OECD Rural Studies

Shrinking Smartly in Estonia

PREPARING REGIONS FOR DEMOGRAPHIC CHANGE

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BETTER POLICIES FOR BETTER LIVES

The activity “Adapting to shrinkage and ageing through spatial interventions” was co-funded by the European Union via the Structural Reform Support Programme (REFORM/IM2020/004).

This publication was produced with the financial assistance of the European Union. The views expressed herein can in no way be taken to reflect the official opinion of the European Union.

Please cite this publication as:
OECD (2022), *Shrinking Smartly in Estonia: Preparing Regions for Demographic Change*, OECD Rural Studies, OECD Publishing, Paris, https://doi.org/10.1787/77cfe25e-en.

ISBN 978-92-64-85061-3 (print)
ISBN 978-92-64-98729-6 (pdf)

OECD Rural Studies
ISSN 2707-3416 (print)
ISSN 2707-3424 (online)

Photo credits: Cover © PeopleImages/Gettyimages; Cover Illustration: Christophe Brilhault.

Corrigenda to publications may be found on line at: www.oecd.org/about/publishing/corrigenda.htm.

Foreword

Many lower density areas in the OECD face declining and ageing populations. By 2050, projections suggest that half of Europe's economies will need to manage decline in their remote regions. Estonia has been severely affected by this phenomenon, with its population shrinking by 15% since 1991, and declines of more than 25% in half of its counties. This raises a number of challenges, including housing vacancies and deteriorating built environments, lower municipal revenues and greater per capita costs of providing services such as education, health and infrastructure, especially in relation to higher shares of the elderly population.

This report provides analyses and recommendations, across key policy sectors, to shrink smartly. Recognising the challenges that low density brings to the environment and the effective provision of services, it analyses spatial development patterns and the spatial planning system of Estonia and presents recommendations to make land use more efficient and planning more coherent. In the face of declining municipal revenues and increasing needs brought by an ageing population, it also assesses Estonia's multi-level governance and municipal finance model, highlighting ways to boost inter-municipal co-operation, improve the transfer system and strengthen the municipal revenue base. It also discusses education, the municipalities' largest spending responsibility, providing recommendations that adapt the school network to shrinkage while ensuring access to high-quality education for all students.

This report is part of the sub-series *Preparing Regions for Demographic Change* and was carried out as part of the OECD Regional Development Policy Committee (RDPC) Programme of Work. The RDPC provides a unique forum for international exchange and debate on regional economies, policies and governance. It was discussed at the 26th meeting of the Working Party on Rural Policy on 17 November 2021 and the meeting of the RDPC Expert Group on Multi-level Governance for Regional Development on 16 November 2021. The report was approved by the RDPC [CFE/RDPC(2021)23] via written procedure on 12 January 2022.

Acknowledgements

The report *Shrinking Smartly in Estonia: Preparing Regions for Demographic Change* was produced by the OECD Centre for Entrepreneurship, SMEs, Regions and Cities (CFE), led by Lamia Kamal-Chaoui, Director, as part of the Programme of Work of the Regional Development Policy Committee (RDPC).

The project was carried out with funding by the European Union via the Structural Reform Support Programme and in co-operation with the European Commission's Directorate-General for Structural Reform Support (DG REFORM).

This report was elaborated jointly by the Economic Analysis, Data and Statistics Division, led by Rudiger Ahrend, and the Regional Development and Multi-level Governance Division led by Dorothée Allain-Dupré in the OECD Centre for Entrepreneurship, SMEs, Regions and Cities. It has been co-ordinated and edited by Jaebeum Cho under the supervision of Andrés Fuentes Hutfilter, Jose Enrique Garcilazo and Antti Moisio. The report was jointly drafted by Jaebeum Cho (all chapters), Hyunjoon Cho (Chapter 2), Antti Moisio (Chapters 1 and 3), and Ana Isabel Moreno Monroy (Chapters 1 and 4), with contributions from Marc Bournisien de Valmont and Carlo Menon.

The OECD is grateful to Tiit Oidjärv and Andres Levald from the Estonian Ministry of Finance for their collaboration and extensive efforts throughout the implementation of the project. The OECD would also like to thank stakeholders from central government ministries for their support during the two fact-finding missions, their data inputs for the questionnaire and their feedback on draft versions of the report. Warm thanks are also due to Sverker Lindblad (Ministry of Enterprise, Energy and Communications, Sweden) and stakeholders from municipalities and academia for their contributions and valuable inputs during the two fact-finding missions and the policy seminar. Special thanks are also due to Maria Paula Caldas (CFE) and Chris Jacobs-Crisioni (EC-JRC) for providing data inputs. The report also benefitted from comments from Isabelle Chatry (CFE), Maria Varinia Michalun (CFE), Abel Schumann (EDU), Courtenay Wheeler (CFE) and Yingyin Wu (CFE), as well as from input from CFE colleagues during an internal brown bag seminar.

Pilar Philip co-ordinated the production process of the report, and Eleonore Morena provided editorial assistance for the manuscript.

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Abbreviations and acronyms

CP	Comprehensive Plan
CSP	County-wide Spatial Plan
DRT	Demand-responsive transport
DSP	Detailed Spatial Plan
FAR	Floor area ratio
FUA	Functional Urban Area
GDP	Gross domestic product
GHG	Greenhouse gas
ICT	Information and communication technology
IMC	Inter-municipal co-operation
ISCED	International Standard Classification of Education
KredEx	Estonian Credit and Export Guarantee Fund
LGDSP	Local Government Designated Spatial Plan
NDSP	National Designated Spatial Plan
NSP	National Spatial Plan
PIAAC	Programme for the International Assessment of Adult Competencies
PIT	Personal income tax
PS-TRE	Problem-solving in technology-rich environments
RPAP	Regional Policy Action Plan
SNG	Subnational government
SPB	Special-purpose body
TL3	Territorial level 3 (small regions)
TOD	Transit-oriented development
VET	Vocational education and training

Executive summary

Estonia's population – 1.33 million inhabitants in 2020 – has shrunk by 15% since 1991 and all available projections indicate that this trend will continue. But shrinkage has been uneven. While larger urban areas have grown, more than half of Estonia's counties experienced population decline greater than 25%. Rural and remote areas have been hardest hit. Shrinkage results in lower density, which increases per head service and infrastructure provision costs. It also results in housing vacancies and deteriorating built environments, problems that require additional municipal resources to maintain suitable living conditions in the face of declining tax revenues. Another effect is a higher share of the elderly population in all regions of Estonia. These older residents require additional services and care, compared to the average citizen.

This study assesses shrinkage in Estonia across key policy sectors and recommends interventions that adapt regions to shrinkage in a smart and sustainable way. It discusses spatial development and planning practices and presents recommendations to make land use more efficient and spatial planning more coherent. It also reviews Estonia's multi-level governance and municipal finance model, highlighting ways to boost inter-municipal co-operation, improve the transfer system and strengthen the municipal revenue base. Finally, it examines education, by far municipalities' largest spending responsibility, presents recommendations that adapt the school network while ensuring access to high-quality education for all students and considers how other services can apply lessons learned from the education sector.

Key findings

- **Despite depopulation, the amount of developed land is increasing.** From 2000 to 2014, Estonia had the sixth-highest growth (18%) among OECD countries in the amount of built-up area per capita. Over the same period, its population decreased by 5%. This, together with increasingly sparse settlement patterns, suggests that land use in Estonia may be becoming increasingly inefficient. As most development occurs in converted farmland and forests, this generates adverse environmental impacts, which can include degradation of land, biodiversity loss and greenhouse gas emissions, as well as economic costs, notably for per capita infrastructure consumption.
- **Depopulation widens and reinforces regional disparities.** Estonia's population is concentrating near urban centres, leading to regional disparities in tax revenues, income, house prices and the quality of built environments. Shrinking regions often do not have functioning real estate markets, which makes it difficult for people to move between regions, reinforcing regional disparities and chronic labour shortages.
- **Providing quality education in shrinking areas is challenging.** Shrinkage has resulted in 50 000 fewer students over the last 20 years. Student numbers will continue to decline in sparsely populated rural areas while numbers in other areas will remain steady or increase. While shrinking municipalities are consolidating schools, they still face 30% greater, unavoidable per capita costs compared to cities. Attracting high-quality teachers is also challenging in these areas.

- **Regional governance is fragmented and inter-municipal co-operation is limited.** Spatial planning, strategic sectoral initiatives and development strategies are all governed separately at the regional level. This leads to a lack of policy coherence, inefficient service and infrastructure networks as well as uncoordinated spending at the national and municipal levels. Voluntary co-operation between municipalities is rare.
- **Planning and legal frameworks are not prepared for shrinkage.** Local Comprehensive Plans (CPs) do not address shrinkage or properly integrate population projections. Thus, re-evaluation of settlement boundaries and densification rarely occurs. Vacant housing requires demolition in order to improve land use efficiency and reduce infrastructure delivery costs, yet expropriation is legislatively time-consuming and challenging, and not integrated into spatial planning.
- **Municipal finance and taxation systems encourage inefficiency and weaken local decision-making capacity.** Eighty percent of central government transfers to municipalities are earmarked. This prevents discretionary decision-making and discourages efficiency gains, as savings cannot be used elsewhere. Greater land tax exemptions exist for residential plots in non-urban areas, adding to distortions harming efficiency. Impact fees, which require developers to bear the cost of development of public infrastructure and services in the vicinity, are not well enforced.

Key recommendations

- **Reduce land consumption and promote densification of central areas.** CPs should steer spatial development by incorporating population projections. Subordinate plans should not allow the CP to be overridden. Plans should adapt to demographic trends and economic opportunities through flexible zoning, temporary uses and upward flexible density regulations.
- **Promote governance spanning sectors and levels of government.** County-wide spatial plans (CSPs) should act as the central platform for regional governance by integrating frameworks for voluntary inter-municipal co-operation across sectors. The central government should encourage co-operation by directing fiscal transfers to inter-municipal bodies rather than municipalities.
- **Increase the quality of services through municipal co-operation.** The central government should direct resources to joint municipal projects with quality-enhancing service goals. This is especially needed for incentives dealing with shortages in teachers, healthcare providers and other key workers in shrinking areas. Aggregated service centres coupled with digital provision should be promoted to increase resource sharing and efficiency while bridging gaps in service quality.
- **Implement demolition and renovation projects within the spatial planning system.** Demolition and renovation should be planned at a larger scale within CSPs and local CPs. Spatial planning should guide the location of these projects. Expropriation should be allowed for the demolition of empty detached housing and be based on land use decisions outlined in spatial plans.
- **Reform fiscal structures to better prepare for shrinkage.** The complex earmarked grants system should be abandoned or at least considerably reduced. Factors in the transfer system that inadvertently foster remoteness should be replaced with indicators such as population density, encouraging efficient settlement structures. Land tax exemptions in rural areas should be abolished and impact fees should be actively utilised. Fiscal incentives addressing teacher shortages in remote areas need to be implemented together with the streamlining of the school network.
- **Provide municipalities with open information systems and administrative support.** Database documenting costs and outcomes of municipal services should be established to support benchmarking of service provision. These databases should be integrated into e-platforms to evaluate and monitor the quality of services across municipalities. The central government should aid local government capacity building by training and maintaining a certified pool of planning and architectural experts to support local governments.

Assessment and recommendations

Introduction

Estonia's population of 1.33 million inhabitants in 2020 has shrunk by 15% since 1991. Available national and European projections suggest that this trend will continue. Depopulation has not happened evenly. While the larger functional urban areas (FUAs) of Tallinn and Tartu grew, rural and remote urban areas have been rapidly shrinking. Shrinkage results in lower density, which increases per head service and infrastructure provision costs. It also results in housing vacancies and deteriorating built environments, problems that require additional municipal resources in the face of declining tax revenues. Shrinkage also leads to a higher share of the elderly population requiring additional services and care. Adding to difficulties is the fact that Estonia has the most carbon-intensive economy in the OECD, together with heavily utilised forests and steadily increasing built-up areas, indicative of inefficient spatial development.

Tackling such challenges requires spatially oriented policies in a number of areas in order to respond to demographic change in a smart and sustainable manner. This study provides key findings from a variety of policy sectors including land use and spatial planning, services and infrastructure provision, municipal finance and multi-level governance that assess the current state of Estonia in effectively responding to shrinkage and ageing. The following policy recommendations stress the need for governance frameworks that span administrative boundaries and policy sectors to bring about a whole-of-government approach to tackling depopulation, together with spatially oriented strategies that recommend densification and improved efficiency in providing infrastructure and services.

Key findings

Despite depopulation trends, developed land in Estonia is steadily increasing, leading to inefficient spatial development and poor environmental performance

According to OECD statistics, over 2000-14, the total built-up area in Estonia increased from 232 km^2 (0.54% of total land area) to 257 km^2 (0.6%). This represents an 11% increase, ranking Estonia 33rd out of the 38 OECD countries. However, this masks the fact that, at the same time, Estonia's population decreased by almost 5%, contrary to most other OECD countries where populations grew. Utilising built-up area per capita as a proxy for (lack of) land use efficiency, Estonia saw an increase of 18% over the same period, ranking it 6th in terms of growth among OECD countries and well above the OECD average of 6%. This increase was not limited to the Tallinn and Tartu FUAs, with most counties experiencing roughly similar increases over the period. Absolute levels of built-up area per capita in Estonia, on the other hand, are still low relative to other OECD countries. As such, some increase is understandable, especially considering Estonia's strong economic growth and an increasing need for better infrastructure. However, the fact that most of the growth occurs from converted farmland and forests, distant from urban centres, means that most of the land used to build new infrastructure could have been saved if development had been more compact. In the face of shrinkage and declining municipal revenues, maintaining this sprawling network of infrastructure will become more and more difficult in the future.

Data on settlement patterns are also indicative of a strong trend towards spread-out development. Using Eurostat data for the period 2006-18, the number of 1 km² grids inhabited by at least 1 person increased by 30%. Only about 24 000 people (1.8% of Estonia's population) moved to these new settlement areas during this time. Many of these new settlements were in rural and remote areas converted from farmland and forests. Ninety-one percent of these new grids were populated by less than five people.

Such an inefficient pattern of spatial development is problematic for a number of reasons. Most obviously, it increases the per capita costs of providing services, infrastructure and amenities across a broader area, which leads to fiscal strain for central and local governments. Importantly, however, such patterns also have significant adverse effects on the environment. Extensive artificial surface cover diminishes biodiversity and deteriorates soil quality, both key worldwide environmental challenges. Already, Estonia is the most carbon-intensive economy in the OECD with 533 kg of CO_2 emissions per USD 1 000 of gross domestic product (GDP), well above second-place Canada at 370 kg. It is also sixth among OECD countries in greenhouse gas (GHG) emissions per capita. In addition, forests, which cover half of Estonia's territory, are heavily utilised despite sustainable forestry efforts, with Estonia ranking second among OECD countries in fellings relative to annual production capacity. Finally, Estonia ranks first among OECD countries in the residential sector's share of total final consumption of energy, which is due to sparse land use and old and energy-inefficient building stock. Inefficient spatial development and land use contribute to Estonia's poor environmental performance through land degradation, increased car usage and energy demand, greater air pollution and carbon emissions, and lower quality of the natural environment.

Depopulation widens and reinforces regional disparities, disproportionately affecting rural and remote areas

Estonia's population is increasingly concentrating near the main urban centres

The two main urban centres of Tallinn and Tartu have been experiencing an increase in population of 6% and 3% respectively from 2015 to 2020. This is in contrast to the rest of the country where the population decreased by 5%. Close to 60% of the population now lives in these 2 areas. In addition, these urban centres are experiencing urban sprawl, with populations escalating in their peripheral areas while inner areas are not being densified significantly.

Regional disparities in income and housing prices are widening

Income disparities between regions in Estonia are relatively high compared to other European Union (EU) countries. In 2019, GDP per capita in Tallinn was EUR 36 000, compared to only EUR 9 000 in the rural county of Põlva. In addition, these gaps are growing. Income in the 1st quintile of regions was 2.5 times that of the 5th quintile in 2018, compared to 2.2 in 2008. These economic disparities are also mirrored in the labour market. The unemployment rate in Harju and Tartu Counties was 4.6% and 4.7% respectively but 10.7% in Ida-Viru and 7.9% in Põlva. The average monthly gross wage in Harju County (EUR 1 588 in 2020) was 24-49% higher than other counties excluding Tartu. Such gaps in economic conditions accelerate migration to more prosperous regions, resulting in severe polarisation in house prices. In 2021, the price of an apartment in Tallinn (EUR 2 159 per m²) was almost 10 times higher than in the southern region of Valga (EUR 212 per m²). In many rural and remote regions, the price of a house is lower than the initial costs of construction. Consequently, it is getting harder to obtain financial support through mortgages or loans from the private banking system for purchases and renovations, as houses are unable to act as collateral. This results in new construction and renovation activities being concentrated in urban centres and their periphery, while rural and remote areas attract the construction of second homes that are only inhabited during certain periods. This in turn widens the regional disparities in the housing market and makes it difficult for people to move between regions, which reinforces regional disparities and labour shortages in the non-metropolitan regions.

Providing quality education and public transport is a challenge for rural and remote regions

The number of students served by the school network in Estonia declined by over 50 000 between 2000 and 2020 as a result of demographic change. In the midst of this decline, the process of school consolidation has picked up pace in recent years after being stalled by complex decision-making requiring alignment between central and local governments. Already between 2005 and 2013, 9% of schools were closed and, by 2020, there were 173 fewer basic schools (primary and lower secondary) compared to 2000. Projections show that while student numbers will remain steady or even increase in towns, suburbs and cities, sparse rural areas and villages are expected to see student numbers decline substantially. Assuming the school network fully adjusts to future demand, estimates suggest a reduction of 16% (0.3% annually) and 22% (0.4% annually) respectively in the number of primary and secondary schools in those areas up to 2035.

