

Productivity Dynamics and Long-Run Growth

Principality of Liechtenstein

Tara Iyer and Andinet Woldemichael

SIP/2026/033

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 March 5, 2026. This paper is also published separately as IMF Country Report No 26/68.

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Productivity Dynamics and Long-Run Growth, Principality of Liechtenstein
Prepared by Tara Iyer and Andinet Woldemichael

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ABSTRACT: This Selected Issues Paper analyzes productivity and long-run growth in Liechtenstein. Despite among the highest labor productivity levels in Europe, growth has been weak over an extended period, leading to declining relative performance. Sectoral differences persist between high-productivity manufacturing and lower-productivity services. Long-run growth is constrained by demographic pressures, skills shortages, reliance on cross-border commuters, and infrastructure bottlenecks, despite strong private innovation. The paper concludes that sustaining high living standards will require targeted structural reforms, including upgrading human capital, expanding labor supply, strengthening public-private innovation partnerships, and improving physical and digital infrastructure.

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SELECTED ISSUES PAPERS

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PRINCIPALITY OF LIECHTENSTEIN

SELECTED ISSUES

March 5, 2026

Approved By
European Department

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PRODUCTIVITY DYNAMICS AND LONG-RUN GROWTH

This Selected Issues Paper examines the drivers of productivity and long-run growth in Liechtenstein. Although productivity levels remain among the highest in Europe, growth has slowed amid factors including demographic pressures and skills shortages. Further, relative productivity has been declining over the past two decades, presenting potential long-term competitiveness issues. The analysis points to the need for continued structural reforms including labor supply expansion, human capital upgrading, innovation support, and infrastructure reforms.

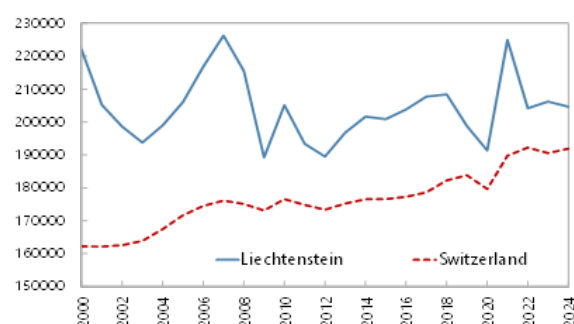
A. Introduction

1. Labor productivity in Liechtenstein is among the highest in Europe, but productivity growth has been weak for an extended period. High labor productivity reflects an export-oriented, highly specialized manufacturing and financial sectors, and a growth model that relies heavily on skilled cross-border commuters. In level terms, productivity—measured by real GDP per full-time equivalent (including cross-border commuters)¹—remains comparable to Switzerland and above most European peers. However, productivity growth has been limited for more than two decades, and relative productivity has declined compared with peer economies, including Switzerland and the United States (Figure 1). GDP per worker has remained broadly flat over this period, and these patterns are observed across business cycles, suggesting a prolonged structural slowdown rather than cyclical weakness.

Figure 1. Aggregate Productivity Trends in Liechtenstein

Productivity in Liechtenstein is high though growth has been limited—narrowing the gap with Switzerland...

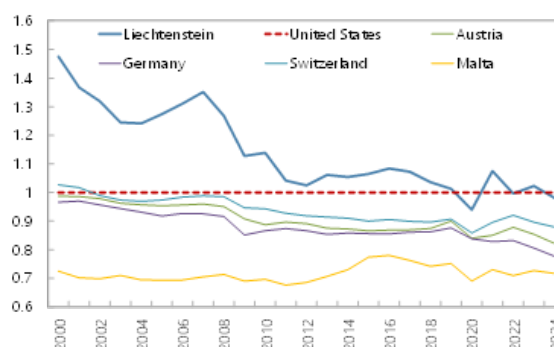
Productivity in Liechtenstein and Switzerland
(Real GDP per FTE, CHF)



Source: Liechtenstein Authority

...while relative productivity vis a vis the U.S. has declined more sharply than comparator economies.

