

Accessible Scale in Small States

Cross-Border Labour, Production, and the Limits of Resident Population

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Working Paper

Abstract

Country size is commonly proxied by territory or resident population, yet these measures can misstate the economic scale available to highly integrated small states. This paper develops the concept of accessible economic scale: the labour, demand, infrastructure, and productive networks that firms and institutions can use without those resources being located inside the political territory or resident population. The framework is motivated by Liechtenstein, where the number of employed persons exceeds the resident population and 57.4 percent of workers were inward commuters at the end of 2024. Cross-border labour is especially important in industry, while firms operate inside a highly open economy connected to Swiss and European markets. The resulting structure also helps explain the unusually large gap between GDP and GNI documented by the IMF: production occurs inside the territory while substantial labour income accrues to non-residents. The paper distinguishes resident scale from accessible scale, identifies labour, market, and infrastructure access as separate channels, and proposes a qualitative Scale-Access Test based on depth, friction, continuity, and bottlenecks. The contribution is not that openness benefits small states, a well-established result. It is the narrower claim that resident population is an incomplete proxy for the productive scale a state can mobilize, and that economic viability depends partly on access to scale beyond the border.

Keywords: small states; economic scale; cross-border labour; commuters; openness; Liechtenstein; resident population; labour markets; economic integration; microstates

Author note: This working paper develops and formalizes the accessible-scale concept introduced in Kao (2026).

1. Introduction

How large is a country with roughly forty-one thousand residents but more than forty-three thousand employed persons? The political answer is straightforward: the resident population remains roughly forty-one thousand. The economic answer is less obvious. At the end of 2024, Liechtenstein recorded 43,441 employed persons, of whom 24,943 were inward commuters. In other words, 57.4 percent of the workforce lived outside the country, and total employment exceeded the country's resident population (Office of Statistics Liechtenstein, 2025).

The example exposes a measurement problem in small-state analysis. Population is often used as a proxy for domestic market size, labor supply, fiscal capacity, and the ability to exploit economies of scale. Those relationships are real, but they become less reliable when borders are economically permeable. A microstate can remain politically small while drawing workers from neighboring countries, selling into much larger markets, and relying on transport, financial, and institutional networks that extend beyond its territory.

The economics of small states has long emphasized openness. Alesina, Spolaore, and Wacziarg (2000) argue that trade openness reduces the economic advantages of large political units by allowing small jurisdictions to access wider markets. Easterly and Kraay (2000) find that small states are highly open and, despite greater volatility, do not systematically suffer the growth disadvantage that simple scale arguments might predict.

Armstrong and Read (1998, 2003) likewise identify openness, human capital, and location as important conditions shaping small-state performance.

This paper develops a narrower conceptual extension: accessible economic scale. The argument is not that political borders are irrelevant or that external resources should be counted as domestic. It is that resident population is an incomplete measure of the economic scale available to production. A state can access labor, demand, and infrastructure beyond the resident community without annexing territory or expanding citizenship. The resulting distinction between resident scale and accessible scale helps explain both the productive capacity and the vulnerabilities of highly integrated microstates.

Liechtenstein provides a structured case because the mismatch is unusually visible. Cross-border workers are a majority of employment, industrial firms rely heavily on non-resident labor, and the IMF documents a substantial difference between domestic production and income accruing to residents. The case therefore allows the scale question to be observed directly rather than inferred from trade openness alone.

2. Smallness, Economies of Scale, and Openness

The conventional economic problem of smallness begins with fixed costs and limited domestic scale. Public institutions, infrastructure, specialized firms, and regulatory systems often require minimum efficient scale, while a small domestic market can constrain specialization and competition. Alesina and Spolaore (2003) frame country size as a trade-off: larger political units can spread fixed costs and provide larger markets, while smaller units may better match heterogeneous preferences.

Economic integration changes this trade-off. Alesina et al. (2000) show theoretically and empirically that the benefits of political size depend on the international trade regime. When trade barriers fall, market size becomes less tightly tied to political borders. Small jurisdictions can retain political distinctiveness while accessing external demand. Easterly and Kraay (2000) similarly find that greater openness helps offset scale disadvantages, even as it exposes small economies to larger external shocks.