While small and sparsely populated municipalities are indeed consolidating their schools, they also need to retain small schools in remote regions to ensure some access to basic education for all. Thus, while consolidation brings down per capita costs overall, these municipalities still face large unavoidable per capita costs, estimated to be on average over 30% greater compared to cities. The additional cost of not adjusting the school network to future lower demand is highest in the smallest municipalities that also face the highest costs of maintaining old and underutilised facilities. At the same time, these areas are likely to face the challenge of having to attract qualified, high-performing teachers. Access to services or working conditions (e.g. multiple roles of teachers, teaching different age groups) make it difficult to attract and retain qualified teachers, which is why financial and non-financial incentives for teachers are essential.

Similar challenges are present for the provision of public transport. In a recent study, the International Transport Forum (ITF) highlighted four key challenges for Estonia's transportation sector: i) a lack of co-ordination with spatial planning agendas; ii) low public transport quality in peripheral and rural regions; iii) low road pavement ratio; and iv) low investment efficiency. Although Estonia is aiming to introduce demand-responsive transport (DRT) through pilot projects, the pace of adoption is slower compared to other Scandinavian countries such as Denmark, Norway and Sweden. Furthermore, rural areas are more dependent on cars, which not only results in adverse environmental consequences but also high unit costs for public transport as small populations and low density make it increasingly difficult and costly to provide quality transport infrastructure.

Tax revenues are unevenly distributed between municipalities

In Estonia, the personal income tax revenue, which is shared between central government and municipalities, is an important source of income for municipalities, making up the majority (56%) of total revenues. However, its distribution is highly uneven across localities. The substantial differences between Estonian municipalities in personal income tax (PIT) revenue can be attributed to, among other reasons, disparities in income levels and poor economic conditions in rural and remote areas. The fact that people can live and work in one municipality and be registered for tax purposes in another, complicates the situation and makes comparisons difficult. Nonetheless, in general, small and sparsely populated municipalities are at a disadvantage compared to more populated areas in terms of municipal per head revenues, which leads to widening gaps in services, infrastructure and the quality of built environments.

Regional governance is fragmented, making it difficult to promote inter-municipal co-operation (IMC)

Spatial planning, strategic initiatives and development strategies are governed separately at the regional level

While the aim of the County-wide Spatial Plan (CSP) in Estonia is to define the principles and directions of spatial development at the regional level, in practice, CSPs do not cover important aspects of spatial policy such as health, education or socio-economic development. Instead, these aspects of development are delegated to various sectoral policies in a piecemeal fashion. For one, the Regional Policy Programme governs solely the regional planning activities of the Ministry of Finance, while horizontal sectoral policies are addressed in the newly established Regional Policy Action Plan (RPAP). Furthermore, spatial planning through the CSP and strategic planning through County Development Strategies are carried out separately, with no clear communication mechanism between them. Recent reforms to the *Planning Act* have also weakened the power of CSPs even further by taking away their decision-making capacity on projects that span municipal boundaries, such as network infrastructure.

This leads to inefficiencies across government agendas and a lack of policy coherence

This results in a complex and inefficient regional governance structure. The fragmentation of various county development strategies together with a patchwork of various plans makes it difficult to co-ordinate spatial planning at the regional level. CSPs are not substantive enough to be an appropriate tool to guide spatial development and promote local government co-operation. As a result, local plans related to land use or infrastructure and service provision do not span across municipalities and are not well aligned with national objectives. For example, the location of higher education institutions is not considered within a spatial planning framework to capitalise on the role of these institutions in built environment improvement and service provision integration strategies.

A lack of coherence also results in municipal finances and spending that lack co-ordination with regional and national objectives. Adding to the problem is the fact that only about 14% of municipal revenue comes from own revenue sources. This means that fiscal pressure to co-operate is moderate and comes mainly from the transfer system, which adversely affects municipalities' incentives for engaging in voluntary co-operation. The education sector is a key area where these problems play out. While spending-wise the main task of Estonian municipalities is education provision, the central government has taken more responsibility for secondary education and upper secondary education is provided for by both government levels. Such an arrangement results in a limited division of roles between governments and has led to inefficiencies in service delivery. Shrinking and ageing coupled with declining revenues in rural and remote areas may pressure the central government to further intervene in other services, especially if IMC continues to be limited. Without effective multi-level governance frameworks, this could lead to further inefficiencies and misalignment of objectives.

Planning and legal frameworks are ill-equipped to tackle depopulation

Local Comprehensive Plans (CPs) do not steer spatial development and lack the flexibility to adapt to demographic change

Land use and spatial planning at the municipal level are still relatively new in Estonia as, during the Soviet occupation, planning processes were centralised with local administrations having little authority over planning processes. After independence, local governments were suddenly given the role of implementing planning policies for which they had little experience and knowledge. This led to a lack of capacity in devising coherent land use and spatial plans, and plans were often influenced by local actors pursuing private interests.

In theory, CPs are the primary instrument for spatial planning at the municipal level, with Detailed Spatial Plans (DSPs) existing at a smaller scale to implement the CP by determining land use functions at the plot level. In practice, however, the development of new settlements is often determined by fragmented, small-scale DSPs prepared and adopted separately and in random chronological order. These DSPs often override the CP and are in most cases initiated by property developers.

As a result, CPs struggle in their function of promoting coherent spatial development within the municipality. They fail to address depopulation through instruments such as settlement boundaries and do not encourage the densification of central areas. Population projections are not integrated into spatial strategies, resulting in land use decisions being made on unrealistic assumptions. CPs are also rigid, mainly setting building regulations, which makes it difficult to adapt to changing demographic trends or economic opportunities. The lack of capacity at the local level has resulted in many municipalities outsourcing planning development to consultants. While not always a bad practice, this has resulted in planning authorities retreating from leading roles and leaving the process of balancing interests, making discretionary decisions and reaching agreements with these hired experts.

Expropriation in Estonia is limited, time-consuming and legally challenging, exacerbating the problem of vacant housing and spread-out development

High vacancy rates, low energy efficiency and low quality are major problems in the Estonian housing sector. The overall housing vacancy rate was 24.5% in 2018, significantly higher even compared to Japan (13.6% in 2018) or eastern Germany (10-12% in 2013), countries also experiencing significant decline. In addition, the apartment stock consists of mainly old buildings, with 13.5% of houses still without indoor flushing toilets. In addition, these old apartments suffer from a lack of accessibility, which is problematic as rural and peripheral areas continue to age. Low energy efficiency is another problem that results in high heating costs, with the building sector accounting for 40% of national GHG emissions. As the building stock is rather old, the energy demand for heating per surface area in residential buildings is among the highest in the EU. According to recent Estonian reports, by 2050, there will be an estimated 5 300 apartment buildings needing to be demolished and 14 000 in need of renovation, with total costs estimated to be roughly EUR 22 billion.

Half-empty, old apartments and buildings detract from pleasant living environments and contribute to sprawl and migration. In addition, vacant houses increase the per capita cost of providing essential services such as district heating, water and sewage, aggravating the fiscal burden placed on local governments.

While a limited number of municipalities have been dealing with these issues and the central government is beginning to address these problems through studies and pilot demolition projects, legal barriers regarding expropriation, together with a lack of experience, is hampering efforts. The Acquisition of Immovables in the Public Interest Act allows expropriations only under strict conditions. There is no provision for expropriation for “public interest” or “public use”, as is the case for the majority of OECD countries. Thus, expropriations in Estonia are generally limited to public infrastructure construction, such as ports, utilities or roads, in addition to over half-empty apartment buildings. However, the agreement procedures for the expropriation of apartments have also proven arduous and time-consuming. Furthermore, even today, the expropriation of abandoned detached housing is not allowed.

The municipal finance system and land taxation schemes weaken municipal decision-making capacity while encouraging the inefficient use of resources

Earmarked grants are rigid and disincentivise efficiency gains in service provision

The central government has the main responsibility of financing municipalities in Estonia. The bulk of municipal revenue is formed by PIT revenue (56% of municipal operating revenue), shared between central

government and municipalities, and state grants (29%). Municipal own revenue, which includes land tax, other small taxes, sales revenue and other operating income, makes up only about 14% of total municipal revenue. The state grant system has been in place for 15 years with only minor changes. It is comprised of block grants (20.9% of municipal operating revenue in 2020), equalisation funds (4.9%) and other transfers (3.6%). The block grant for general education comprises a major share (77%) of total block grants and is mainly targeted to finance teachers and school leaders' salaries (81% of the grant), school lunches (7%) and study support to pupils with special needs (6%).

The fact that the Estonian transfer system consists mostly of earmarked grants (80% of all transfers) weakens the decision-making power of municipalities. For example, education grants must be used within the service they target, disallowing any savings made in one sector to be used in another sector (such as social services). This makes the system rigid and bars municipalities from utilising their revenues in a flexible manner to suit local needs, also discouraging efficiency-improving measures.

The current earmarked grant system also disincentivises municipalities from improving the efficiency of services because any cost savings automatically result in cuts in block grants. In some cases, resources cannot be reallocated even within the same service sector. For example, a rural municipality may save on teacher costs by consolidating classes, yet the saving cannot be used for pupils' transportation without a loss in education transfers. This can, for example, discourage municipalities from merging schools into bigger units. Furthermore, some of the indicators used in the transfer system (equalisation system and earmarked transfers) are based on the degree of population dispersion (e.g. *tagamaalisuse koefitsient*) and the presence of small schools. While well-intended, such calculations nonetheless disincentivise municipalities away from efficient land use.

Land tax legislation and the limited use of land-based financing instruments encourage spread-out development

By law, the land tax is set by municipalities to be between 0.1% to 2.5% of taxable values. In practice, most municipalities simply opt to tax at the highest rate allowed. The land tax is considered a central government tax but 100% of its receipts go to local government budgets. Land taxes account for just 2.9% of total municipal revenues, amounting to 0.3% of GDP which is well below the OECD average of 1.1%. This results in part from the fact that taxable land values have not been re-evaluated since 2001 and are thus unrealistically low compared to market values. While new legislation to allow new valuations are currently being proposed by the Ministry of Finance, this legislation still provides for a long adjustment period. As higher land taxes generally encourage densification and more efficient use of land, the current regime is in effect incentivising sparsity over sufficiently compact development.

Land tax exemptions are another factor that further encourages sparsity. Exemptions exist for residential land plots where the owner's permanent residence is located. The exemption extends up to 0.15 hectares in cities, towns and areas designated as densely populated areas in a comprehensive plan and up to 2.0 hectares elsewhere. Through larger exemptions in remote areas far away from residential centres, coupled with low land prices compared to dense areas, this incentivises residential land owners to locate in the outskirts of rural and remote regions and promotes sprawl.

The limited implementation of land-based financing instruments also disincentivises sufficiently compact development. For example, while Estonia uses impact fees to levy costs related to upgrading technical infrastructure (based on the Planning Act, paragraph 131), its implementation is limited only to instances where the development falls under a DSP, which are mostly urban areas. Other instruments such as betterment contributions are not used in Estonia. The lack of a scheme to internalise the costs of infrastructure and service provision in remote areas makes living in these areas cheaper, further encouraging spread-out development. As a consequence, many rural homes in Estonia are secondary residences inhabited only during certain months of the year.

Key policy recommendations

Reduce land consumption sustainably and promote gradual densification of central areas

Rural and remote regions experiencing population decline and ageing should aim to reduce land consumption and increase current land use efficiency, taking into account infrastructure and service delivery capacities. This benefits local municipalities by not only reducing per capita service delivery and infrastructure costs but also by reducing the environmental impacts of spread-out development. Analyses show, for example, a strong positive correlation between built-up area per capita and both education provision costs and GHG emissions at the TL3 level. Furthermore, denser places are on average more productive than less dense places due to productivity gains obtained through agglomeration economies, with the population density of a region being a strong predictor of economic performance. General densification could also lead to a functioning real-estate market, improvements to the built environment and better connections to services, boosting property values in remote areas.

CPs should steer spatial development while subordinate plans should adhere to spatial planning objectives

The DSP, despite being the subordinate plan in the planning hierarchy, has the authority to override the CP. This poses issues in Estonia as DSPs are most often initiated by developers and thus are influenced by private interests. The overriding of the CP in favour of a more detailed plan influenced by private interests carries the danger of detracting from a more coherent spatial development strategy.

Rearranging the hierarchy of local plans is necessary to promote coherent spatial development at the local level. This is especially important because, in addition to DSPs, Local Government Designated Spatial Plans (LGDSPs) and design criteria also exist to set building regulations and land uses, which, without streamlining, can result in confusion regarding planning processes. The CP should confirm its role as the higher-order plan that sets out strategic initiatives for land use and development. The subordinate plans and codes should conform to the CP and complement it by implementing building and land use details based on these agendas.

Alterations to the CP by subordinate plans should be disallowed or at the very least allowed only in exceptional circumstances. In return, CPs should refrain from “over-planning” by moving away from setting detailed building codes and specific uses and rather focusing on planning the strategic location of land use, housing, infrastructure and service networks, while also setting strict development boundaries. This would have the added benefit of easing the requirements of what constitutes a CP and shortening approval processes.

CPs need to integrate population projections into land use planning and adjust development boundaries accordingly

Without population projections, land use plans tend to overestimate the future demand for land. This is especially the case when regions are declining, as plans tend to be overly optimistic in estimating land demand compared to population forecasts. In order to prevent a “race to the bottom”, CPs should incorporate the population guidelines set in CSPs and implement them into land use plans and regulations, encouraging densification of core areas. If needed, Statistics Estonia could provide municipal level population projections that CPs could utilise.

A strategy of proposing settlement boundaries and service limits while providing various incentives for investments within those boundaries helps in deterring spread-out development. Instruments such as urban growth boundaries, urban service boundaries and greenbelts could be used to set temporary limits on expansion. Such boundaries should be clearly laid out and enforced in CPs, in harmony with strategic objectives and socio-economic development plans. These boundaries should then be adjusted as needed to better contain development in areas that face population decline. When coupled with fiscal incentives, these boundaries are capable of improving the quality of the built environment within the limits, which can attract residents and businesses.

Local plans should be more flexible to adapt to demographic trends and economic opportunities

Zoning should be sufficiently flexible to allow neighbourhoods to change over time according to evolving population patterns and changes in housing demand. Flexible zoning plans allow underused areas to be allocated to new uses, possibly even through temporary uses. This can increase the density of development and improve environmental sustainability while reducing burdens on transport infrastructure. Flexible zoning also ensures efficient patterns of spatial development, especially in low-density areas and along public transport corridors.

Importantly, however, flexibility in land use planning should not lead to uncontrolled land use. Zoning regulations should define maximum nuisance levels, with uses that create fewer nuisances than the maximum level generally being allowed. For example, all types of residential buildings could be allowed in a commercial zone, while warehouses and garages (but not factories) are allowed in commercial areas. Importantly, none of the zones should be strictly single-use in principle, with single-use zoning being reserved mainly for specific purposes such as hazardous industrial areas.

Flexible zoning districts or Special Purpose Bodies (SPBs) could be used to improve the adaptability of land use in instances where new developments need to be implemented quickly. Many OECD countries such as Germany and Poland have adopted extraordinary measures for such cases. However, such zoning districts, if implemented, should only be utilised in cases where a significant investment or opportunity arises for which quick development is necessary. Various incentives for investments within these districts could also be used to spur development and growth.

Density regulations should be upwardly flexible to allow for the gradual densification of central neighbourhoods, in line with infrastructure and service delivery capacity. This is important especially in rural and remote regions where reliance on personal vehicles is high. Thus, when utilising mixed-use and flexible density regulations, the priority should be to establish well-functioning public transport networks including DRT services through transit-oriented development (TOD). Such land use patterns also result in a reduction of service per capita and infrastructure delivery costs. This is critical for rural and remote areas and small towns facing decline, as their fiscal capacity to provide for an extensive infrastructure network that spans thinly developed areas is limited.

Governance spanning sectors and levels of government is needed for coherent spatial planning and IMC

Voluntary IMC should be promoted through incentives and legal frameworks

Promoting IMC has become increasingly important in Estonia since the municipal reform and abolition of county governments. This is because uncoordinated local regulations can be easily sidestepped by simply moving to a nearby, less restrictive jurisdiction. A classic example is the local property tax, where higher tax rates can be avoided by moving to a nearby municipality. The positive effects of providing services and

infrastructure in a municipality are also bound to traverse administrative boundaries through spill-over effects.

Without formal regional governments, Estonia should consider strengthening policies for IMC, especially in the case of services and infrastructure with externalities requiring a larger catchment (e.g. education, water and sewerage). This is important also because municipalities often appear to compete for central government financing and EU funds. Without special arrangements and enabling frameworks, municipalities may not have a strong financial incentive to enter into co-operation.

Policies that clarify the legal base for voluntary IMC are needed to help municipalities to utilise economies of scale and also to reduce confusion and streamline administrative processes. This could possibly be done within the planning framework, by outlining processes for co-operation in important areas such as education and infrastructure within the National and County-wide Spatial Plan (NSP and CSP, which are legally binding). In addition, utilising the transfer system by targeting certain transfers to inter-municipal bodies rather than municipalities could incentivise municipalities to choose voluntary co-operation. This would be particularly effective for rural and remote municipalities, as they often lack the fiscal capacity to undertake large scale projects spanning administrative boundaries. The central government could further encourage municipal co-operation by engaging in capacity-building efforts to support municipalities in improving administrative capacity, as well as funding pilot projects and experiments on voluntary IMC to gain more experience in best practices. A state government-led comprehensive review of municipal service responsibilities is also warranted to help identify services where reassignment of spending and IMC could be viable approaches.

CSPs should be the central platform in guiding regional development

In theory, the aim of a CSP is to define the principles for coherent spatial development within county boundaries. Its primary role is to formally express interests that transcend local municipal boundaries and to balance national and local needs and interests regarding spatial development. In this way, CSPs are the ideal platform to address issues such as land use, territorial development, infrastructure, service delivery and housing, that are closely related to shrinkage, as these issues need to be solved collectively at a higher spatial scale. In practice, however, CSPs are weakly implemented and lack proper details regarding the scope and procedures for IMC.