Productivity Relative to the U.S.
(GDP per worker, PPP International Dollar)



Source: World Economic Outlook

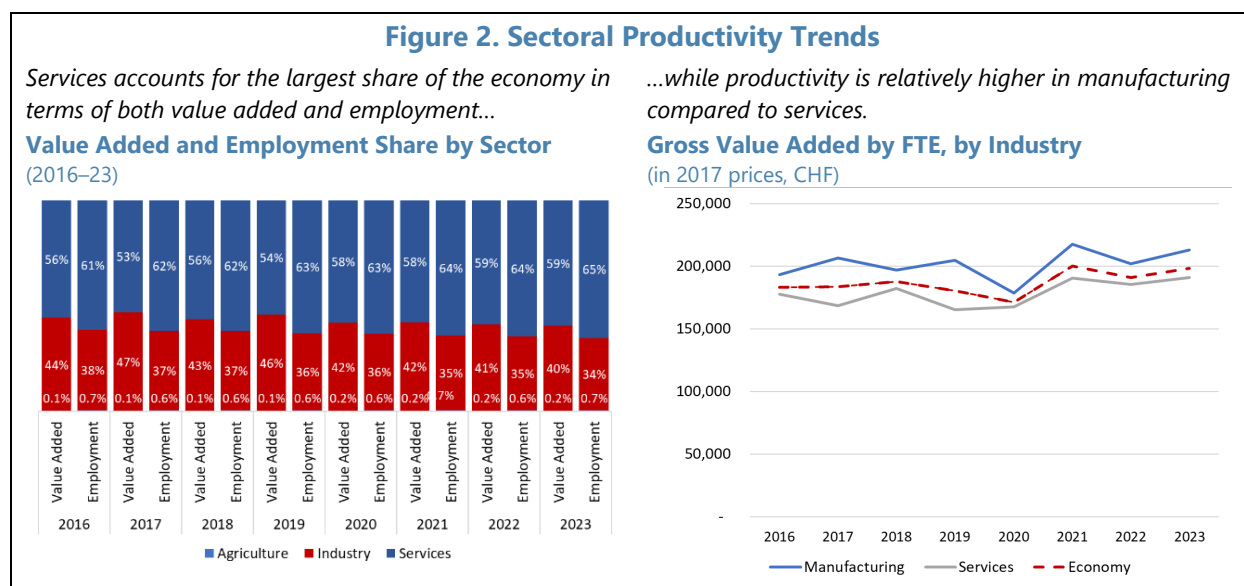
¹ Domestic employment covers Liechtenstein residents working in Liechtenstein and inward commuters from abroad working in Liechtenstein (Liechtenstein residents working abroad are not included). An alternate measure, GNI per capita, would allow for a cross-country comparison at the firm level.

2. Long-run growth depends on productivity, labor input, and capital accumulation.

Liechtenstein's economy combines an important, highly export-oriented manufacturing sector with a large financial sector relative to GDP. However, limited land availability and natural resource endowments and a small resident population, constrain the scope for expanding factor inputs. Performance has relied on maintaining high productivity levels, high private R&D investments (6 percent of GDP), supplementing domestic labor with cross-border workers, and sustaining capital accumulation through private investment at home and abroad. This Selected Issues Paper (SIP) examines how each of these channels has evolved over time, structuring the analysis around productivity outcomes, labor input dynamics, and capital accumulation.

B. Sectoral Analysis of Productivity

3. Economy-wide productivity dynamics are shaped by differences in productivity performance across sectors. Services—including financial services—account for a major share of Liechtenstein's economy—58 percent of gross value added and 64 percent of total employment. The manufacturing sector consists of small and medium enterprises (SMEs) which account for 95 percent of registered firms as well as a small number of larger multinational enterprises (MNEs).² Productivity levels in manufacturing remain high but have shown limited gains over the past decade (Figure 2). Productivity growth in services has been lower, consistent with the sector's lower capital intensity and smaller average firm size.³ The resulting productivity gap between manufacturing and services would constrain aggregate productivity growth especially when labor reallocation across sectors is limited.



² Based on data from Office of Statistics, SMEs employ 1–49 workers. While manufacturing SMEs account for 95 percent of registered firms, they account for 25 percent of domestic employment in 2023.

³ Financial sector accounts for 17 percent of services value added.