The small-state literature therefore already rejects a simple equation between small population and economic failure. Katzenstein (1985) describes small European states as highly exposed to world markets yet capable of successful adaptation. Armstrong and Read (2003) emphasize conditioning variables such as openness, human capital, and location. Briguglio (1995), from a different small-island context, highlights the other side of openness: external exposure can create vulnerability that income measures fail to capture.

What remains analytically useful is to separate openness from scale access. Openness usually describes flows across borders: trade, capital, labor mobility, or institutional integration. Accessible scale asks what effective pool of resources and demand those flows make available to production. Two equally open small states may therefore possess different accessible scale if one is adjacent to dense labor and transport networks while the other is geographically remote.

3. Resident Scale and Accessible Economic Scale

Definition 1 (Resident Scale). Resident scale is the economic resource base that can be associated directly with the population and territory inside the political jurisdiction, including resident labor supply and domestic demand.

Definition 2 (Accessible Economic Scale). Accessible economic scale is the set of external labor, demand, infrastructure, and productive networks that actors inside the jurisdiction can use with sufficiently low friction and continuity to affect feasible production and specialization.

The distinction does not reclassify external resources as domestic. A commuter who lives in Austria remains an Austrian resident. A customer in Germany does not become part of Liechtenstein's domestic market. The point is functional: both can expand the scale available to economic activity located inside Liechtenstein.

Three channels are especially important. Labour access expands the usable workforce beyond resident labor supply. Market access expands effective demand beyond local consumers. Infrastructure and network access allows firms to use transport, logistics, finance, suppliers, and other systems that need not be reproduced within the territory. These channels can reinforce one another. Export-oriented production may attract specialized commuters; commuter access may support firms that would be impossible at resident scale; regional infrastructure makes daily mobility and external logistics feasible.

Accessible scale is therefore conditional. It exists only while access remains sufficiently reliable. A worker five kilometres away can be economically less accessible than a worker fifty kilometres away if permits, congestion, or border rules change. A foreign market can remain physically present while tariffs or regulatory divergence raise the cost of reaching it. The concept therefore combines scale with friction.

Table 1. Channels of accessible economic scale

Channel	Resident-scale constraint	Accessible-scale mechanism
Labour	Small resident workforce limits specialization and hiring depth.	Cross-border commuting expands the usable regional labor pool.
Markets	Domestic demand is too small for many specialized producers.	Trade and single-market access connect firms to external customers.
Infrastructure / networks	Territory cannot reproduce every logistics, transport, finance, or supplier system.	Regional networks allow external capacity to be used without territorial incorporation.

4. Liechtenstein's Cross-Border Labour Market

Liechtenstein provides an unusually clear case of labor scale extending beyond resident population. Official 2024 employment statistics record 43,441 employed persons and 41,398 residents. Inward commuters numbered 24,943, or 57.4 percent of employment. Around 61.2 percent of commuters lived in Switzerland and 34.6 percent in Austria. In full-time-equivalent terms, commuters supplied 58.5 percent of labor resources, and their share in industry reached 68.0 percent (Office of Statistics Liechtenstein, 2025).

These are not marginal corrections to a resident labor market. They are structural. The IMF describes Liechtenstein as an export-oriented economy specializing in engineering and financial services in which non-resident workers comprise the greater share of employment. It reports that, in recent years, eight out of ten vacancies were filled by non-residents and that commuters are disproportionately represented in higher-skilled occupations (Iyer, 2025). The 2025 Article IV report similarly notes that the share of commuters rose from about 25 percent of employment in the 1980s to roughly 57 percent, with demand for skilled workers exceeding resident supply (International Monetary Fund, 2025).

From a resident-scale perspective, this labor market looks paradoxical. A population slightly above forty thousand should impose a severe ceiling on specialization in engineering, advanced manufacturing, finance, and professional services. The ceiling is relaxed because the relevant labor pool is regional. Political membership does not expand, but productive labor access does.

This distinction also clarifies why cross-border labor should not be described as a resource 'owned' by the state. Commuters remain mobile individuals making labor-market decisions. Accessible scale is therefore relational rather than territorial. It depends on wage differentials, transport capacity, legal rights, and the attractiveness of employment. Iyer (2025) identifies congestion and infrastructure constraints as limits to further commuter growth, while Iyer and Woldemichael (2026) again treat cross-border workers as central to Liechtenstein's growth model while noting persistent skill shortages and infrastructure bottlenecks.