The recent changes Estonia has undergone in its county governance have brought about fragmentation in county strategies. The Regional Policy Programme and Regional Policy Action Plan should be streamlined to provide one coherent regional policy framework that integrates spatial objectives with strategic objectives. CSPs should be a *de facto* platform for which regional issues relating to spatial development are outlined. CSPs need to outline a clear division of roles between the central government and municipalities for tackling issues that span municipal boundaries. In addition, CSPs should expand the scope of functions to determine the conditions for IMC in other policy areas pertinent for tackling depopulation and ageing, including education, health and other critical services and infrastructure. To this end, the central government and municipalities need to review the appropriateness and feasibility of the current hierarchical service network and outline clear implementation plans with timelines in CSPs. There is also a need to combine strategic planning with spatial planning at the county level, by integrating county development strategies and CSPs, or even by subsuming county development strategies within CSPs.

Increase the quality of services through municipal co-operation

Promoting co-operation among municipalities undergoing shrinkage will be key in the next decades as increasing the quality of services is closely linked to increased scale and resource sharing. Estonia lacks a history of quality-oriented co-operation across rural municipalities. As such, co-operation may require additional policy actions on top of existing financial incentives for consolidation. For education, these could focus for instance on incentives to develop dormitories and transportation solutions in co-operation with

neighbouring municipalities. The network of service centres outlined in CSPs should be utilised to further consolidate services in general and promote IMC.

For education, a modular approach for the integration and combination of school services can aid joint restructuring processes in neighbouring small municipalities. This can work for instance to improve the integration of pre-primary and primary school levels and to separate lower education when there is room for consolidation at that level. The central government could actively promote strategic partnerships among small rural municipalities, for instance through additional financial incentives for joint municipal projects with clear quality-enhancing goals for students. Importantly, with consolidation, distances to schools will increase for students in rural remote areas that already face long travel distances. In this context, there is a need to mitigate the effects of consolidation for rural students that are not limited to physical access but also include an increased mismatch between educational offerings and local market demands, and a reduction in the variety of courses offered. Strategies can include new digitally-based models of provision and opening the option for rural students to virtually attend courses offered outside their catchment area.

The regional education centres that are part of the Estonian Education Strategy 2021-2035 can help aid the transfer of capacity from central to local levels and co-ordinate all stakeholders involved in the strategic provision of vocational training, including local economic actors. Moving beyond political entities such as municipal co-operation organisations at the county level, this co-operation needs to be done at a level that is fully recognised and supported by the municipalities involved, for instance by strategic partnerships formed through bottom-up approaches.

In general, rural school clusters could aid in increasing resource sharing and allocating resources more efficiently and effectively across rural schools. This would increase accountability for school directors and incentives for specialised teachers. If formalised for groups of municipalities, school clusters can have the additional benefit of increasing managerial decision capacities oriented towards development and change management, while improving the connection between school and municipal level decisions.

Strategic and flexible use of digital education provision in combination with school clusters can further reduce the need for staff and student travelling. Such measures mitigate inequities in access to education due to consolidation. Digitally-based models of upper secondary provision could also have the added benefit of leveraging high digital skills in Estonia. Vocational students in rural areas could be given the chance to complement their programmes by virtually attending courses offered outside their catchment area. Rural vocational schools could update their offer to cater to information and communication technology (ICT) professional profiles in sectors such as tourism and agriculture. These efforts will likely require state government support as well as co-operation among rural municipalities as private incentives are low. When properly implemented, such policies could be used as a vehicle to ensure regional development objectives are integrated into decisions on vocational education and training (VET) curricula. This is especially important in shrinking regions where a misalignment of VET offerings and local needs could contribute to further brain drain.

Going beyond education, it is imperative to align the adaptation of services in a coherent manner across sectors. Such integration takes advantage of potential synergies and reduces inefficiencies in the use of fiscal resources. Estonia’s existing network of service centres outlined in CSPs should be better utilised to consolidate municipal services while still maintaining quality across all areas, including sparsely populated regions. This requires a coherent regional framework and strong IMC, along with financial support from the central government. The integration of services through the service centre network should also bring cost savings based on economies of scale.

Demolition and renovation projects should take place at a larger scale, through coherent planning, fiscal support and legislative changes

Current efforts to improve living conditions and residential environments through demolition and renovation projects in Estonia, while ongoing, are still in their infancy. For example, the *Hea avalik ruum* programme in Estonia has been implemented since 2014 and the rejuvenation of ten town centres has been completed. They have been successful in achieving their goal of improving the built environment of central areas yet these projects have been implemented in a piecemeal fashion at the site level. It is necessary to establish a system in which these projects can be implemented at a larger scale through co-operation between government levels, ideally within the spatial planning framework through the CPs and CSPs. Importantly, these programmes should be implemented in a participatory and horizontal manner. This would not only improve their efficiency but also better align regeneration efforts with strategic objectives.

Demolition and renovation projects should be aligned with spatial planning objectives outlined in CSPs and CPs. The CSPs should outline which areas need demolition and renovation based on population projections and spatial development trajectories. The CPs should outline the settlement boundaries and allocate land uses and development densities. The demolition and renovation projects should follow a process of “shrinking from the outside in”, where the building stock in the periphery is reduced and renovation efforts are concentrated in town centres.

The estimated annual investment needed for demolition and renovation is 4.5 times larger than that of current investments. As such, the central government should prepare a sufficient and stable financing mechanism, possibly through the Estonian Credit and Export Guarantee Fund (KredEx) or by establishing a housing investment fund as well as increase annual investment scales. Funding priority should be given to non-metropolitan regions where shrinkage and vacant housing issues are most prevalent. Additional bonuses or higher grant percentages could also be awarded to projects reflected in the CSPs or CPs.

Legislation for expropriation should also be revised to allow for the easier demolition of vacant buildings. Expropriation should be allowed for the demolition of empty detached housing, while the expropriation of apartment buildings should be streamlined. Expropriation initiatives should be integrated with land use plans through the CP and CSP, thus allowing expropriations to be carried out at a larger scale based on demographic projections and settlement boundaries. This would require expropriations to be allowed based on land use decisions, such as in countries including Denmark, Finland, Latvia and Poland.

When expropriation proves difficult, strategies such as land readjustment or land banking could be utilised. Land readjustment strategies could provide residents with an alternative residence in the vicinity of their current plot that is more valuable due to infrastructure and built environment improvements but smaller in area. “Land banking”, the practice of assembling plots of undeveloped or abandoned land for development or sale, could be used in declining areas to help municipalities identify, prepare and redevelop vacant sites.

The municipal financing system and land taxes should be revisited to better prepare for depopulation

The municipal transfer system should be reformed to be more transparent and efficient

The current system of municipal transfers in Estonia is a complex entity and, due to overlapping indicators, the equalisation model and the earmarked grants system do not work well together. Measures are needed to promote transparency and efficiency in spending at the municipal level. Estonia could consider abandoning altogether or at the very least considerably reducing the complex earmarked grants system. The money saved from earmarked grants could instead be used to strengthen the equalisation system. All municipalities, including those with shrinking populations, could benefit from such a reform because they could better allocate the financing according to their local needs and demand.

The transfer system also needs to become more transparent. Specific circumstantial factors such as remoteness and low population density should be taken into account using a maximum of one or two criteria. The current measures used to support remote and low-density regions often inadvertently foster inefficient development patterns. These could be replaced with more neutral indicators, such as population density. The advantage of population density as an indicator for state support is that the recipients (municipalities) cannot directly influence the grants they receive with their own measures. Furthermore, population density as a measure of state aid encourages municipalities to improve the efficiency of their settlement structure. On the contrary, if the municipality managed to obtain cost benefits from a denser settlement structure, it could keep the benefit to itself, as the population density would remain unchanged in this case and the state contribution would not be reduced. Using population density as a need indicator would not change the balance between rich and poor municipalities because revenue capacity is taken into account in the equalisation.

From the perspective of rural and remote regions experiencing depopulation, demographic shifts should be taken into account more explicitly in the equalisation system, with a specific indicator for population change for example. Such an indicator could be used to support not only municipalities with shrinking populations but also those that are growing.

Land taxes and land-based financing instruments should be revised to deter spread-out development in rural areas

Land tax rate limits should be relaxed to allow municipalities greater autonomy in collecting revenues and to encourage efficient land use. Land taxes should not incentivise spread-out development and the ownership of single-family homes over multi-family homes. Tax exemption for residential land in remote areas should be abolished, or at least reduced, while exemptions in denser areas within rural municipalities could be relaxed further. The additional revenues collected from land taxes should be reinvested towards improving amenities in shrinking regions.

Importantly, these measures would need to come hand-in-hand with the re-evaluation of taxable land values, as current low valuations make such measures ineffective. Differentiated land tax rates depending on land use could be utilised, as in the case of Germany which differentiates tax rates based on land uses and associated environmental costs. In the Netherlands and the United States, there have been discussions on a tax on the welfare loss associated with the loss of open space due to development.

Alternative fiscal instruments could be used to better align land use with desired spatial outcomes. Importantly, impact fees should be more actively utilised to not only apply to developments in dense areas but also those in remote regions, with the rationale being the internalisation of additional costs related to service and infrastructure delivery. Impact fees have the benefit of not only internalising externalities but also providing local governments with financial resources to improve the quality of the built environment when fees are redirected towards improving public infrastructure and services.

Fiscal incentives need to be implemented in conjunction with school network reform to address shortages in teachers and other professionals in rural areas

The issue of shortages of teachers and other professionals (such as healthcare staff) in rural areas will have to be managed with career incentives that go beyond lump-sum financial aid. For this, special emphasis has to be placed on incentives to ensure a better assignment of human resource funds within rural schools and service centres. This could be done, for instance, by assuming more flexibility in roles, outlining clear retirement plans for older staff and providing strong career and training incentives for younger qualified staff, including digital skills and support targeted at the needs of women and their families, as well as additional provisions for flexible work hours, fewer contact hours per week and/or rotation systems. As the responsibility for the strategic planning of human resources in services falls under the responsibilities of municipalities, the state government should keep close track of performance

indicators in small and shrinking municipalities and act to bridge capacity gaps, for instance by actively promoting managerial capacity-sharing across neighbouring municipalities.

The central government should aid municipalities by providing data and open information systems together with administrative support

Establishing data and open information systems for vacant houses and buildings, in particular, is necessary to provide information on the spatial distribution and status of depopulation across regions. A database documenting the costs and outcomes of main municipal services should be established to support benchmarking of service provision across municipalities. Relatedly, existing and planned platforms such as “My municipality” (*Minuomavalitsus*) and the e-construction platform could be expanded to include key aspects of spatial planning and the built environment, to regularly evaluate and monitor the quality of life in regions. For example, the United Kingdom’s Ministry of Housing, Communities and Local Government has developed and published online a relative deprivation index based on 39 separate indicators at the municipal level that is used to gauge the living conditions of residents across multiple domains. A dedicated e-platform could also integrate data from various government sources, such as the land portal and the building register.

In light of local governments’ short history of land use planning, the central government could aid in local government capacity-building to effectively design CPs. It could train and maintain a national pool of certified planning and architectural experts that would aid local municipalities in devising CPs as needed and serve as consultants for the planning authority. This would provide local planning officials with the administrative capacity to co-operate on planning efforts, balance the interests of various stakeholders and ensure overall that a comprehensive spatial solution is prepared for the municipality.

Action plan

	Raise the awareness in municipalities of the cost and service quality effects caused by the shrinking population		
	Main text for recommendation		
	• The seriousness of the effects of a shrinking population seems not to be widely understood by the municipalities, with some not yet accepting the fact that their population is shrinking. Municipalities' awareness of their shrinking population and related costs and service quality effects needs to improve to align land use strategy and service planning with population forecasts.		
	Actions		
	• Establishing an advisory service for municipalities to better identify the additional costs caused by shrinking population, for instance on the mismatch between the population base and current infrastructure and service delivery. Such a service could for example help municipalities to plan and reorganise school networks and local infrastructure. The service could be organised jointly by Statistics Estonia and the Ministry of Finance, and could support the training of municipal officials and municipal council members. • Extend the current databases on the costs and outcomes of main municipal services to support benchmarking between municipalities. A database with more detailed information on the inputs and outputs of municipal services (including indicators on service quality) would enable advanced efficiency analyses.		
	Actors		
	• The central government in co-operation with the Association of Estonian Cities and Rural Municipalities		
	Timeline		
	Short-term	Medium-term	Long-term
		✓	

	Better integrate population projections in Comprehensive Plans (CPs) and adjust land use accordingly		
	Main text for recommendation		
	CPs should better integrate population projections into land use plans and regulations, encouraging densification of core areas. Local land use plans should take into account the forecasted demand for housing, infrastructure and other uses, as well as allow for the adjustment of densities and development boundaries.		
	Actions		
	• Incorporate municipal population projections into CPs. • Propose settlement boundaries and service limits to contain sparse development. • Provide incentives for investment within settlement boundaries. • Create a database of municipal-level population projections managed through Statistics Estonia.		
	Actors		
	• Municipalities • Central government (Ministry of Finance, Statistics Estonia)		
	Timeline		
	Short-term	Medium-term	Long-term
	✓	✓	✓

Make Comprehensive Plans (CPs) steer spatial development and make subordinate plans adhere to spatial planning objectives

Main text for recommendation

CPs should steer coherent spatial development. The current planning framework should be rearranged so that subordinate plans such as the Detailed Spatial Plan (DSP), Local Government Designated Spatial Plan (LGDSP) and design criteria conform to the CP.

Actions

- CPs should set out strategic initiatives for land use and development and their binding nature should be confirmed.
- CPs should focus on planning the strategic location of land use categories, housing, infrastructure and service networks and avoid setting detailed building codes and specific uses.
- DSPs should override the CPs only exceptionally.

Actors

- Central government (Ministry of Finance)
- Municipalities

Timeline

Short-term	Medium-term	Long-term
	✓	✓

Make Comprehensive Plans more flexible to adapt to demographic trends and economic opportunities

Main text for recommendation

Zoning should allow neighbourhoods to change as the population evolves. Importantly, however, flexibility in land use planning should not lead to uncontrolled land use that does not internalise the potentially harmful externalities stemming from developments.

Actions

- Zoning should be based on tolerated nuisance levels for each land use category. Uses that create fewer nuisances than this maximum should be permitted.
- Flexible zoning districts or Special Purpose Bodies could be utilised where new developments need to be implemented quickly.
- Single-use zoning should be avoided in favour of mixed-use zoning and density regulations should be upward flexible, especially in transport corridors.

Actors

- Central government
- Municipalities

Timeline

Short-term	Medium-term	Long-term
	✓	✓

Make County-wide Spatial Plans (CSPs) the central platform in guiding regional development

Main text for recommendation

CSPs should be a platform outlining regional issues relating to spatial development. They should fulfil the primary role of formally expressing interests that transcend local municipal boundaries and balance national and local needs and interests regarding spatial development.

Actions

- The Regional Policy Programme and Regional Policy Action Plan should be streamlined to provide one coherent regional policy framework that integrates spatial objectives with strategic objectives.
- Regional policy frameworks should be well integrated within the National Spatial Plan (NSP) such that it provides a clear framework that can be implemented by individual CSPs.
- The Nationally Designated Spatial Plan should be well integrated into the NSP so that CSPs can better take national level construction projects into account when devising regional level spatial planning strategies.
- CSPs need to outline a clear division of roles between the central government and municipalities.
- CSPs should expand the scope of functions to determine the conditions for inter-municipal co-operation (IMC) in other policy areas pertinent for tackling depopulation and ageing, including education, health and other critical services and infrastructure.
- The central government and municipalities need to review the appropriateness and feasibility of the current hierarchical service network in close co-operation with public transport authorities and outline clear implementation plans with timelines in CSPs.
- CSPs should better outline areas for IMC with regards to the function of the network of centres and clearly determine principles for municipalities in co-ordinating development patterns.
- County development strategies and CSPs should be well integrated, possibly by subsuming county development strategies within CSPs.

Actors

- Central government
- Municipalities
- Public transport authorities
- Public companies providing services in CSPs

Timeline

Short-term	Medium-term	Long-term
	✓	✓

Promote voluntary inter-municipal co-operation (IMC) through incentives and legal frameworks

Main text for recommendation

IMC is a viable approach to better utilise economies of scale and scope of public service provision at the municipal level. The central government should step up the voluntary co-operation between municipalities especially in the case of services with externalities and services needing a bigger scale (e.g. education, public transport and some infrastructure such as roads). Enhanced IMC is important also because often the municipalities compete for central government financing and the EU funds, and therefore without special arrangements, the municipalities may not have a strong financial incentive to enter co-operation. A larger share of own revenues of municipal total revenue would incentivise municipalities to co-operate because co-operation would bring cost savings to municipalities.

Actions

- Clarify the legal base for voluntary IMC for different types of co-operative arrangements. IMC should be legally and contractually easy to establish and easy to exit for the municipalities.
- Use the transfer system to encourage voluntary IMC, for example, targeting some transfers to IMC instead of municipalities.
- Utilising piloting and experiments on voluntary IMC to get more experience on best practices of such arrangements.
- Central government could support municipalities to build municipal administrative capacity to organise IMC, for example by preparing model contracts for establishing IMC and by establishing advisory services for municipal council members and top civil servants in the municipalities.

Actors

- Central government
- Municipalities
- Association of Estonian Cities and Rural Municipalities

Timeline

Short-term	Medium-term	Long-term
	✓	✓

Develop incentives to boost co-operation in education provision across municipalities

Main text for recommendation

Estonia could benefit from promoting co-operation among municipalities undergoing shrinkage with the aim of increasing the quality of basic education through increased scale and resource sharing. This requires additional policy actions on top of existing financial incentives for school closures.