C. Drivers of Long-Run Growth

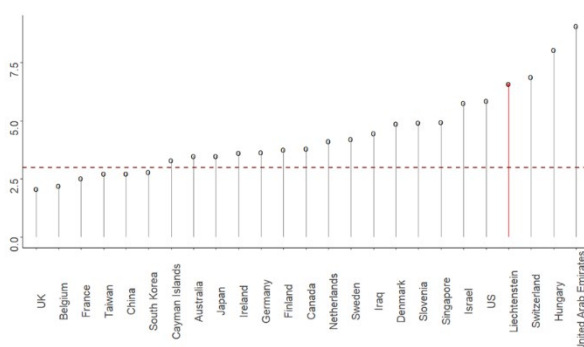
4. Innovation activity supports high productivity but is concentrated. The industrial sector is characterized by small and medium enterprises (SMEs) as well as a small number of larger multinational enterprises (MNEs) that employ up to 70,000 workers worldwide—more than double the resident population. R&D investment is concentrated in manufacturing and increased from 6.6 percent of sales in 2013 to 8.5 percent of sales in 2023. About 47 percent of R&D spending is devoted to product development and basic research; a quarter of employees are engaged in R&D (see Figure 3). The share of public sector R&D spending in Liechtenstein is low—at around 2 percent of total R&D spending in 2023—primarily on personnel in educational and research institutes. During 2013–23, productivity and innovation indicators relative to the United States declined, in line with broader European trends.

5. Registered intellectual property, a key metric of innovation, offers insight into competitive and productivity advantages that support sustained growth. There is a strong correlation between the volume of registered IPs and elevated productivity levels, as measured by GDP per worker. In 2022, Liechtenstein was among countries with the highest number of registered intellectual properties on a per capita basis, including designs, technologies, and trademarks.⁴ The average individual in Liechtenstein holds three IPs; the typical Swiss resident holds fewer than one. Recent decades have seen a relative decline in registered IPs per capita, corresponding with reduced productivity (refer to Figure 4). This trend may be linked to structural challenges such as demographic shifts, domestic skill gaps, and the pace of digitization and AI adoption.

Figure 3. Private Sector R&D Investment and Productivity

Liechtenstein enterprises are among the highest R&D investors in the world

R&D Spending: Share of Net Sales

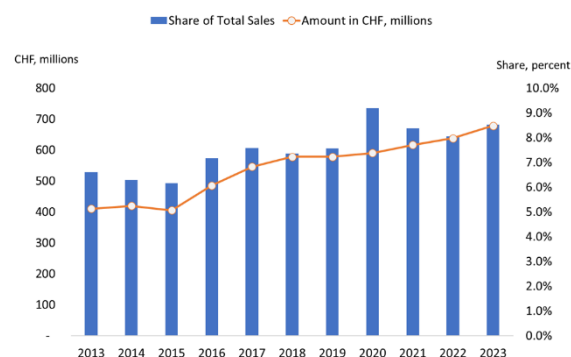


Source: EU Industrial R&D Investment Scoreboard.

Note: Dotted horizontal line represents world average of 3 percent. The data is pooled spending across sectors. The two Liechtenstein companies that are among the top R&D spending are included in the data.

R&D spending increased from 6.6 percent of total sales in 2013 to 8.5 percent in 2023.

R&D Spending, Manufacturing (Amount and share of total sales)



Source: Liechtenstein Chamber of Commerce and Industries (LCCI).

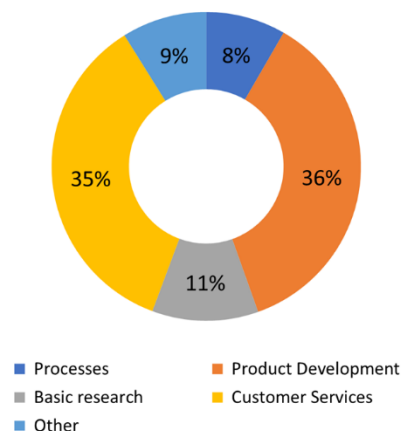
Note: Private sector R&D spending represents spending only by members of LCCI.

⁴ World Intellectual Property Organization.

Figure 3. Private Sector R&D Investment and Productivity (Concluded)

A large share of R&D spending is on product development and customer services.

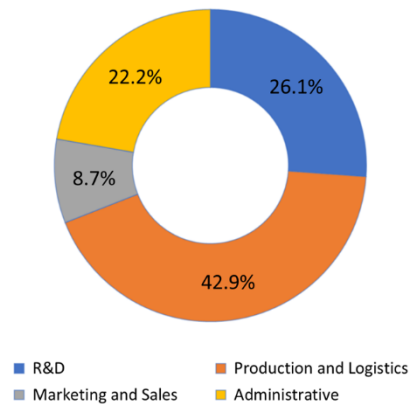
Average Distribution of R&D Spending by Area



Source: Liechtenstein Chamber of Commerce.
Note: Shares are average between 2017 and 2023.

More than a quarter of the total employees are engaged in R&D activities.