Accessible scale thus has a capacity frontier. Regional labor can relax the resident-population constraint without removing it permanently. As commuting rises, roads, housing patterns, wage competition, and border arrangements can become new bottlenecks.

5. Production Scale Is Not Resident Income Scale

The distinction between resident and accessible scale also helps interpret Liechtenstein's national accounts. GDP measures production within the territory. Gross national income moves closer to income accruing to residents after cross-border primary income flows. When a large share of production is performed by workers who live abroad, the two measures can diverge substantially.

Iyer and Baer's (2025) study of cross-border income flows identifies Liechtenstein's GDP-GNI gap as unusually large and attributes much of it to net compensation paid to foreign workers rather than to the profit-shifting structure associated with some other high-GDP jurisdictions. This is exactly what an accessible-scale framework would predict. Productive scale can exceed resident scale because non-resident labor participates in domestic production, while part of the resulting income flows back across the border.

This does not make GDP per capita wrong. It makes the denominator easy to misinterpret. Dividing territorial production by resident population can produce a very high figure even though a large share of the labor input is not contained in that population. For comparative work on microstates, the issue is therefore not merely statistical. It concerns the underlying unit of analysis: political population, production workforce, and resident income base answer different questions.

The distinction is also relevant to fiscal and social analysis. A state can host production that depends on non-resident labor while many social expenditures for those workers are partly organized through cross-border arrangements. Conversely, transport and infrastructure costs generated by commuting are experienced locally. Accessible scale expands productive possibilities but changes the distribution of costs and income.

6. Market and Infrastructure Access

Labour is the most visible channel in Liechtenstein because commuters are countable. Market access is equally important. Alesina et al. (2000) show why small political jurisdictions become more economically viable when firms can sell into markets larger than the domestic population. Liechtenstein is deeply connected to both Switzerland and the European Economic Area. The IMF describes it as a highly open economy with export-oriented manufacturing, close ties to Switzerland and the EU, a customs union with Switzerland, and full access to the EU single market through EEA membership (International Monetary Fund, 2025).

This means that the domestic population is not the relevant demand ceiling for a manufacturer located in Schaan or Vaduz. Production can be organized inside a microstate while customers are distributed across Europe and beyond. The same logic applies to suppliers and specialized services. Firms need not reproduce every stage of a value chain inside 160 square kilometres if regional and international networks are accessible.

Infrastructure access performs a similar function. Cross-border commuting is possible because the surrounding transport network connects Liechtenstein to residential areas in Switzerland and Austria. Logistics, energy, telecommunications, and financial networks likewise extend beyond the political border. These systems are not costless external gifts; they involve contracts, regulation, investment, and interdependence. But they change the minimum scale that must be contained domestically.

The resulting economy is therefore larger in a functional sense than the resident population suggests. The state remains politically small while production draws on a wider spatial system. This is the core of accessible scale.

7. A Scale-Access Test

Accessible scale can be assessed without attempting to calculate a universal 'effective population.' Such a number would falsely imply that workers, customers, infrastructure, and market access are interchangeable. A qualitative diagnostic is more useful.

First, depth: how large is the external pool relative to the resident base? Second, friction: what legal, transport, regulatory, or transaction costs stand between domestic actors and that external pool? Third, continuity: how stable is access over time, especially during shocks or policy changes? Fourth, bottlenecks: what constraints become binding as external access expands?

Scale-Access Test. A small state has economically meaningful accessible scale when external labor, markets, or networks are large enough to relax resident-scale constraints, reachable at sufficiently low friction, and continuous enough to support durable production rather than episodic transactions.

The test distinguishes access from mere proximity. Austria and Switzerland are geographically close to Liechtenstein, but proximity becomes economic scale only because commuting, legal arrangements, wages, and transport make daily labor mobility feasible. Likewise, the EU single market is much larger than Liechtenstein, but its relevance depends on institutional access through the EEA.

Table 2. Qualitative Scale-Access Test

Dimension	Diagnostic question	Liechtenstein illustration
Depth	Is the external pool large relative to resident scale?	Inward commuters were 57.4% of employment at end-2024.
Friction	How costly is routine access?	Daily commuting is enabled by regional transport and labor-market rules.
Continuity	Is access durable enough for long-lived investment and specialization?	Cross-border employment has grown over decades and is embedded in Swiss/EEA integration.
Bottlenecks	What limits further scale access?	Congestion, skills shortages, wage competition, and infrastructure capacity.