Actions

- Promote new ways of organising school resources – such as school clusters where schools formally co-operate under a single leadership – to increase resource sharing and to allocate resources more efficiently and effectively.
- Combine a strategic and flexible use of digital education provision with school clusters.
- Encourage a modular approach for the integration and combination of school services in neighbouring small municipalities.
- Promote strategic partnerships among urban and suburban municipalities as well as among small rural municipalities, for instance through additional financial incentives for joint municipal projects.
- Promote effective access to dormitories and transportation solutions for vocational school students in co-operation with neighbouring municipalities.

Actors

- Central government
- Rural municipalities
- Transport agency
- Regional development centres

Timeline

Short-term	Medium-term	Long-term
	✓	✓

Support demolition and renovation projects through coherent planning, fiscal support and legislative changes

Main text for recommendation

Current efforts to improve living conditions and residential environments through demolition and renovation projects in Estonia, while ongoing, are still in their infancy. It is necessary to establish a system in which demolition and renovation projects can be implemented at the county and national levels, with regards to demographic trends and spatial planning objectives.

Actions

- Demolition and renovation projects should be aligned with spatial planning objectives outlined in CSPs and Comprehensive Plans (CPs). The CSPs should outline which areas are in need of demolition and renovation based on population projections and spatial development trajectories. The CPs should outline the settlement boundaries, the amount of land allocated to each use and development densities, directing demolition and renovation projects according to these plans.
- The central government should prepare a sufficient and stable financing mechanism, possibly through the Estonian Credit and Export Guarantee Fund (KredEx) or by establishing a housing investment fund, and increase annual investment scales.
- Mid-to-long-term investment plans including the amount of funds available and deadlines for application rounds should be announced as early as possible so that local governments and the private sector are able to prepare accordingly.
- Integrate expropriation initiatives into CPs and allow expropriations based on land use decisions made in these local plans.
- Strategies such as land readjustment or land banking could be utilised in cases where expropriation is difficult.

Actors

- Central government (Ministry of Finance, Ministry of Economy and Communication, Ministry of Culture, Ministry of Education and Research)
- County development centres
- KredEx
- Municipalities

Timeline

Short-term	Medium-term	Long-term
	✓	✓

Revise taxes and land-based financing instruments to deter spread-out development in rural areas

Main text for recommendation

Land taxes and land-based financing instruments should not incentivise spread-out development and the ownership of single-family homes over multi-family homes. The additional revenues collected from land taxes should be reinvested towards improving amenities in shrinking regions.

Actions

- Tax exemption for residential land in remote areas should be abolished, or at least reduced, while exemptions for core areas within rural municipalities could be relaxed further.
- Taxable land values should be re-evaluated.
- Differentiated land tax rates depending on how land is used and associated environmental costs could also be utilised.
- Impact fees should be more actively utilised to not only apply to developments in dense areas but also those in remote regions, with the rationale being the internalisation of additional costs related to service and infrastructure delivery.

Actors

- Central government
- Municipalities

Timeline

Short-term	Medium-term	Long-term
		✓

Carry out a comprehensive review of municipal service responsibilities

Main text for recommendation

A periodic review of municipal service responsibilities is usually recommended every 5 to 10 years. Carrying out such a review could help identify services where reassignment of spending assignments between central government and municipalities as well as inter-municipal co-operative units could be a viable approach. The review could be conducted jointly by central and local government representatives, with support from academia and other expert organisations.

Actions

- Establish an independent temporary body (a working group or an ombudsman) for reviewing the spending assignments.
- Establish a steering group for the review (central government and municipalities).
- Use the review and its recommendations to plan the reorganisation of service assignments.
- Plan for the next review in no later than 10 years after the first review.

Actors

- Central government
- Municipalities, Association of Estonian Cities and Rural Municipalities
- Academia, other expert organisations

Timeline

Short-term	Medium-term	Long-term
✓	✓	

Reform the municipal transfer system

Main text for recommendation

The current earmarked grant system disincentivises municipalities from improving the efficiency of services because efficiency-improving changes that lead to costs savings will not allow the use of saved funds in other services. This makes the system rigid and considerably restricts the municipal decision-making power. Overall, the transparency of the current transfer system should be improved and disincentives for improving efficiency should be resolved.

Actions

- Carry out an independent review of the municipal transfer system in Estonia, in order to increase the transparency of the system and to increase municipal decision-making power.
- Use the results of the review to reform the transfer system.
- In line with the recommendations for the overall reform of the system, consider taking the shrinking population into account more explicitly in the equalisation system, for example with an indicator on population change.

Actors

- Central government

Timeline

Short-term	Medium-term	Long-term
	✓	

Strengthen the municipal own revenue base

Main text for recommendation

The fact that the Estonian transfer system consists mostly of earmarked grants (80% of all transfers) and the fact that municipalities have no powers on personal income tax (PIT), weakens the municipal decision-making power. High reliance on transfers and shared taxes may have a negative effect on the efficiency of municipal service delivery. A local income tax could be considered to increase the municipal own revenue-raising power. After the merger reform of 2018, the municipalities should have the adequate administrative capacity to take bigger responsibility not only for their spending but also for their financing.

Actions

- Successfully complete the land tax base re-evaluation.
- Ease the land tax rate regulation by increasing the upper band from the current 2.5%.
- Explore the possibility of introducing a municipal income tax (a truly local income tax or establishing a "piggyback" tax on the national income tax).

Actors

- Central government

Timeline

Short-term	Medium-term	Long-term
✓	✓	✓

Focus on training and career incentives to attract teachers to rural schools

Main text for recommendation

Rural areas need to ensure clear career incentives for new teachers as well as mechanisms to compensate for the specificities of rural schools, including not only small and multi-grade classroom teaching but also possible isolation and long travel times. These incentives need to go beyond lump-sum financial aid.

Actions

- Assume more flexibility in roles and retirement plans for older staff and strong career and training incentives for newly qualified staff, including on digital skills.
- Evaluate the current attractiveness of part-time contracts.
- Promote school managerial capacity oriented towards development and change management while pooling resources under school clusters.
- Ensure a faster progression at the start of rural teachers' careers and specific measures for itinerant teachers such as flexible work hours, fewer contact hours per week or rotation systems.

Actors

- Central government (Ministry of Education and Research)
- Municipalities

Timeline

Short-term	Medium-term	Long-term
	✓	

Use objective measures of unavoidable costs while allowing more flexibility in the use of funding for education

Main text for recommendation

The inclusion of a fixed coefficient in the education grant system aims at ensuring similar levels of quality across urban and rural schools by aligning the wages of rural and urban teachers. In this context, Estonia could consider moving towards a measure of unavoidable costs based solely on geographic and demographic factors. Furthermore, with more flexibility in the use of funds, municipalities could focus on quality objectives.

Actions

- Avoid factors that are under the direct control of municipalities in the criteria used in the education grant system.
- Use unavoidable costs of remoteness and smallness estimations to determine the level of additional funding to rural municipalities.
- Increase the flexibility in the use of education funding.
- Phase out earmarked block education grants for basic education and redirect funds towards an equalisation fund while keeping in place mechanisms to ensure appropriate conditions for rural teachers.

Actors

- Central government (Ministry of Education and Research)
- Rural municipalities

Timeline

Short-term	Medium-term	Long-term
	✓	

Further develop innovative transport solutions to facilitate access to rural regions

Main text for recommendation

For shrinking rural regions with low service frequency, relying only on conventional (bus) public transport is unsustainable. Demand-responsive transport (DRT) could allow rural areas to benefit from flexible pre-bookable transport instead of scheduled services. In addition to DRT, it is also necessary to consider ways to provide transport services in connection with other private and public services such as post, retail shops and banking. Digital solutions such as a dedicated application can also aid in the implementation of such solutions by accurately determining demand and analysing accumulated traffic data.

Actions

- Provide rural inhabitants with DRT and promote the progress of ongoing DRT pilots.
- Incorporate software (such as applications) for DRT services to allow users and drivers to make last-minute bookings from a mobile phone.
- Develop grant programmes to promote local transport innovation.
- Promote complementary measures including the provision of electrically assisted bicycle services and subsidies for driving licences for young people in rural communities.

Actors

- Ministry of Social Affairs
- Ministry of Finance
- Ministry of Economy and Communication
- Public transport authorities
- Rural municipalities

Timeline

Short-term	Medium-term	Long-term
✓	✓	✓

Consolidate upper secondary education provision with a functional and strategic view

Main text for recommendation

Placement based on functional service provision areas that also take into account the future demand for education can optimise access to schools and avoid resource duplication. In particular, the placement upper secondary schools should be more aligned with other spatial planning policies to capitalise on the potential of newly constructed schools in built environment improvement and service provision integration strategies.

Actions

- Encourage placement based on optimal service provision areas.
- Align the placement of upper secondary schools with other spatial planning policies.
- Co-ordinate all stakeholders involved in the strategic provision of vocational education through regional education centres.
- Support students in their transition from basic to higher education through early and high-quality support systems.

Actors

- Ministry of Education
- Schools and regional education centres
- Local stakeholders and economic actors
- Municipalities

Timeline

Short-term	Medium-term	Long-term
	✓	

Digitalise vocational education to broaden opportunities for rural youth

Main text for recommendation

Estonia can develop specific strategies to better integrate general and vocational upper secondary schools that serve rural students as well as to better connect vocational education and training (VET) with the skills needed in tomorrow's rural labour market. The mechanisms employed should address not only the impact of consolidation on physical access but also the increased mismatch in the educational offer and local market demands and the reduction in the variety of course offers.

Actions

- Offer to VET students in rural areas the opportunity to complement their programmes by virtually attending courses offered outside their catchment area.
- Monitor rural labour market needs through the OSKA forecasting system in order to better connect VET with future rural jobs and, in particular, with the digital skills needs of rural employment.
- Strengthen training on digital tools in all vocational schools to sustain growth and employment in key sectors for rural areas such as tourism, biotechnology, renewable energies, agri-food or silver economy.
- Develop talent meetings between final-year students and small- and medium-sized enterprises (SMEs) in key sectors for rural areas.

Actors

- Central government (Ministry of Education)
- VET schools
- Private sector (SMEs and businesses)

Timeline

Short-term	Medium-term	Long-term
	✓	

	The central government should aid municipalities by providing data and open information systems together with administrative support		
	**Main text for recommendation**		
	Establishing data and open information systems, for vacant houses and buildings in particular, is necessary to provide information on the spatial distribution and status of depopulation across regions. Such systems together with administrative support and capacity-building efforts by the central government are needed to aid municipalities in adapting to depopulation and shrinkage.		
	**Actions**		
	• A database documenting the costs and outcomes of main municipal services should be established to support benchmarking of service provision across municipalities. • Existing platforms such as "My municipality" (Minuomavalitsus) and the planned e-construction platform could be expanded to include key aspects of spatial planning and the built environment, to regularly evaluate and monitor the quality of life in regions and support place-based policies. • The central government could train and maintain a national pool of certified planning and architectural experts with experience handling shrinkage issues, that would aid local municipalities in devising CPs as needed, and serve as consultants for the planning authority.		
	**Actors**		
	• Central government (all ministries)		
	**Timeline**		
	Short-term	Medium-term	Long-term
	✓	✓	

1 Setting the scene

This chapter sets the scene of this report by assessing the current demographic challenges Estonia is facing and presenting key facts relevant to the spatial interventions needed to address them. Specifically, it gives an overview of policy responses aimed at addressing shrinkage, stressing a generalisation approach that combines growth and shrinkage strategies based on spatial interventions in key policy areas. It then presents data on demographic trends and projections, together with data on digital connectivity. Finally, it concludes with an assessment of the governance structure of Estonia and an overview of the structure of the report.

Introduction

Depopulation is a challenge for many rural areas in OECD countries. The long-term effects are a declining tax base, a higher share of elderly people who are less mobile, a greater per head cost in the provision of public services (OECD, 2021[1]) as well as vacant homes and deteriorating housing quality, among others. A shrinking population also has considerable negative effects on the provision of local infrastructure. This is especially the case for services such as water supply, sewerage, public transportation, education and healthcare that benefit from economies of scale. As populations shrink, these networks become more expensive to maintain. Adding to the challenge is eroding tax bases, which make it harder for local governments to find resources to maintain these basic infrastructures. As people are increasingly attracted to densely populated areas with better opportunities, the trend of depopulation in rural areas is likely to continue into the future. Indeed, across OECD countries, the share of the national population living in metropolitan regions increased between 2001 to 2018 in all except one (Greece) (OECD, 2020[2]).

Estonia's total population, which amounted to 1.33 million inhabitants in 2020, shrank by 15% since 1991. This decline has not happened evenly across Estonia. Population growth occurred only in the larger urban areas of Tallinn and Tartu, while rural and remote urban areas have been shrinking rapidly. Ever since Estonia regained its independence in 1991, the population has declined by more than a quarter in more than half of Estonia's counties and some such as Ida-Viru in the northeast have lost more than a third of its population (Statistics Estonia, 2021[3]).

This context requires policy responses in a number of areas to adapt to the changes in settlement structure. Tackling current gaps in service provision and adapting to demographic change requires mobilising many layers of government. Effective vertical and horizontal co-operation within a multilevel governance framework and more cross-sectoral co-operation at the central government level is needed to improve the efficiency and impact of policy actions. Land use needs to become more efficient and spatial planning frameworks more coherent to tackle depopulation and shrinkage. Most importantly, these responses need to be approached from a spatial framework that aligns policies to jointly address shrinkage issues in a coherent way. This is because the consequences of shrinkage, whether it be declining taxes, greater per capita service or infrastructure costs, or indeed vacant homes, manifest differently across space. The objective of this report is to assess the current situation in Estonia across these policy areas and recommend spatial policy interventions that manage the decline of remote regions in a sustainable way. Accordingly, this chapter sets the scene by assessing the current demographic challenges Estonia is facing and presenting key facts relevant to the spatial interventions needed to address them.

The policy responses to shrinkage: From trivialising to managing strategies

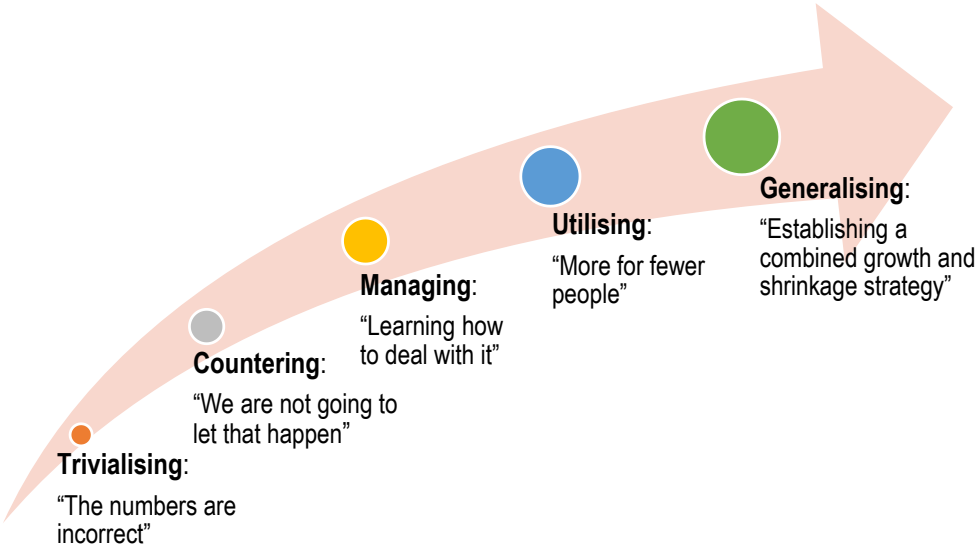
A traditional way to address population shrinkage at the regional and local government levels in OECD countries has been the "going for growth" policy, in other words trying to reverse shrinking trends and stimulate population growth (ESPON, 2017[4]). However, a completely different approach has recently begun to receive attention. Specifically, it has been argued that a "coping with decline" strategy forms a more realistic way forward for declining population regions and municipalities. This strategy, also called "smart shrinking" or "smart adaptation", means that shrinkage is accepted and the focus is on measures to adapt to its economic and social consequences (Haase et al., 2012[5]). For example, remote rural areas in Nordic countries have begun to adapt to shrinkage by aiming to maintain regional attractiveness, through investments in the diverse natural and cultural assets that differentiate them from urban areas (Kull et al., 2020[6]). These efforts have picked up pace since the outbreak of the COVID-19 pandemic. Importantly, adapting to shrinkage should go hand-in-hand with measures to promote economic development through measures such as smart specialisation, in order to maintain the vitality of shrinking regions.

In practice, four types of practical policy responses at the subnational government level have been identified by researchers: i) trivialising shrinkage; ii) countering shrinkage; iii) managing shrinkage; and iv) utilising shrinkage (Figure 1.1) (Haase et al., 2012[5]; Hospers and Reverda, 2015[7]). The "trivialising" approach refers to a situation where local policy makers challenge demographic local shrinkage projection data and offer no response. Under a "countering" approach, policy makers do identify the problem but offer only a counter-strategy focused on attracting new residents and firms to the local jurisdiction. The "managing" approach, in turn, focuses on improving quality of life for the residents that decide to stay, instead of focusing on how to attract people from outside. Finally, under the "utilising" approach, policy makers see shrinking municipalities as societal laboratories to test new methods, under the assumption that a municipality's quality of life does not necessarily depend on population density.

The "trivialising" approach is problematic because the approach is likely to lead to problems related to vacant housing, lower tax bases, budget deficits and indebtedness, among others. The "countering" strategy, in turn, requires realistic growth prospects to be successful and is likely to need strong financial support from the central government. The "managing" approach is perhaps the most realistic strategy, especially in a situation where the population has already declined for a long time and where there are no prospects for growth policy in the foreseeable future. The "utilising" approach works only if residents are able and willing to pay higher taxes for local public services or if there is enough private service capacity to replace the public service provision.

The recommendations throughout this report aim at a generalisation approach that combines growth and shrinkage strategies based on spatial interventions in key policy areas. A generalisation approach combines the "countering", "managing" and "utilising" approaches to focus more on current residents than on newcomers (Hospers and Reverda, 2015[7]). This includes efforts to maintain place attractiveness and quality of life as well as efforts to mitigate the negative impacts of depopulation. This "generalising" policy is however challenging from a governance aspect and requires skilled local government management as well as active and engaged local decision-makers.