Average Distribution of Employment by Functional Department

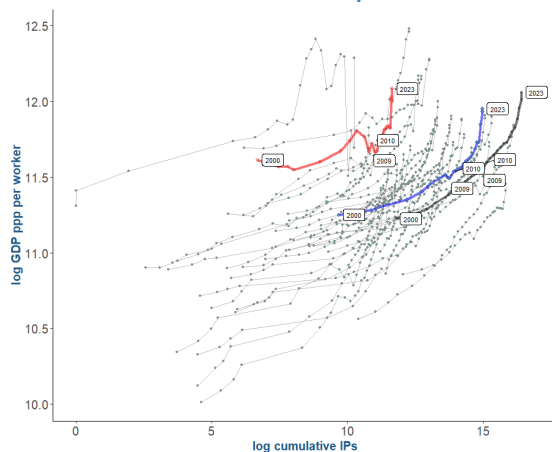


Source: Liechtenstein Chamber of Commerce.
Note: Shares are average between 2017 and 2023.

Figure 4. Intellectual Property (IP) and Productivity

Productivity has been positively correlated with the number of registered IPs; growth in the number of IPs for Liechtenstein has stalled in recent years.

Cumulative IP and GDP Per Worker, PPP



Sources: EU Industrial R&D Investment Scoreboard; WEO
Note: The total number of countries in the data is 41 between 2005 and 2022. Red line=Liechtenstein, blue= Switzerland, black=United States. Cumulative number of registered IPs is the sum of all IPs, grey=rest of countries in the data.

The decline in the number of IPs per person is associated with the decline in relative productivity.

IPs per Person and Relative Productivity



Sources: EU Industrial R&D Investment Scoreboard; WEO
Note: Red dotted line=productivity relative to the US, black solid line=number of IPs per person, and black dotted line=IP per person adjusted by commuter workers. The IP per person covers the period 2005–2022, whereas relative productivity series covers 2000–2023 and IP per person: 2005–2025.

6. Skills shortages constrain productivity gains across sectors. Labor market indicators and firm-level surveys point to persistent shortages of workers with technical and specialized skills, particularly in advanced manufacturing and engineering-related occupations. These shortages reflect strong demand for high-skilled labor from export-oriented firms and a limited domestic labor pool. While cross-border commuters have mitigated skill gaps, shortages appear persistent and affect firms' ability to adopt new technologies, expand high-value activities, and reorganize production processes. As a result, skills mismatches are likely constraining productivity improvements even in sectors with high capital intensity and technological capability.

7. Labor input is characterized by a high reliance on cross-border commuters alongside demographic constraints with important implications for the growth model. A significant share of employment consists of non-resident workers, such that total employment exceeds the resident population (Figure 5). Cross-border commuters are employed across manufacturing and services, including engineering, specialized manufacturing, and financial services, supporting high GDP per capita and a high-wage economic model. At the same time, population aging and low labor force participation among older workers and women relative to men (Figure 6) limit the expansion of the domestic workforce. While commuter inflows have historically mitigated these pressures, infrastructure constraints—particularly transport congestion and limited cross-border capacity—affect the scope for further expansion. In addition, the wage premium relative to neighboring regions has narrowed over time, which may influence cross-border labor supply decisions. Taken together, these labor market features may shape the contribution of labor input to long-run growth.

