1980s, resulting in the founding of ASML, and its electronic division at the beginning of the 21st century, leading to the formation of several new deeptech companies (e.g., NXP Semiconductors). The establishment of other research institutes in the region further strengthened the knowledge infrastructure. This historical development created fertile conditions for collaboration around innovation and entrepreneurship in the region.

The uniqueness of Brainport-Eindhoven is characterized by collaborative governance designed to foster cooperation among local government, educational institutions, and industries as equal partners (known as the "triple helix model"). The Brainport Foundation, established in 2006, plays a crucial role in coordinating efforts among various stakeholders, ensuring that initiatives align with the region's strategic goals. This collaborative framework is essential for maintaining the region's status as a leading center for deeptech entrepreneurship. The physical infrastructure of Brainport-Eindhoven significantly contributes to its innovative capabilities. The region has multiple physical locations or hotspots (e.g., High Tech Campus Eindhoven). People visit these places for social and business activities, facilitating informal interactions and exchange of ideas among companies and institutions. These locations also offer daily rentals for cleanrooms and testing instruments, making the campus an attractive location for startups. Furthermore, hosting many knowledge brokers on the campus, who seek to develop new value chains, contributes to innovation.

Although it may be difficult to replicate the ecosystem of Brainport-Eindhoven due to its uniqueness and location-based factors, collaboration among stakeholders as equal partners could be an important element for enhancing regional labor productivity.

1/ The box is summarized based on Romme (2022a and 2022b) and Stam et al. (2016).

E. Conclusion and Policy Considerations

21. The analysis highlights the Netherlands' potential to enhance productivity by addressing bottlenecks affecting workers and firms. Despite having one of the highest productivity levels globally, the Netherlands faces challenges in enhancing its productivity growth

[16] Despite efforts toward the single market, barriers remain. Average intra-EU trade costs are estimated to be as high as a tariff equivalent of about 44 percent for goods and about 110 percent for services (IMF, 2024b).

rate. Skill levels of Dutch workers are generally high, but they might not fully utilize their potential at work (especially in SMEs) and declining skill levels of young students raise concerns. Self-employed workers show lower productivity. With population aging, it is crucial to maintain high skills across generations and integrate migrants effectively into the labor market. Additionally, with signs of resource misallocation, higher business dynamics and capital deepening will be important for firms, given low churn and investment levels. In this respect, addressing factors impeding investment (e.g., electricity grid, labor shortage, and policy uncertainty) will be critical. Promoting productivity spillovers both domestically and internationally, as well as encouraging SMEs to engage in more R&D activities, will also benefit productivity growth.

22. The analysis offers a number of angles to enhance the productivity growth.

- *Improve education outcomes to enhance skill levels of future workers*: It is important to continue investing in education and improve outcomes by fostering early childhood education, boosting secondary educational attainment, and addressing shortages of teaching staff. Aligning education with (future) labor market needs or priorities, along with improved career guidance and counseling, would help mitigate labor shortages and reduce skill mismatch.

- *Enhance vocational trainings and lifelong learning programs to fully utilize workers' potential*: Facilitating close collaboration between training institutions and business representatives will help ensure that training programs are aligned with current and future market demands. Adjusting active labor market policies by reorienting trainings towards skills needed to address shortages and incorporating new technologies would be beneficial. Promoting e-learning resources and providing financial assistance, especially to those from disadvantaged backgrounds and workers in smaller firms, would enhance accessibility to a diverse range of learners. Beyond financial support, promoting awareness and local initiatives could foster continuous education in SMEs.[17]

- *Continue to reduce labor market duality*: To establish a more level playing field between employees and self-employed, the authorities have introduced and accelerated a phase-out of the self-employed person's tax. Recent progress to address labor market duality, such as reducing false self-employment, are welcome. Introducing mandatory disability insurance and strengthening pension arrangements for the self-employed are important measures to be implemented to enhance social protection.

[17] Ludolph et al. (2023) reported innovative local initiatives in Finland and Germany (see box 5.11 and 5.12). In Vantaa, Finland, the city administration proactively approaches SMEs and identifies modular training courses for them. In Germany, the government launched "continuous education and training employers' networks", aiming to develop joint training measures that can be carried out across company boundaries in a resource saving manner.

- *Effectively integrate migrants into the labor market*: Providing stepped-up language training together with vocational training, supporting job search, and recognition of qualifications acquired abroad would help.[18]

- *Promote business dynamism to enhance resource allocation:* Strategies include deepening single EU market, re-examining the efficiency of regulatory barriers to entry and insolvency regime,[19] removing hurdles to scaling up businesses (e.g., eliminating the reduced profit tax rate for SMEs), and facilitating labor mobility toward priority sectors.

- *Encourage productivity-enhancing investment for capital deepening:* The government needs to address factors affecting firms' investment decisions, such as the electricity grid, labor shortages, nitrogen constraints, and domestic policy predictability. Policies should also aim to encourage investment in new technologies (e.g., digitalization), implement tax reforms incentivizing productive investment, enhance access to finance for SMEs through domestic capital market reform, and promote R&D activities, especially for smaller businesses.

- *Promote productivity spillovers*: The government should aim to foster productivity spillovers by implementing and promoting investments with large spillover effects (e.g., research parks and networks) to build connections among firms, research institutions, and regions. The Netherlands will reap productivity gains from enhancing the functioning of the EU single market.[20]

[18] Based on the labor market mobility of Migrant Integration Policy Index, the score for the Netherlands in 2023 is particularly low for 1) education and vocational training and study grants and 2) economic integration measures of third-country nationals.

[19] According to the OECD insolvency indicator in 2022 (André and Demmou, 2022), the Netherlands ranked 6th among the most unfavorable insolvency frameworks out of 24 EU countries, with a relatively unfavorable score for prevention and streamlining (i.e., enabling the early detection and resolution of debt).

[20] See Budina et al. (2025) for the discussion on the synergies between domestic and EU-level reforms.

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