Figure 1.1 Five approaches to respond to population shrinkage



Source: Author's elaboration and modification based on Hospers, G. and N. Reverda (2015[7]), *Managing Population Decline in Europe's Urban and Rural Areas*, Springer.

Demographic trends in Estonia

Estonia is located on the eastern shores of the Baltic Sea, bordering the Gulf of Finland in the north, Latvia in the south and Russia in the east. Besides three main cities (Tallinn, Tartu and Narva) concentrating about half a million inhabitants, its relatively small population of about 1.3 million inhabitants is sparsely spread over the territory. Without a significant push in international in-migration, Estonia is projected to lose population in the next decades – especially in low-density rural areas.

In the midst of slow population growth, people in Estonia have favoured moving into urban areas and away from remote areas. In a larger context within Europe, all Estonian regions besides North Estonia (where the capital Tallinn is located) are part of a group that face the largest challenges from depopulation because they are far away from centres of growth, with lower quality services and housing.

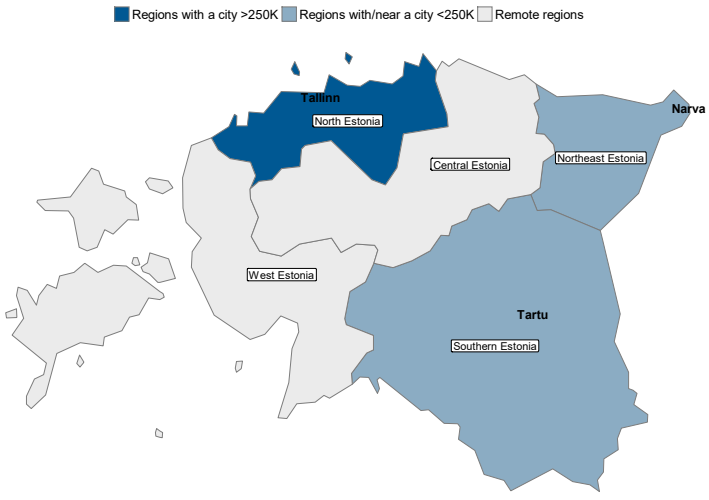
This section first reviews the current settlement patterns and population distribution in Estonia and then continues with an analysis of the past and future main demographic trends shaping the provision of services.

Settlement patterns and population distribution

The 1.3 million inhabitants of Estonia are spread over 45 000 km² of territory and 5 small (TL3) regions classified based on the OECD access to cities regional typology: one region with a city of more than 250 000 inhabitants (North Estonia, where Tallinn is located); two regions with or near a small or medium city (Northeast Estonia, hosting Narva, the third city in terms of population, and Southern Estonia, hosting the second largest city Tartu); and two remote regions, Central and West Estonia (Figure 1.2). The regions of Central and West Estonia are remote and sparsely populated, even though, like the rest of the country, these regions are relatively flat. In this sense, Estonia's depopulation of remote regions is not necessarily linked to difficult access due to topographic conditions as in other remote regions. The maximum elevation in the country (317 metres) is found in the south. All regions in Estonia, except Southern Estonia, are coastal regions and the territory includes about 1 500 islands and islets.

Figure 1.2. TL3 regional classification of Estonia

Classification based on OECD access to cities typology



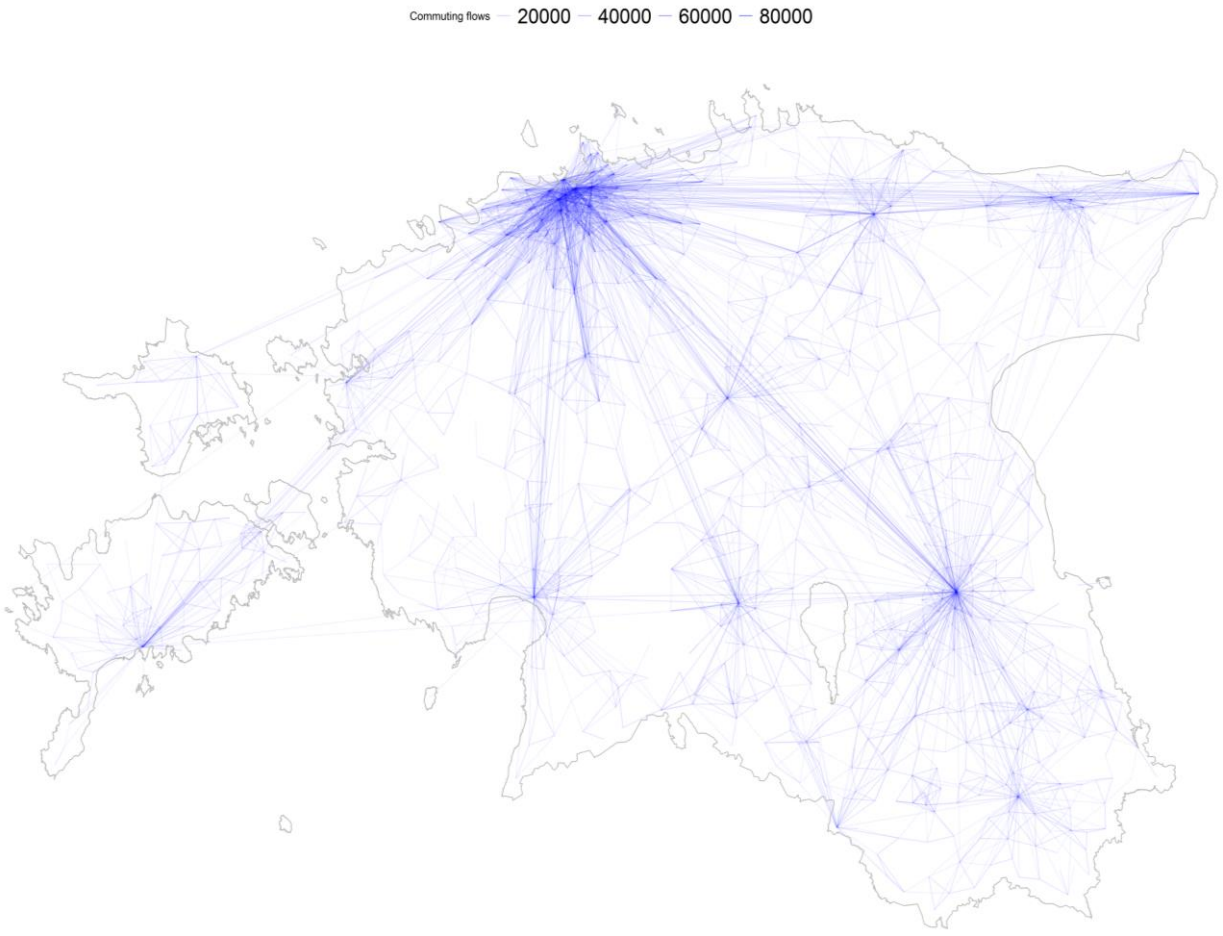
Source: Fadic, M. et al. (2019[8]), "Classifying small (TL3) regions based on metropolitan population, low density and remoteness", https://dx.doi.org/10.1787/b902cc00-en.

For statistical and policy purposes, there are 15 municipalities classified as urban or towns (*linnad*, singular *linn*) and 64 classified as rural or parishes (*vallad*, singular *vald*). The capital area of Tallinn (with a population of 438 341 inhabitants) and the main university city area of Tartu (with a population of 95 430) form about 40% of the total population of Estonia.

Commuting flow data for 2018 shows that Tallinn and Tartu and their areas of influence concentrate the largest share of activity in the country, as measured by flows. There are in fact significant flows between Tallinn and Tartu, as the 2 main cities are about 2 hours away by car. Narva and smaller towns outside these main cities also concentrate small commuting flows around their areas of influence.

Figure 1.3. Commuting flows between territorial communities in Estonia, 2018

Home-work movements between territorial communities based on mobile positioning data



Note: Flow records for 1 March 2018.
Source: Aasa, A. (2019[9]), *OD-matrices of Daily Regular Movements in Estonia (dataset)*, https://doi.org/10.23659/UTMOBLAB-1.

Recent demographic trends

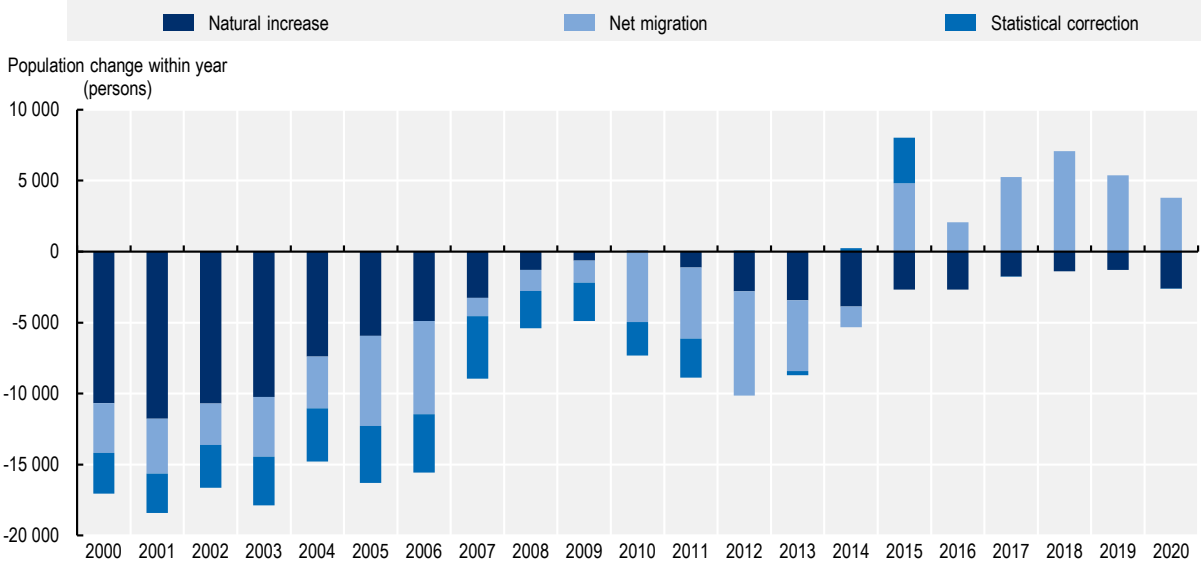
Population declined from 2000 to 2015 and has increased slightly since 2016 thanks to return immigration (Estonian Ministry of Finance, 2019[10]). At the county level, the population declined in 2000-20 in all counties except for Harju where Tallinn is located. Tartu (in the east), Lääne-Viru and Pärnu (in the west) and Viljandi (in the south) accumulated a combined loss of over 23 000 people in the period. With a

decrease from over 181 000 inhabitants in 2000 to about 132 000 in 2020, Ida-Viru – located on the eastern border with Russia – is the county with the largest population losses.

While birth rates in Estonia are similar to those in Europe, a large portion of population decline was nonetheless attributed to natural decrease between 2000 and 2020, though diminishing in absolute magnitude. Net migration remained negative until 2014 (Figure 1.4). Immigration experienced a jump from 3 904 in 2014 to 18 172 in 2019, overcompensating from a similar jump in emigration from 4 637 in 2014 to 12 801 in 2019. In 2020, Harju County (with net immigration of 3 924) and Ida-Viruy (with net immigration of -1 012) were respectively the 2 counties with the largest and smallest net migration in 2020.

At the regional level, the only metropolitan region (North Estonia) grew at a similar rate to other metropolitan regions in OECD countries (Table 1.1, see Box 1.1 for an explanation of the typology). This is in stark contrast to the rural regions in Estonia that all experienced population decline and is distinct from the trend across OECD countries that shows a steady (yet slower than the metropolitan regions) increase in population across rural regions (OECD, 2020[2]).

Figure 1.4. Population change by source, 2000-20



Source: Statistics Estonia (2021[3]), *Main Demographic Indicators*, http://andmebaas.stat.ee/ (accessed on 8 February 2021).

Table 1.1. Population change by region type, OECD countries and Estonia, 2001-19

Population change calculated as compound annual growth rate

Region type	Annual population change OECD countries (%)	Annual population change Estonia (%)
Regions with a city >250K	0.70	0.65
Regions near a city >250K	0.30	-0.73
Regions with/near a city <250K	0.28	-1.01
Remote regions	0.45	-0.81

Source: OECD (2021[11]), "Regional economy", https://dx.doi.org/10.1787/6b288ab8-en (accessed on 12 October 2021).

Box 1.1. Classifying TL3 regions by their level of access to cities

The regional classification based on access takes into consideration the presence of and access to functional urban areas (FUAs). Access is defined in terms of the time needed to reach the closest urban area, a measure that takes into account not only geographical features but also the status of physical road infrastructure.

The typology classifies TL3 regions into metropolitan and non-metropolitan according to the following criteria:

- ***Metropolitan TL3 region (MR)***, if more than 50% of its population live in an FUA of at least 250 000 inhabitants.
- **Non-metropolitan TL3 region (NMR)**, if less than 50% of its population live in an FUA. NMRs are further classified according to their level of access to FUAs of different sizes into:
  - ***Close to metropolitan (NMR-M)***, if more than 50% of its population live within a 45-minute drive from a metropolitan region (an FUA with more than 250 000 people).
  - ***Close to small metropolitan (NMR-S)***, if the TL3 region does not have access to a metropolitan region and 50% of its population has access to a small or medium city (an FUA of more than 50 000 and less than 250 000 inhabitants) within a 45-minute drive.
  - ***Remote (NMR-R)***, if the TL3 region is not classified as NMR-M or NMR-S, i.e. if 50% of its population does not have access to any FUA within a 45-minute drive.

Driving time by road to the nearest city depends on the definition of the cities, the road network used, the boundaries of the regions and the spatial distribution of the population within the region. In the implementation, cities are represented by their centroid point, defined as the population-weighted average location of the centroids of 1 km² grid cells covering the city. Around these centroid points, service areas of 45 minutes by major and secondary roads are calculated. The generic speed attribute provided with the road network data is used so that it does not take into account possible traffic congestion issues.

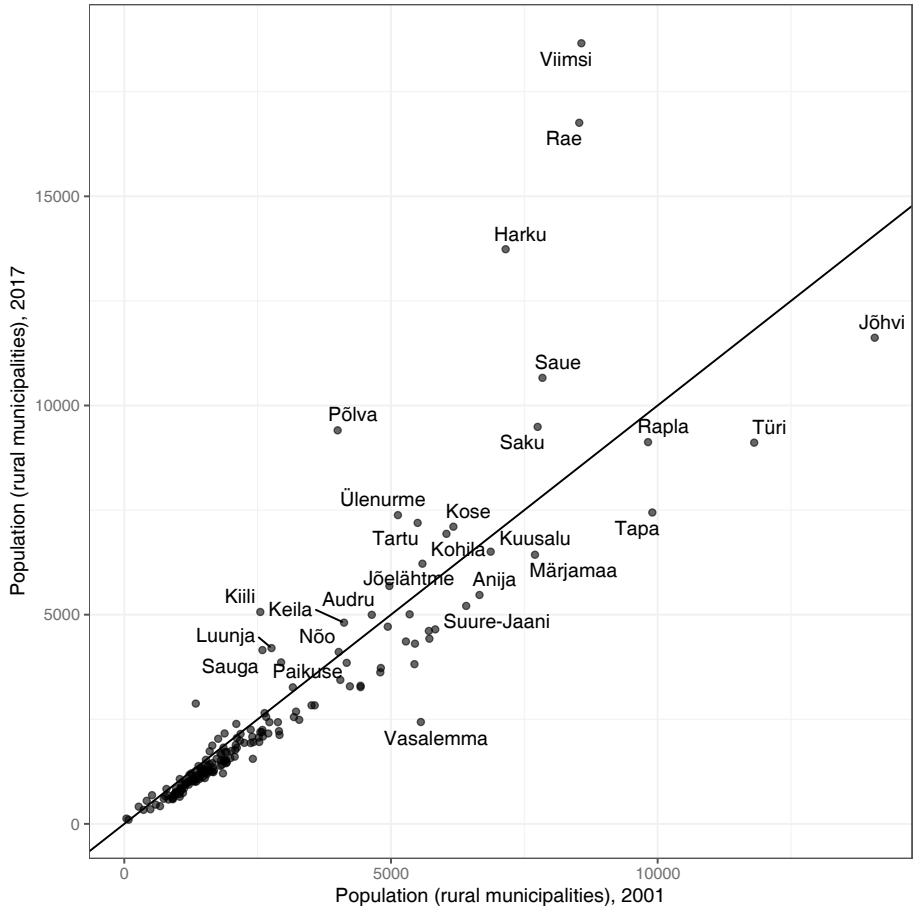
All service areas are merged to create an accessibility surface characterised by its maximum driving time to at least one city. This surface is then overlaid with the centroid points of 1 km² population grid cells. All centroids falling within the accessibility surface are defined as “close to a city”, the other cell centroids as “remote”. From this, it is possible to determine which part of the TL3 population is located in areas close to a city by calculating the share of the regional population living close to a city.

Source: Eurostat (2018[12]), *Methodological Manual on Territorial Typologies: 2018 Edition*, https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-18-008; Dijkstra, L. and H. Poelman (2008[13]), “Remote rural regions: How proximity to a city influences the performance of rural regions”, https://ec.europa.eu/regional_policy/en/information/publications/regional-focus/2008/remote-rural-regions-how-proximity-to-a-city-influences-the-performance-of-rural-regions; Fadic, M. et al. (2019[8]), "Classifying small (TL3) regions based on metropolitan population, low density and remoteness", https://doi.org/10.1787/b902cc00-en; OECD (2020[2]), *Rural Well-being: Geography of Opportunities*, https://doi.org/10.1787/d25cef80-en.