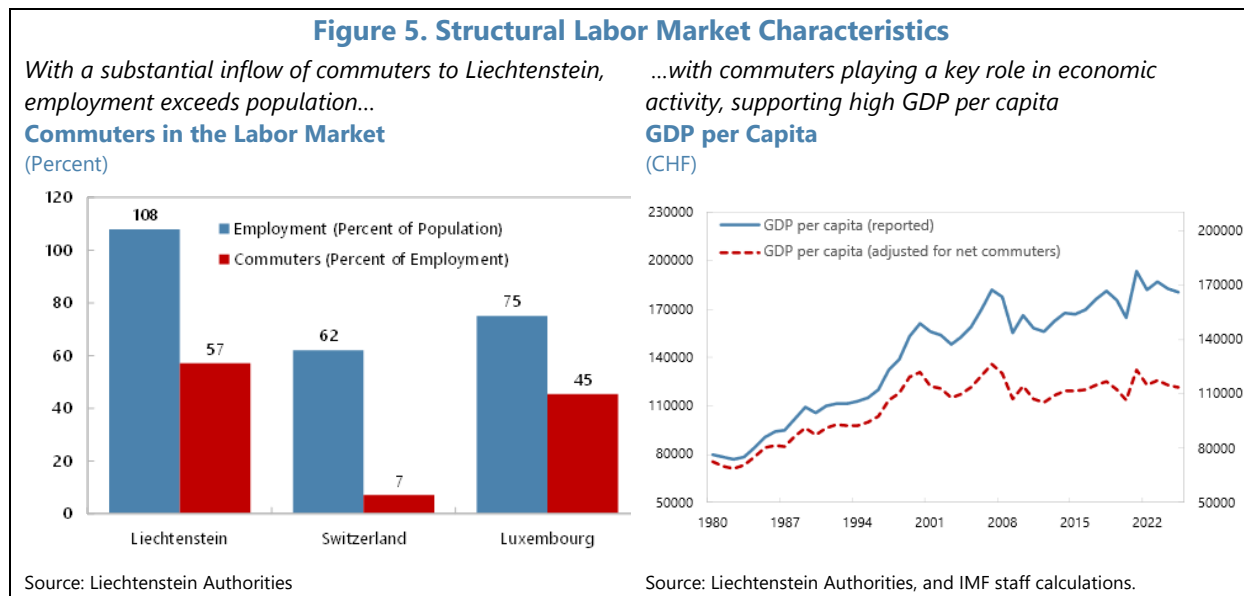
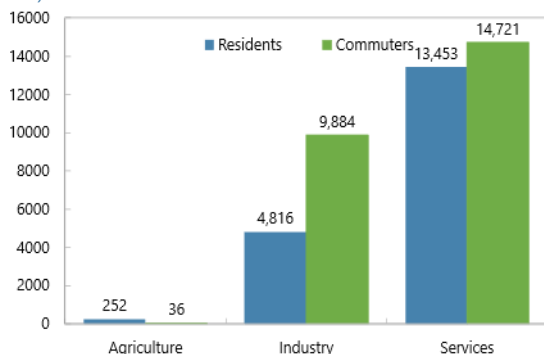


Figure 5. Structural Labor Market Characteristics (Concluded)

Employment of commuters and residents is primarily in the industry and services sectors...

Employment Across Sectors

(Unit)

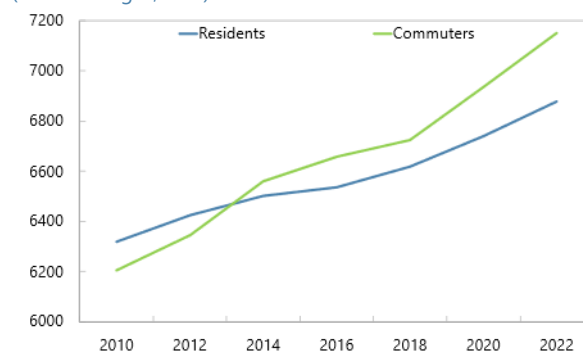


Source: Liechtenstein Authorities

...while the need for skilled workers has led to a wage premium for commuting

Evolution of Wages by Resident Status

(Median wages, CHF)



Source: Liechtenstein Office of Statistics

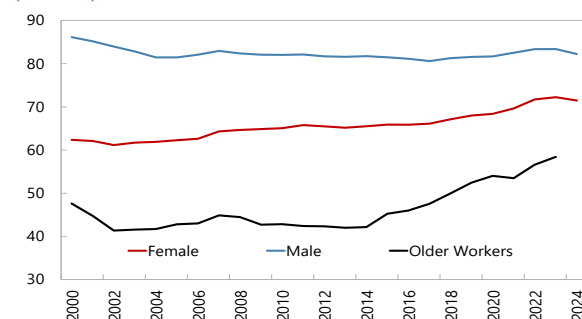
8. Capital accumulation is a key component of the growth framework, although lack of data prevents a detailed assessment for Liechtenstein. Conceptually, capital deepening is an important channel through which economies sustain productivity and long-run growth. However, the absence of detailed capital stock data and firm-level investment information limits the ability to assess the specific contribution of capital accumulation in Liechtenstein. Available information indicates that investment supports the country's capital-intensive production structure. At the same time, persistent transport congestion—reflecting high reliance on cross-border commuters and infrastructure capacity pressures—characterizes the environment. Beyond this, data constraints limit quantitative assessment of capital's contribution.

Figure 6. Labor Supply by Gender and Age

The labor supply of women and older workers in Liechtenstein remains low relative to men, though their labor force participation has increased in recent years...