8. What Accessible Scale Adds to Small-State Analysis

The framework makes three contributions to existing small-state economics. The first is measurement. Resident population is an essential political and demographic variable, but it should not automatically be used as a proxy for the labor and market scale available to production. In highly integrated border regions, the difference can be large enough to reverse basic intuitions about feasible specialization.

The second contribution is to the economics of country size. Existing research already shows that trade openness weakens the link between political size and market size (Alesina et al., 2000; Alesina & Spolaore, 2003). Accessible scale extends the same logic to productive inputs. A state can import not only goods and capital but daily labor services and network capacity. The minimum viable economic scale of a jurisdiction can therefore be partly assembled through access rather than ownership. Liechtenstein's 2026 productivity evidence makes the point concrete: high-value production depends on a resident base that is supplemented by skilled cross-border labor, even as infrastructure and skill bottlenecks constrain further expansion (Iyer & Woldemichael, 2026).

The third contribution is vulnerability. Accessible scale creates exposure to conditions that are not fully controlled domestically. Commuter dependence introduces transport and labor-supply risks. External market access introduces regulatory and demand risks. Infrastructure dependence creates network bottlenecks. The concept therefore does not imply that external scale is equivalent to internal scale. It is both an opportunity and a dependency.

This connects directly to Briguglio's (1995) argument that high income can conceal structural vulnerability in small economies. Liechtenstein differs from the island cases that motivated that literature, especially because its geography provides exceptional access to dense neighboring economies. But the broader principle survives: the same external connections that make high specialization possible can also transmit shocks.

9. Limits and Research Agenda

Liechtenstein is an extreme and favorable case. It sits between two wealthy labor markets, participates in dense European institutions, and has transport distances that make daily cross-border work feasible. Accessible scale is therefore likely to operate differently in remote island states, landlocked states without comparable neighbors, or small economies facing restrictive borders.

The framework is also deliberately multidimensional. Labor access cannot be reduced to market access, and neither can be treated as equivalent to infrastructure. Future research should therefore avoid a single synthetic index unless the research question justifies explicit weights.

Comparative empirical work could proceed in three ways. First, cross-sectional studies could compare the ratio of resident population to workplace employment, commuter shares, export intensity, and market-access arrangements across European microstates and small states. Luxembourg would provide an obvious comparison because it also relies heavily on cross-border labor, while Monaco and Andorra offer different institutional configurations. Second, longitudinal analysis could examine whether rising commuter shares predict infrastructure bottlenecks, wage convergence, or changes in productivity. Third, shock-based studies could test how accessible scale behaves when borders, transport systems, or market-access rules are disrupted.

A further research direction concerns political economy. When productive scale depends heavily on people who do not vote in the jurisdiction, the constituency that produces output and the constituency that elects government diverge. This paper does not analyze the normative implications of that divergence, but it is a

distinctive feature of cross-border production systems and may affect infrastructure, housing, tax, and labor policy.

10. Conclusion

Population remains one of the simplest ways to describe country size. It is also one of the easiest ways to mistake political scale for economic capacity. Liechtenstein demonstrates the difference. Its resident population is roughly forty-one thousand, yet more people work in the country than live there, and a majority of workers cross the border from neighboring states.

Accessible economic scale describes the productive resources and demand a jurisdiction can reach without containing them inside its resident population or territory. In Liechtenstein, cross-border labor expands the workforce, EEA and Swiss integration expand market access, and regional networks make production possible at a scale that the domestic population alone could not support.

The concept does not erase borders. On the contrary, it makes the conditions at borders analytically central. Accessible scale depends on low enough friction, durable institutional arrangements, transport capacity, and external willingness to remain connected. When those conditions weaken, the apparent scale available to the economy can contract without any change in resident population.

The implication for small-state analysis is therefore limited but important: resident population is a poor standalone proxy for the economic scale a state can mobilize. The relevant question is not only how many people live inside the country, but how much labor, market demand, and productive infrastructure actors inside it can reliably reach.

AI Use Disclosure

OpenAI's ChatGPT was used only for literature discovery and bibliographic verification. The accessible-scale framework and underlying concepts originate in the author's prior published work (Kao, 2026). The author independently reviewed all cited sources and remains solely responsible for the final manuscript, its arguments, source selection, and citations.

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