Demographic trends in Estonia are consistent with a pattern of deconcentrated urbanisation, that is, urban growth in the periphery of the largest urban centres. While population growth concentrated in the metropolitan region, the group of all cities lost 63 594 inhabitants between 2001 and 2017, while the group of all rural municipalities lost 14 663 (all municipalities below the 45 degree line in Figure 1.5). Tallinn gained 26 448 inhabitants in the period but other cities including Kohtla-Järve, Narva and Tartu lost over 12 000. On the other hand, some rural municipalities experienced considerable population gains in the period, including Põlva, Harku, Rae and Viimsi. These last three are located in the suburbs of Tallinn.

Estonia is also expected to age quickly in the coming years. In 2021, 19.8% of the population was 65 years old or over, while 2.6% were 85 years old or over. In 2045, the percentage of the population 65 and over is expected to increase to 25.5%, with 4.9% being 85 years old or over. These changes are not expected to occur evenly across regions. Already in 2021, the percentage of population 65 and over in the counties of Harju and Tartu was 17.8% and 18.1% respectively, lower than the percentage in the other counties combined, at 23.8%. This gap is expected to widen in 2045, with the percentages in Harju and Tartu counties expected to increase to 21.7% and 22.8% respectively, compared to 36.7% in the other counties.

Figure 1.5. Evolution of population in rural municipalities in Estonia, 2001-17



Note: Municipalities based on the pre-2018 reform definition.
Source: Statistics Estonia (2021[3]), *Main Demographic Indicators*, http://andmebaas.stat.ee/ (accessed on 8 February 2021).

Population projections

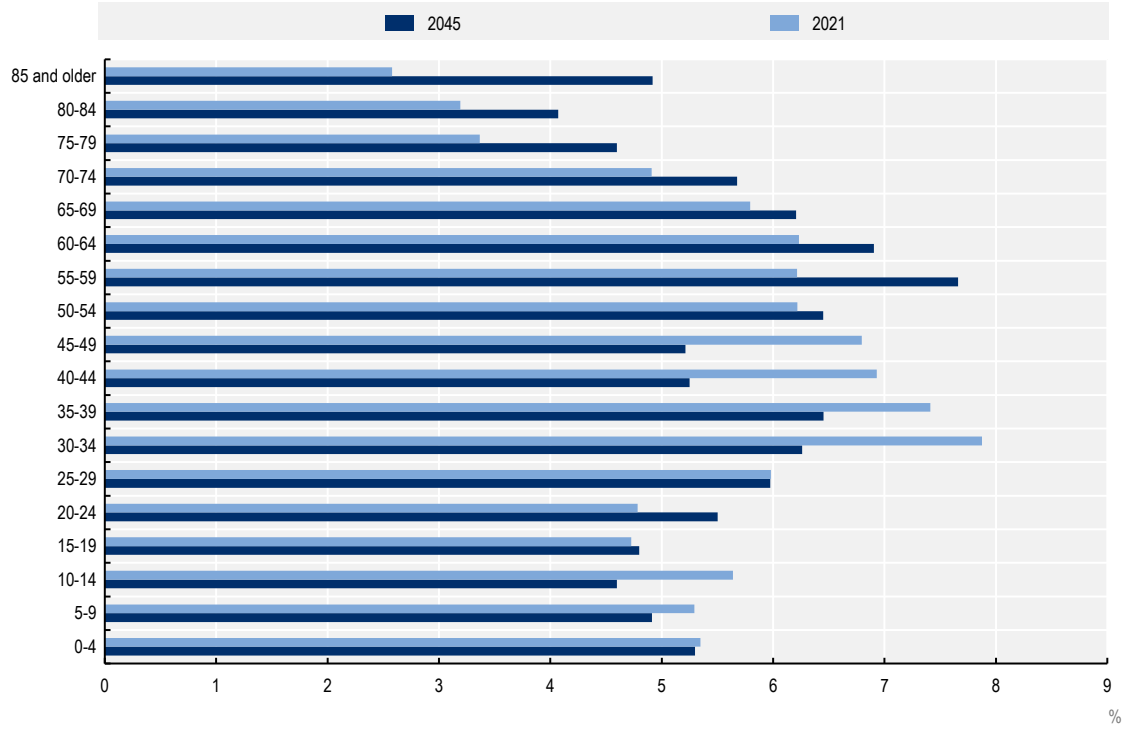
Available population projections for Estonia show that the population of Estonia will shrink from about 1.28 million people in 2011 to about 1.17 million in 2035 – that is, the country is projected to lose about 114 000 people by 2035. Available national population projections for 2080 (Government of Estonia, 2021[14]) show population decline to below 1 million in the most pessimistic scenario of lower fertility, lower mortality and no migration.

According to internationally comparable projections, the yearly population decline in Estonia (-0.39%) is the 7th largest for European countries with available data, behind other small countries in the vicinity including Bulgaria (-0.68%), Latvia (-1.22%) and Lithuania (-1.6%). At the subnational level, all TL3 regions

except for North Estonia are forecast to shrink by 2035. While Central Estonia (with the lowest population density) and Northeast Estonia (on the border with Russia) will experience the largest rate of decrease, with a projected population change of -1.3% (33 596 people) and -1.2% (38 151) respectively, Southern Estonia will experience the largest absolute decrease (50 740) (Table 1.2). Notably, declining populations in rural and remote regions are not unique to Estonia. Countries such as Germany, Japan, Latvia and Lithuania, as well as certain parts of Portugal and Spain, are experiencing a decline in peripheral regions, although the causes and magnitude of the decline vary across countries.

Figure 1.6. Evolution of age distribution in Estonia, 2021 (actual) and 2045 (projections)

Percentage of population per age category



Source: Statistics Estonia (2021[3]), *Main Demographic Indicators*, http://andmebaas.stat.ee/ (accessed on 8 December 2021).

Table 1.2. Projected population change by TL3 region, 2011-35

Population change calculated as compound annual growth rate

Region	2011	2035	Annual population change 2011-35 (%)
Central Estonia	124 918	91 322	-1.31
Northeast Estonia	148 105	109 954	-1.24
West Estonia	144 482	114 813	-0.96
Southern Estonia	317 626	266 887	-0.73
North Estonia	547 659	586 358	0.28

Note: Population change corresponds to annual growth calculated using compound growth rates.
Source: Authors' elaboration based on Goujon, A. et al. (eds.) (2021[15]), "The demographic landscape of EU territories: Challenges and opportunities in diversely ageing regions", EUR 30498 EN, Publications Office of the European Union, Luxembourg, and Jacobs-Crisioni, C. et al. (2020[16]), "Development of the LUISA Reference Scenario 2020 and production of fine-resolution population projections by 5 year age group".

Digital connectivity

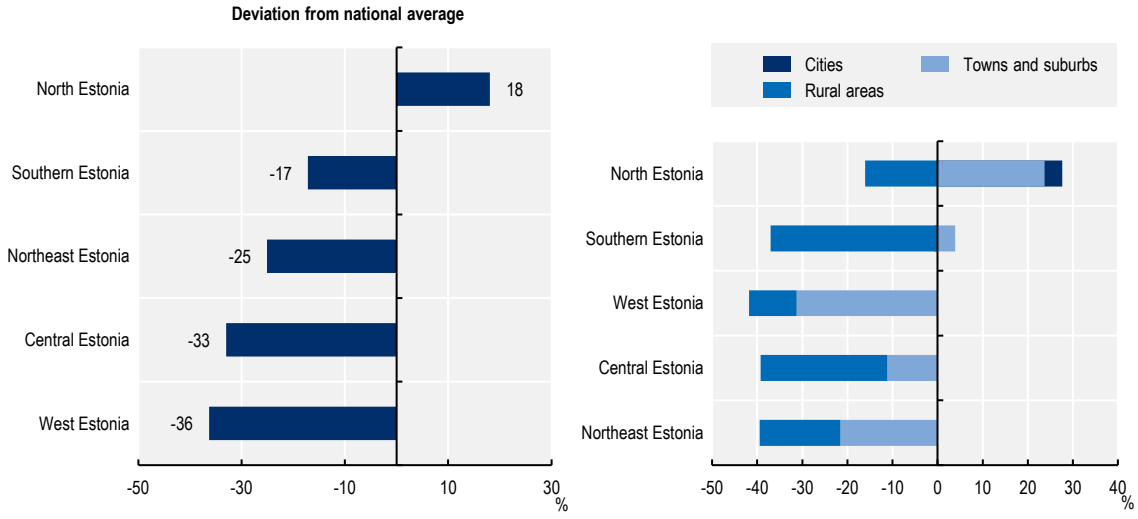
Digital connectivity is crucial for rural areas. It ensures that people and communities living in these areas can participate in day-to-day activities that are taken for granted in more densely populated areas. It is also critical to address the higher unit costs of delivering public services, including in sometimes challenging environments, as well as dealing with longer distances to markets. As such, digital connectivity is especially important in declining rural regions that face these challenges.

While Estonia has above average broadband connectivity, actual fixed download speeds in everyday use vary substantially across and within regions (Figure 1.7). In North Estonia, fixed download speeds are on average 18% above the national average but 36% below the national average in West Estonia.

Within TL3 regions, users in cities, towns and suburbs in North Estonia experience better connection speeds and users in rural areas experience worse connection speeds. Users in Tallinn experience connection speeds 28% above the national average and speed for users in Tartu aligns with the national average. Unlike users in towns and suburbs in the vicinity of Tallinn and Tartu, users in these types of areas in other regions experience speeds that are below the national average (Figure 1.7). In West Estonia for instance, speeds in towns and suburbs are 32% below the national average. Rural areas in all regions have lower connection speeds than the national average. The rural connectivity gap is largest in West Estonia, where users experience speeds that are 42% below the national average.

Figure 1.7. Gaps in download speeds, by TL3 region and degree of urbanisation, 2020 Q4

Ookla tests of fixed download speed, gaps estimated as a percentage deviation from national averages



Note Speedtest data corresponds to 2020 Q4. The data for average fixed broadband download Speedtests reported by Ookla measures the sustained peak throughput achieved by users of the network. Measurements are based on self-administered tests by users, carried over iOS and mobile devices. The figure presents average peak speed tests, weighted by the number of tests.
Source: OECD calculations based on Speedtest® by Ookla® Global Fixed and Mobile Network Performance Maps and on analysis by Ookla of Speedtest Intelligence® data for 2020Q4. Provided by Ookla and accessed 2021-01-27. Ookla trademarks are used under license and reprinted with permission.

The governance structure in Estonia

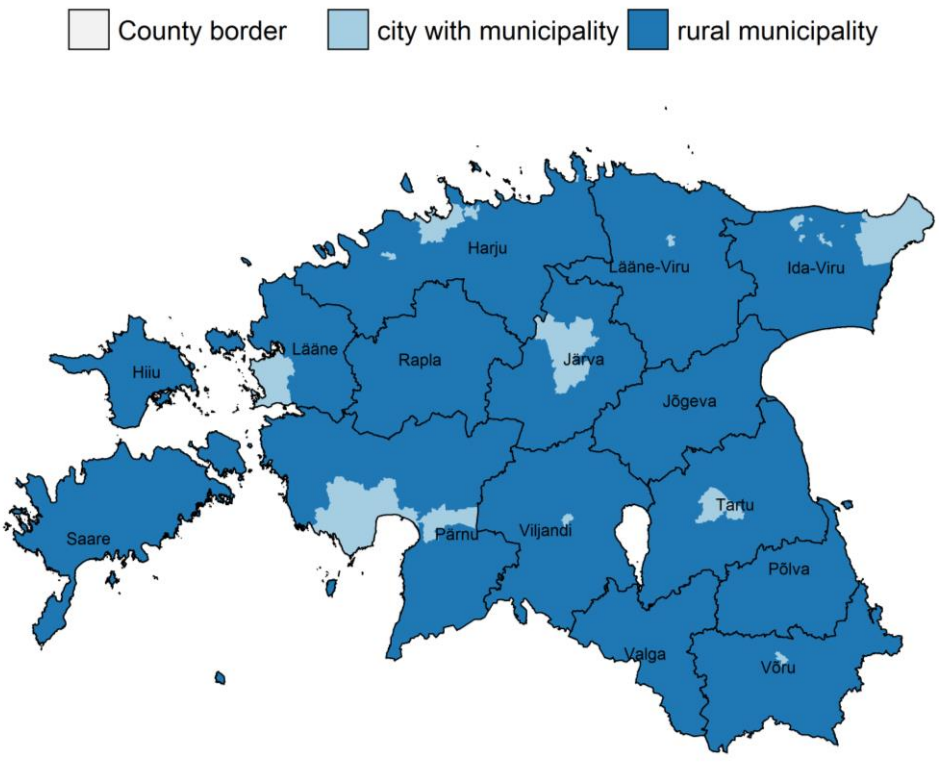
From 1989 until 1993, Estonia had 2 tiers of local self-government: the first comprised the rural municipalities and small towns, and the second was composed of 15 counties and the 6 main cities. In

1994, the model was reformed so that the county administration became part of the central government and the county governor became a representative of the central government. An important landmark in the Estonian local self-government was the establishment of the Association of Estonian Cities and the Association of Rural Municipalities in 1990. At about the same time, the Constitutional Assembly (1991-92) assigned a working group for the preparation of the formal legal foundation for local self-government. That work was completed in 1994 (Mäeltsemees, 2017[17]; Valner, 2017[18]).

From the very beginning of Estonia's independence in 1991, there was much political debate about the multilevel governance model. Between 1995 and 2014, there were several attempts by successive governments to reform the Estonian subnational government structure, notably to reduce the number of municipalities by voluntary municipal mergers, but without major success. The sluggish development of the bottom-up initiative increased the political pressure for a state-led reform. In 2015, after many rounds of consultations and discussions, the preparations for a comprehensive reform were started. As a result, the Administrative Reform Act was accepted by the parliament (*Riigikogu*) in June 2016. The act introduced a minimum municipal population size of 5 000 inhabitants and 11 000 as a recommended size. It also set out the different stages and the timetable for implementing the reform.

The reform was finalised in 2017 and the new municipal structure was adopted at the beginning of 2018. The reform significantly changed the structure of the Estonian local government. It stripped from county governments most of their functions and reallocated their tasks to ministries and municipalities. The counties (*maakond*, Figure 1.8) did not cease to exist, however, as they still represent some central government in the regions and county borders are used as statistical units (Mäeltsemees, 2017[17]; Valner, 2017[18]).

Figure 1.8. National classification of administrative units



Source: Estonian Land Board (2021[19]), *Administrative and Settlement Division*, https://geoportaal.maaamet.ee/eng/Spatial-Data/Administrative-and-Settelement-Devision-p312.html (accessed on 1 February 2021).

Furthermore, co-operation between municipalities continued to be arranged within the county borders. Depending on the task, there are currently between 11 and 15 joint municipal bodies organised at the county level. Currently, co-operation in development planning has been arranged through 15 counties and municipal co-operative associations have been arranged through 13 counties. There are currently 11 co-operative transport centres, of which 9 are county-based and 2 are region-based. The membership of such organisations is voluntary for the municipalities. There is no directly elected body for the co-operative bodies; instead, the member municipalities appoint their representatives to the council. By law, the County Local Government Associations must be involved in the management of public transport in the county where necessary. The county municipality organisations promote municipality co-operation also by fulfilling voluntary tasks. In addition to the county municipal associations, there is a national municipal association, called the Association of Estonian Cities and Rural Municipalities. This association represents the member municipalities in negotiations with the central government.

The municipal reform also reduced the number of municipalities by mergers, from 213 to 79. The size of municipalities in 2019 varied from 141 inhabitants on Ruhnu Island to 434 562 inhabitants in Tallinn. The average municipal population is 16 559 and the median population is 7 372.

The Estonian Constitution provides for autonomous local governments and the Local Government Organisation Act sets the administrative framework for municipalities (Box 1.2). New functions can be assigned to municipalities only by law or mutual agreement. The external monitoring of the municipalities is the responsibility of the government ministries and the State Audit Office. The Ministry of Finance is responsible for the legal framework of local government functions. It develops the financing (including equalisation and support fund division) and financial management principles of local authorities.

Table 1.3. Descriptive data on Estonian municipalities

	2000	2010	2017	2021
Number of municipalities	227	226	213	79
Average population size	6 173	5 900	6 171	16 559
Median population size	1 910	1 755	1 823	7 372
Average area (km²)	192.1	193.0	202.7	562.7
Average density (inhabitants/km²)	171.2	157.4	143.8	163.9
Share of municipalities with negative one-year population change (%)	59.5	68.5	67.3	59.5

Note:. In 2017, a major administrative reform was carried out.
Source: Author's elaboration based on Statistics Estonia (2021[3]), *Main Demographic Indicators*, http://andmebaas.stat.ee/ (accessed on 8 February 2021).

Box 1.2. The administrative framework of local authorities in Estonia

According to the Local Government Organisation Act, each municipality must have a municipal council, a municipal board, an auditing committee and a mayor. A municipal council is elected by the residents in a secret ballot for four-year terms. The number of councillors depends on the population of the municipality with a minimum of 13 members. The council elects the chair of the council. The chair organises the work of the council, represents the council and fulfils other duties imposed by law or municipal statute. Councils can set up committees that handle functions of a permanent character. The chairmen of all committees and all members of the audit committee must be elected from among the

council members. The members of the municipal board are confirmed to the office on the proposal of the municipal mayor (approved by the council). The board may include municipal employees or political appointees. Members of the council cannot be members of the board. The municipal mayor is the head of the municipal administration and municipal staff is employed by the mayor. The main civil servant is called a secretary of the municipal office. The municipality secretary leads the municipal office and is responsible for preparing the materials for the sessions of the board and the council.

Source: Estonian Ministry of Finance (2019[20]), *Local Governments in Estonia*.