Labor Force Participation Rate

(Percent)

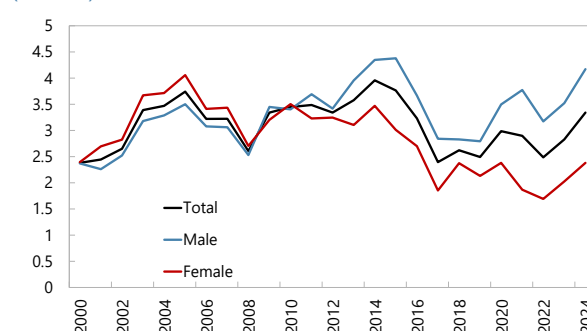


Source: Liechtenstein Authorities

...while the unemployment rate of women is lower than that of men, and declining for the past decade.

Unemployment Rate

(Percent)



Source: Liechtenstein Authorities

Note: The unemployment rate in the chart follows ILO's definition which includes both registered and unregistered employment

D. Reform Options

9. Sustaining productivity and long-run growth requires targeted structural reforms.

European cross-country evidence links specific reform areas to stronger productivity and growth outcomes (IMF, 2025a). This reflects the role of structural reforms in raising per capita incomes and helping narrow cross-country income gaps by improving productivity and resource allocation. The following priority areas are relevant for Liechtenstein:

- **Human capital and skills upgrading.** Expanding STEM and digital skills and strengthening skills-based training systems are consistently associated with higher productivity growth. These findings align with Liechtenstein's strong vocational and dual-training system and support further modernization, expansion of digital and STEM upskilling, and scaling of mid-career reskilling for older workers. Based on World Development Indicators (WDI) data, public expenditure on education is close to 5 percent of GDP in Switzerland and Austria, while it is closer to 4 percent of GDP in Liechtenstein (IMF, 2025b).⁵
- **Innovation and firm capability upgrading.** Innovation policies that support applied research, facilitate technology adoption, and promote SME innovation generate high returns. Strengthening linkages between large multinational firms and smaller domestic enterprises helps diffuse technology and productivity gains across the economy. Increasing public R&D spending through public-private partnerships could supplement private sector R&D investment, and potentially reverse declining trend in IP per capita. An example of public-private innovation partnership includes Swiss Innovation Park.⁶
- **Labor supply expansion.** Higher female labor force participation is associated with sizeable growth gains (IMF, 2018). Policies that encourage longer working lives—including through lifelong learning initiatives, reskilling programs in technological fields, and greater workplace flexibility—alongside expanded parental leave and improved childcare and after-school care, would help ease labor supply constraints given demographic pressures.
- **Physical and digital infrastructure investment.** Addressing transport bottlenecks, improving congestion management, and expanding digital infrastructure are associated with improved productivity performance by supporting skilled labor mobility, firm connectivity, and efficient factor use.

⁵ [Government expenditure on education, total \(percentage of GDP\) | Data](#)

⁶ Swiss Innovation Park is a public-private innovation partnership including public sector, research organizations, and private sectors (<https://www.sbf.admin.ch/en/swiss-innovation-park>).

E. Conclusion

10. This SIP examined the contributors to long-run growth in Liechtenstein. Drawing on available macroeconomic and sectoral data,⁷ the analysis indicates that productivity growth has stalled over an extended period, while skills shortages, demographic pressures, and transport constraints remain salient features of the economic environment. Sectoral productivity gaps, relatively low public sector R&D investment, reliance on cross-border labor, and infrastructure pressures shape the current economic environment and affect growth. At the same time, limitations in capital stock and firm-level data constrain deeper assessment of total factor productivity dynamics and the relative contributions of capital, labor, and technology, underscoring the need for improved data to support more granular analysis. Sustaining high living standards will require continued productivity improvements, and cross-country European evidence highlights priority reform areas—including labor supply expansion, human capital upgrading, public-private innovation partnerships, and infrastructure reforms—that provide possible directions for strengthening medium- to long-term growth.

⁷ It is important to note that data are limited to measure the full extent of private sector productivity, including total factor productivity across firms of different sizes. For instance, there were around 4860 SMEs in 2024 with 10 or less employees creating employment opportunities and value addition. Measuring productivity, firm dynamism and examining key driving factors could shed some light on this important sector of the economy. Available tax data—which has detailed information on firm characteristics, sales, material and wage cost, etc.—could be leveraged to perform such analysis.

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