Structure of the report

This report is organised into four chapters. The second chapter, "Adapting land use and spatial planning to shrinkage in Estonia", presents the recent spatial development patterns of Estonia, along with the spatial planning system. It then outlines the negative consequences these development patterns and planning practices have and presents policy recommendations that aim to tackle depopulation and demographic change from a land use and spatial planning perspective. The third chapter, "Financing local public services and infrastructure in Estonia: Challenges and ways forward", discusses the Estonian multilevel governance and municipal financing framework, especially from the perspective of depopulation and shrinkage. It makes proposals on how to address the key challenges posed on Estonia's governance and municipal finance model that are caused by shrinkage. The final chapter, "The present and future provision of education in Estonia", touches upon the education sector, which is by far the most important municipal task when considering municipal expenditures. It focuses on the question of school network adaptation and presents a series of recommendations to align all actors in Estonia around adapting the school network to demographic change while striving to ensure access to high-quality education for all students.

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2 Adapting land use and spatial planning to shrinkage in Estonia

This chapter analyses the patterns of land use and the spatial planning framework of Estonia, identifying trends relevant to assessing the country' response to shrinkage. It also presents data supporting the argument for efficient land use and the curbing of sparse, outward development from an environmental and fiscal perspective. Finally, the chapter offers a range of policy responses aimed at addressing depopulation and shrinkage, with a focus on strengthening and streamlining the spatial planning framework at the regional level and better equipping local plans to deal with future demographic challenges.

Introduction

Regional disparities in demographic trends across Estonia illustrate the critical importance of place-based interventions. Between 2000 and 2017, the population increased only in the capital region around Tallinn. The population declined in all other counties. Even within declining counties, some municipalities close to urban centres grew while others declined rapidly. With projections suggesting further decline and spatial polarisation, rural and remote regions in particular will become even more vulnerable to the adverse effects of depopulation in the future. In Estonia, policies targeted at metropolitan areas such as Tallinn and Tartu must be devised differently from those that address rural and remote regions.[1] Among other problems, depopulation and ageing result in deteriorating tax bases, greater per capita costs in services and infrastructure provision, and lower productivity for these declining municipalities and regions (OECD, 2021[1]).

A logical first step in addressing Estonia's challenges is through the lens of land use and spatial planning, as both are inherently place-based tools. Furthermore, land use planning policies have implications that reach far outside local areas and also across a multitude of policy sectors. For example, allowing less efficient use of land results in an increased need for automobile-related infrastructure, greatening the fiscal burden of local and central governments. Less efficient land use often leads to sprawling development, which results in greater air pollution, severe health effects, increased morbidity and increased costs related to service provision, all issues which transcend local borders (Künzli et al., 2000[2]; OECD, 2018[3]). Grounding policies to tackle depopulation and ageing within a land use and spatial planning framework allow various policies across sectors to be harmonised within a theme of coherent spatial development. In this way, decisions taken in different policy sectors are less prone to inefficiencies due to consequences that inadvertently result in contradicting spatial outcomes.

This chapter examines land use patterns along with Estonia's spatial planning framework and derives policy recommendations to prepare Estonia's regions for demographic change. It starts with an overview of the importance of spatial planning as opposed to simple land use regulation for a coherent response to depopulation and ageing. Subsequently, the chapter highlights characteristics of Estonia's land use, mainly using data on land cover and built-up area, grid-level population and cadastres. The chapter then moves on to look at the spatial planning system, with a focus on the regional (county) and local levels. Finally, it suggests policy recommendations that aim to counter the inherent problems observed in Estonia's land use patterns and spatial planning framework, providing justification for these recommendations using data and international examples across OECD countries.

Land use planning versus spatial planning

Governing the use of land is complex because it is both highly place-based and location independent. For example, environmental standards for land use are often set at the national level, independent of specific land plots, by defining protected areas and minimum distances between high-risk and residential areas. In many OECD countries, maximum floor area ratios are also defined at the national level. On the other hand, assigning uses to specific land plots is a decision that is mostly made by local governments (OECD, 2017[4]). Due to this unique characteristic, land use planning requires considering the interests of multiple stakeholders across and within levels of government, and across public and private sectors. Hence the tendency is for land use planning to be fragmented, both vertically and horizontally. This makes compromises difficult when the interests of different stakeholders are at odds with each other. For example, in a given location, land owners may wish for greater building rights, municipalities might strive to limit these rights to ensure the overall quality of the built environment, while national environmental authorities may wish to restrict development altogether. The parties involved are not negotiating over the allocation of any one good: rather, they are pursuing different goods, with different rights, incentives and mandates.

In this context, it is important to make the distinction between *land use* and *spatial* planning. Here, land use planning describes the more detailed processes by which the exact ways in which land can be utilised are addressed. Spatial planning is a more generic term used to describe systems for managing spatial development (see Box 2.1). Land use planning instruments such as permitted uses, floor area ratios (FARs) and settlement areas lay the groundwork for which spatial planning objectives are realised. While many definitions exist, spatial planning is generally defined as a set of governance practices for developing and implementing strategies for territorial development and the future distribution of activities in space (CEC, 1997[5]; Healey, 1997[6]). Spatial planning seeks to achieve, among other goals: i) the co-ordination of the spatial dimensions and impacts of various sectoral policies; ii) the establishment of integrated and functional organisations of land uses; and iii) balance between the demand for socio-economic development and the need to protect the environment (Silva and Acheampong, 2015[7]).

Accordingly, land use planning without spatial planning risks land use that is inconsistent with overarching policy objectives. Without an overall vision of balanced development across space, the varying interests of stakeholders are likely to result in contradicting regulations, leading to inefficiencies. Crucially, in the context of depopulation and ageing, it is important to devise policy interventions that align with one another in a spatial planning context, as demographic challenges touch upon a wide range of spatially interrelated policy sectors. For example, the development of public service centres to consolidate services in low-density areas should be done near transport corridors to maximise accessibility and with consideration for changing land use patterns due to depopulation. Consolidation of services based on spatial planning would lead to potential cost savings when such developments capitalise on synergies with nearby efforts. This also leads to an enhancement of the quality of the built environment. Without such considerations, these policy interventions are at risk of being implemented in a piecemeal fashion, with potentially contradictory consequences for land use. It is these types of relationships that spatial planning seeks to clarify and streamline within an overarching spatial framework.

Land use and settlement patterns in Estonia

Data

The main source of information used to analyse land use patterns is official OECD statistics derived from land cover data, taken from the Global Human Settlement multitemporal built-up grid (Florczyk et al., 2019[8]). These data map the extent and change over time of built-up areas using satellite imagery. The definition for “built-up” is the presence of roofed structures, excluding other footprints such as paved surfaces and green spaces. Thus, statistics may be different from data that use alternative definitions. In addition, differing spatial resolutions of satellite images may also result in varying statistics across sources.

The use of satellite data has the advantage of allowing an objective overview and comparison of land use across the OECD. In addition, the data utilise a very high spatial resolution of 30 metres, which makes it suitable for studying changes in smaller, more remote areas. Nonetheless, the data come with limitations, such as not being able to distinguish between the types of land use and not containing information on land use density.

The chapter uses additional datasets to supplement the built-up data. Analysis of settlement patterns over time relies on grid-level population data (at a 1x1 km resolution) from the European Commission Joint Research Centre GEOSTAT (Batista e Silva, Dijkstra and Poelman, 2021[9]), in conjunction with land use patterns. In addition, cadastre data on land and buildings, taken from the Estonian Topographic Database (Estonian Land Board, 2021[10]) and the Cadastral Information System (Estonian Land Board, 2021[11]), supplement land use data. Notably, while data sources vary, similar insights to those reported in the following sections have also been found in other instances (Sooväli-Sepping, 2020[12]).

Box 2.1. Trends in spatial planning across OECD countries

There is growing recognition across OECD countries of the importance of moving from sectoral policies to integrated approaches across multiple policy areas. Spatial plans are following this trend: 76% and 69% of national and regional plans in OECD countries cover 3 or more policy fields – most commonly transport, environment and housing (OECD, 2017[4]). Notably, however, spatial plans still struggle to integrate with policy sectors such as energy, education, retail and health (ESPON, 2018[13]). In comparison, the national spatial plan of Estonia (National Spatial Plan Estonia 2030+) is unique in that it places a strong emphasis on energy infrastructure, along with dedicated plans for green networks and transportation. However, sectors such as education, health, environment and economic development are still not well integrated into the current national spatial plan, other than indirectly through the planning of "daily activity spaces". The revision of the national plan in Estonia aims to partially solve these issues by explicitly addressing climate, built environment, heritage and spatial stratification (Estonian Ministry of Finance, 2020[14]).

Importantly, integrated spatial planning not only concerns multi-sectoral planning but also integration across functionally connected territories. While commonly cited as an important planning approach across the OECD (OECD, 2015[15]), it is much less often realised in practice. Dedicated metropolitan and inter-municipal plans are rare, with only 11 types of such plans identified in a survey of 32 OECD countries (OECD, 2017[4]). Nonetheless, as the purview of spatial planning continues to expand, some countries have begun to arrange for planning within functional territorial boundaries, rather than administrative ones. For example, France has passed a legislature in 2015 that mandates regions to develop a comprehensive spatial strategy, the SRADDET (Schémas régionaux d'aménagement et de développement). The SRADDET defines medium- and long-term objectives relating to 11 compulsory areas, which include balance and equality of territories, infrastructure, housing, transport and climate change, among others (Government of France, 2016[16]). The Austrian Conference on Spatial Planning (*Österreichische Raumordungskonferenz*, ÖROK) is an example of a special body dedicated to co-ordinating spatial planning policies between the three levels of government in Austria. It not only prepares the Austrian Spatial Development Concept but also acts as the co-ordinating body for structural funds provided by the European Union (EU) (ÖROK, 2015[17]).

There is no one-size-fits-all solution to effective spatial planning. This is because spatial planning requires correctly identifying the various spatial scales to which policy and decision-making relate. It also depends on governance structures and historical attitudes toward co-operation. Indeed, Table 2.1 shows that across European countries, there is no clear pattern to the rescaling of spatial planning competencies in recent years.

Table 2.1. Rescaling of competencies for spatial planning, 2000-16

	AUT	BEL	CHE	CZE	DEU	DNK	ESP	EST	FIN	FRA	GBR	GRC	HUN	IRL	ISL	ITA	LTU	LUX	LVA	NLD	NOR	POL	PRT	ROU	SWE	SVN	SVK
National						↑	↑		↓	↓		↑					↑	↑	↓	↑			↓				↓
Regional	↑	↓		↕	↓						↓		↓	↑	↑	↓						↑		↑			
Local						↓			↓	↑		↓					↓	↑	↑	↑							

Note: Grey indicates no major change.
Source: Adapted from ESPON (2018), COMPASS - Comparative Analysis of Territorial Governance and Spatial Planning Systems in Europe.

The success of spatial planning depends in large part on the institutions that elaborate the plans, the capacity of municipalities and joint municipal associations to implement them, the fiscal incentives for or against co-operation, and concrete policy measures to carry out strategic objectives. Importantly, increased policy co-operation brought by spatial planning should not increase the complexity of the planning system nor reduce its flexibility. Instead, spatial planning should simplify the implementation process of local land use plans through a unified and guiding vision for spatial development.

Source: ESPON (2018[13]), *COMPASS - Comparative Analysis of Territorial Governance and Spatial Planning Systems in Europe*; Government of France (2016[16]), "Schémas régionaux d'aménagement et de développement", https://www.cohesion-territoires.gouv.fr/schemas-regionaux-damenagement-et-de-developpement (accessed on 12 September 2021); Estonian Ministry of Finance (2020[14]), *Ülevaade üleriigilise planeeringu „Eesti 2030+" ning maakonnaplaneeringute elluviimisest*, https://www.rahandusministeerium.ee/sites/default/files/Ruumiline_planeerimine/yrp_eesti_2030_ja_mp_ylevaade_2020.pdf (accessed on 2 December 2021); OECD (2015[15]), *Governing the City*, https://dx.doi.org/10.1787/9789264226500-en; OECD (2017[4]), *Land Use Planning Systems in the OECD: Country Fact Sheets*, https://doi.org/10.1787/9789264268579-en; ÖROK (2015[17]), *Austrian Conference on Spatial Planning*, https://www.oerok.gv.at/fileadmin/user_upload/Bilder/1.OEROK/OEROK_Folder_EN.pdf (accessed on 8 September 2021).

Despite depopulation, the built-up area is growing

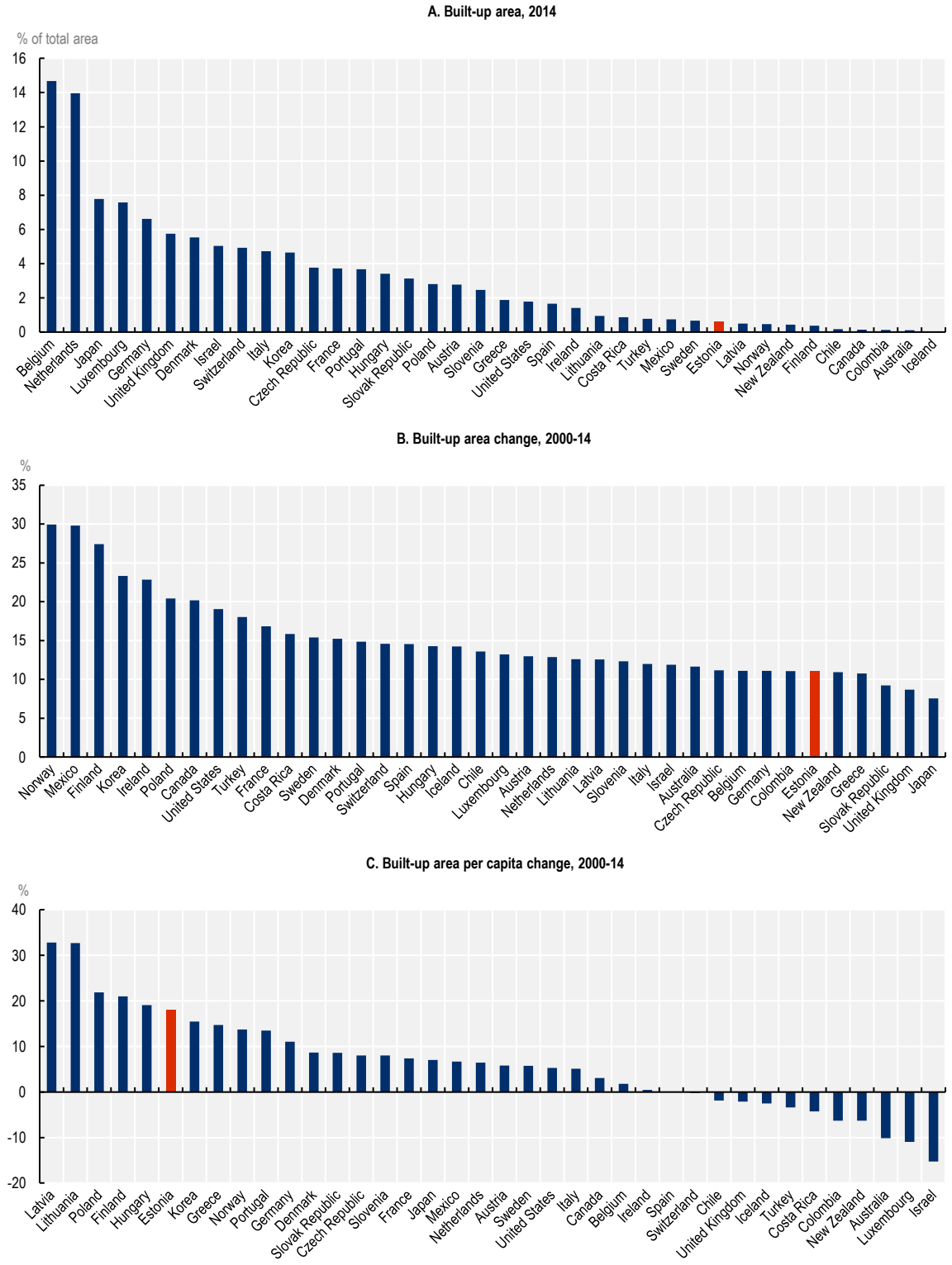
Estonia's total built-up area amounted to 257 km² in 2014, translating to 0.6% of its total land mass (Figure 2.1, Panel A). This percentage is roughly in line with other neighbouring countries such as Finland, Latvia and Lithuania. It is well below the OECD average. However, built-up area shares are highly dependent on the size of the country and its population. Indeed, Estonia is a sparsely populated country with a population density of 30.6 people per km² of land area, below the OECD average of 38.6 and ranking 30th out of the 38 OECD countries (OECD, 2021[18]). It is this sparsity that accounts for Estonia's relatively low overall utilisation of its land.

More relevant to the question of land use patterns is the change in built-up area and built-up area per capita (Box 2.2). Over 2000-14, the total built-up area in Estonia increased by 25 km², representing an 11% increase and ranking Estonia 33rd out of the 38 OECD countries (Figure 2.1, Panel B). However, this increase came as Estonia's population decreased by almost 5%. This is contrary to other OECD countries where the population grew by 10% on average. Estonia saw an increase of 18% in built-up area per capita over the same period, ranking it 6th among OECD countries and well above the OECD average of 6% (Figure 2.1, Panel C).

An increase in built-up area per capita suggests decreasing efficiency in land use patterns. Most commonly, this can be attributed to urban in-migration and sprawl as cities grow outward to accommodate new residents. Only in very rare instances does once developed land return to an undeveloped state, resulting in abandoned (yet still built-up) land in rural areas. Indeed, for Estonia, Tallinn and Tartu experienced urban sprawl and spatial polarisation, as will be shown in the following sections. In addition, built-up areas also increased substantially in rural and remote regions. While overall levels of built-up area per capita are still comparatively low, the ongoing pattern of sparse development is concerning given Estonia's shrinking and ageing population. Such patterns reinforce difficulties in providing services and infrastructure to an ever-spread-out population, straining municipal and national fiscal resources.

Estonia's increase in built-up area per capita in recent years can also be attributed to a number of "soft" factors related to the political and policy landscape, such as the new liberal legislation of Estonia, strong private ownership rights, vested interests of real estate developers undermining public interests and the overall lack of emphasis on coherent spatial development (Roose et al., 2013[19]; Samarüütel, Steen Selvig and Holt-Jensen, 2010[20]). The following sections discuss these issues.

Figure 2.1. Built-up area across countries



Note: Built-up statistics are calculated using Florczyk et al. (2019).
Source: Florczyk, A. et al. (2019[8]), GHSL Data Package 2019, EUR 29788 EN, Publications Office of the European Union, http://dx.doi.org/10.2760/290498.; OECD (2021[18]), *OECD.Stat* (database), https://stats.oecd.org/ (accessed 8 July 2021).

Box 2.2. Understanding built-up area per capita

Built-up area per capita is defined as the total amount of built-up land in an area divided by the number of inhabitants. Importantly, a change in built-up area per capita can be caused by a change in the numerator (amount of built-up area) or by a change in the denominator (number of inhabitants). For example, in cases where the number of inhabitants decreased, the built-up area per capita can increase quickly even if the total amount of built-up area remained relatively unchanged or increased moderately. This is the case for countries such as Estonia, Latvia and Lithuania. Conversely, in cases where the number of inhabitants increased over time, the built-up area per capita can decrease even if the total amount of built-up area increased. This is the case for countries such as Israel and Luxembourg.

Another important aspect to consider is that, as always, growth rates are calculated from a baseline value. In our case, changes in built-up area per capita are calculated based on the amount of built-up area per capita in the year 2000. For example, consider the case where Country A had a baseline value of 100 m² of built-up area per capita, while Country B had a baseline value of 50. If both countries were to develop 75 m² of land per capita for each new resident, Country A would have a negative growth rate while Country B would have a positive growth rate, even though the land was developed at the same efficiency within the studied time period. The difference here is that Country A experienced an increase in land use efficiency while Country B experienced a decrease in efficiency.

Source: Adapted from OECD (2017[21]), *The Governance of Land Use in OECD Countries*, http://dx.doi.org/10.1787/9789264268609-en.

Built-up area growth has little to do with the local demand for land

The increase in built-up area and built-up area per capita that Estonia is experiencing has little to do with local demand for land. Figure 2.2 shows that there is no correlation between the change in built-up area and the change in population over the period of 2000 to 2014 at the county level. Harju County, where the capital city of Tallinn is located, was the only county that experienced an increase in built-up area (roughly 10%) that corresponded with an increase in population (roughly 7%). In fact, Harju was the only county that experienced an increase in population at all. Jõgeva County, which experienced the second-largest increase in built-up area, saw a decrease in population of 20% during the period. The story is similar for other more rural areas such as Valga, Viljandi and Võru, which also experienced increases in built-up area despite significant decreases in population.

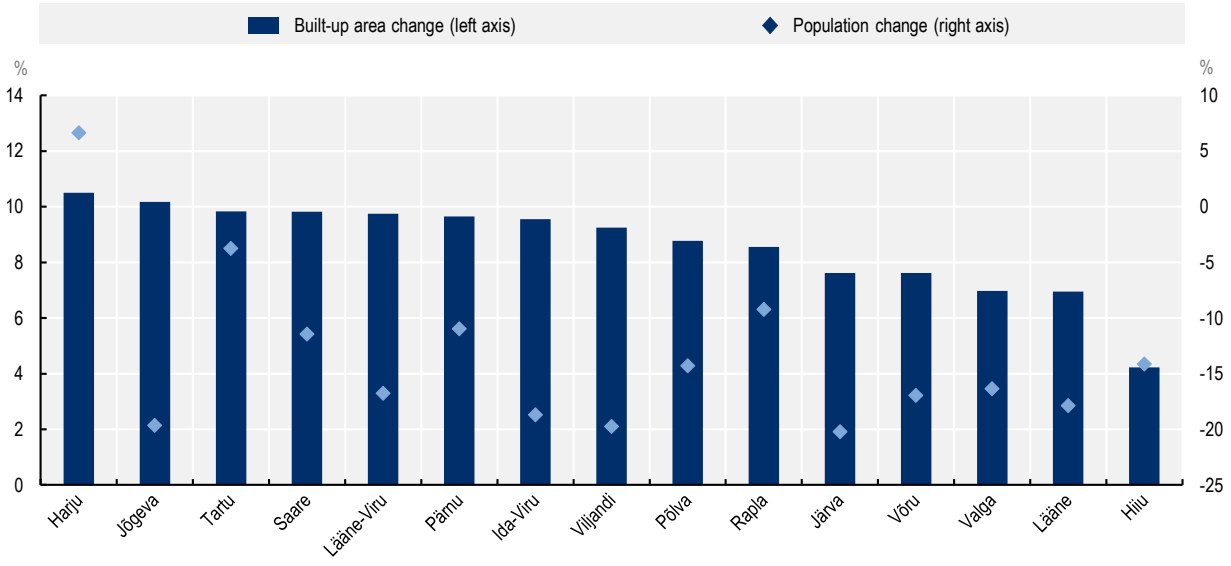
Such discrepancies between development and demand can partially be attributed to the high number of residents with second homes. The 2011 Housing and Population Census (Government of Estonia, 2011[22]) documented 6% of Estonian residents with multiple homes, where a multiple home is defined as a dwelling where one lives at least 3 months every year. This suggests the percentage of people with second homes would be considerably higher if summer and country homes and cottages were also included. The sections that follow illustrate how the low land and housing prices in rural and remote areas together with extremely low assessed values for taxation likely contribute to these trends, which result in greater built-up area per capita and efficiency losses in land use.

Growing outward results in inefficient settlement patterns

The sharp increase in built-up area per capita in Estonia has led to sparse settlement patterns. The number of 1 km² inhabited grids increased by roughly 30% but only around 24 000 people (1.8% of the population) live in these new grids. In addition, 91% of these new grids are populated by less than 5 people, well below the national population density average of 30. As Figure 2.3 shows, there is no clear pattern as to where these new grids are located. Both areas outside of the main functional urban areas (FUAs), as well as

areas outside of previously populated rural regions, experienced an expansion (even in the island areas of Hiiu and Saare), in line with data on built-up area increases shown in Figure 2.2. Taken together, Estonia's land use and settlement patterns are indicative of increasingly inefficient use of land.

Figure 2.2. Increases in built-up area and population in Estonian counties, 2000-14



Note: County-level changes in built-up areas calculated using GIS data from the Global Human Settlements multitemporal layer and administrative boundaries taken from Republic of Estonia Land Board Geoportal.
Source: Corbane, C. et al. (2019[23]), "GHS-BUILT R2018A - GHS built-up grid, derived from Landsat, multitemporal (1975-1990-2000-2014)", *European Commission, Joint Research Centre (JRC) [Dataset]*, http://dx.doi.org/10.2905/jrc-ghsl-10007; Statistics Estonia (2021[24]), *RV002: Population by Sex, Age Group and County*, 1 January (accessed 4 March 2021).

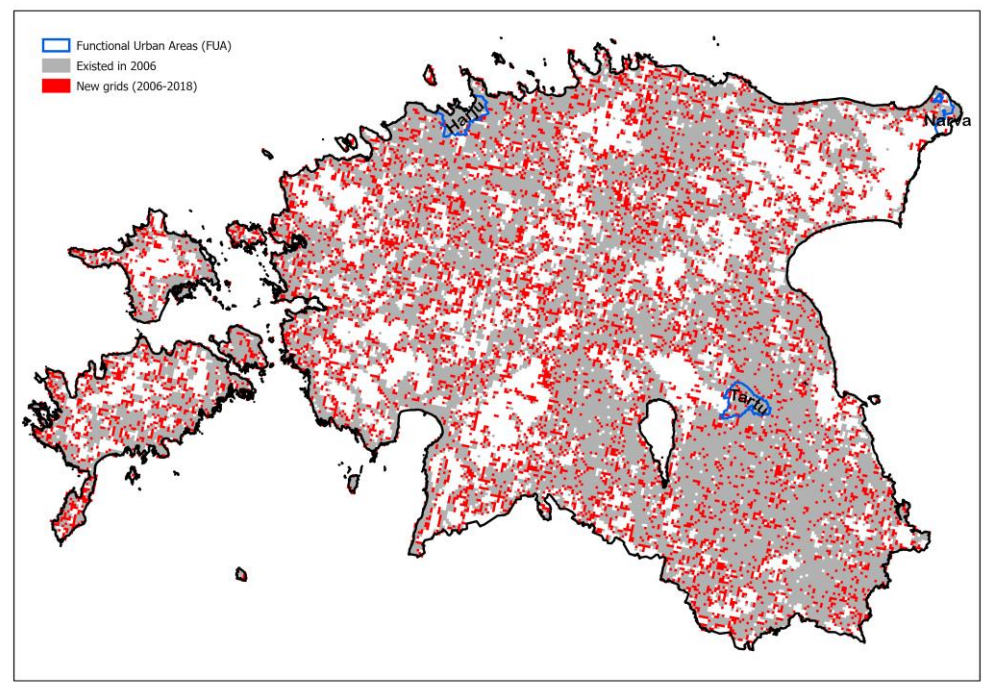
Spatial polarisation is increasing

Estonia's population is increasing in the urban periphery

Outward development in Estonia has been accompanied by greater spatial polarisation in recent years. Grid-level population data shows that between 2006 and 2018, the population increased significantly in the urban peripheries of Tallinn and Tartu, and to a lesser extent Pärnu (Figure 2.4). Importantly, significant population increase did not even occur in the FUAs themselves, indicative of a strong trend towards urban sprawl (or in other words "peripheralisation") in the main urban centres. Excluding these urban peripheries, virtually all of Estonia experienced a decrease in population over the period.

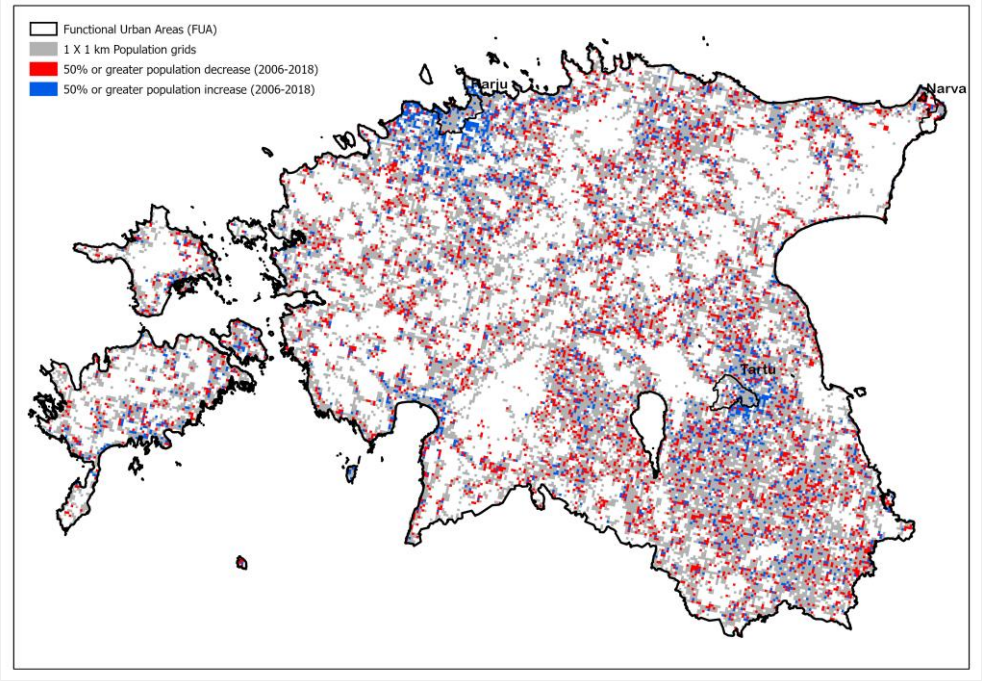
Along with other Central and East European countries, Estonia's regional inequalities have increased due to job opportunities concentrating in urban centres and the resulting rural exodus (Lang and Görmar, 2019[25]). However, other factors also contribute to this trend. For example, it has been highlighted how the shift from a welfare-distributive approach to a competitiveness and innovation approach for EU cohesion policy resulted in centrally administered and spatially blind policies at the state level that were supported by EU funds (Sooväli-Sepping, 2020[12]). In addition, stigmatisation of rural and remote regions as disadvantaged, problematic and lagging areas has further shaped the negative image of these regions, arguably exacerbating peripheralization (Plüschke-Altof and Grootens, 2018[26]).

Figure 2.3. Settlement patterns in Estonia, 2006-18



Note: Depicted using data from the 2006 and 2018 JRC-GEOSTAT population grid and administrative boundaries are taken from Republic of Estonia Land Board Geoportal.
Source: Batista e Silva, F., L. Dijkstra and H. Poelman (2021[9]), *The JRC-GEOSTAT 2018 Population Grid*, JRC Technical Report.

Figure 2.4. Spatial polarisation in population



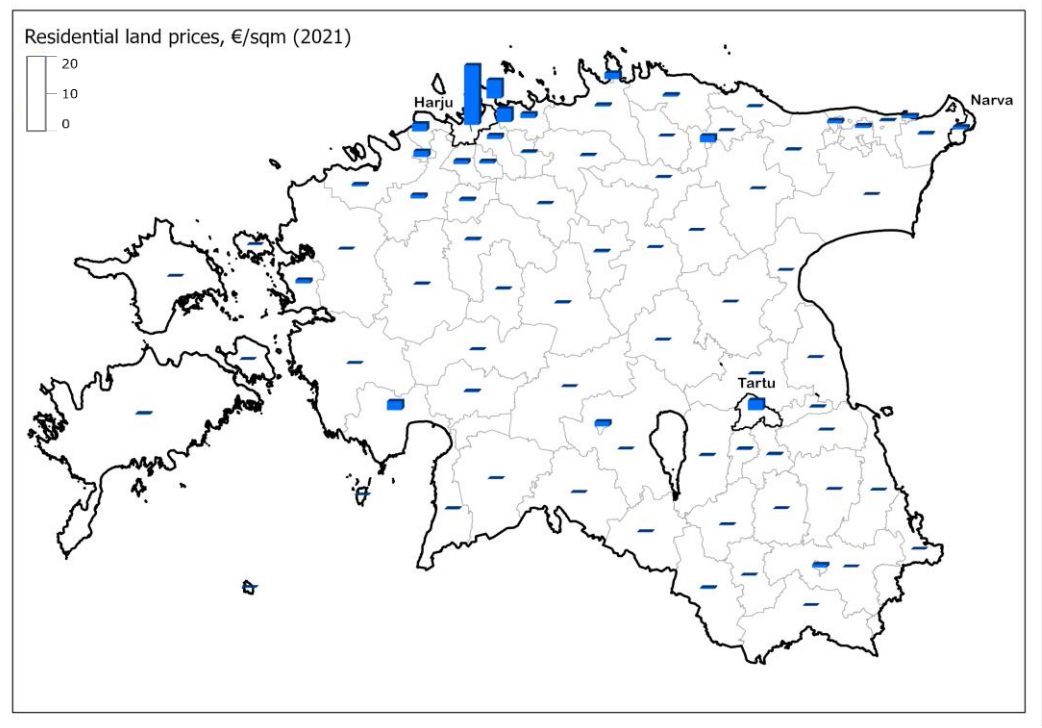
Note: Depicted using data from the 2006 and 2018 JRC-GEOSTAT population grid and administrative boundaries are taken from Republic of Estonia Land Board Geoportal.
Source: Batista e Silva, F., L. Dijkstra and H. Poelman (2021[9]), *The JRC-GEOSTAT 2018 Population Grid*, JRC Technical Report.

Regional disparities in income and land prices are widening

In addition to the polarisation of the population, income disparities between regions in Estonia are also relatively high compared to other EU countries. Such gaps in economic conditions accelerate migration to more prosperous regions, resulting in severe polarisation in housing and land prices. In 2021, the median price of an apartment in Tallinn at EUR 2 159 per m² was almost 10 times higher than in the city of Valga, at EUR 212 per m² (Estonian Land Board, 2021[10]).

Disparities are also apparent in land prices. Figure 2.5 depicts residential land prices across municipalities. These prices are calculated based on assessed values from the cadastre and thus are most likely underestimated compared to actual values. Nonetheless, the relative differences are illuminating. For residential land, at the extreme, prices are more than 360 times higher in Tallinn compared to Setomaa, a municipality in Southwest Estonia next to the Russian border. In addition, residential land plots in urban municipalities are six times more expensive than in rural municipalities. Prices have also decreased much faster in rural areas, by 7% compared to 1% for urban areas during the period between 2012 and 2021.

Figure 2.5. Residential land prices in Estonian municipalities



Note: Residential land prices are based on assessed values in the land cadastre. As such, they most likely underestimate true transaction prices.
Source: Estonia Land Board (2021[11]), *Cadastral Units*, https://geoportaal.maaamet.ee/eng/Spatial-Data/Cadastral-Data-p310.html (accessed on 8 July 2021).

Extremely depressed property values in many rural and remote regions make it harder to obtain financial support through mortgages or loans from the private banking system for housing purchases and renovations. This results in new construction and renovation activities being concentrated in metropolitan regions, with public investment being no exception (Sooväli-Sepping, 2020[12]). This in turn widens the regional disparities in the housing market and makes it difficult for people to move between regions, which reinforces regional disparities and chronic labour shortage in the non-metropolitan regions. Low residential mobility can be an obstacle to labour adjustment, making labour markets less efficient, with adverse effects on overall economic performance (Causa and Pichelmann, 2020[27]).

The causes behind sparse development and spatial polarisation in Estonia

Among other causes, land use is strongly influenced by economic factors such as the level of economic activity and property prices. As a sparsely populated country, Estonia has had an abundance of cheap (mainly agricultural) land that has been utilised extensively for development (Sooväli-Sepping, 2020[12]). This coupled with strong economic growth following independence from the Soviet Union in 1991, together with restitution efforts and the development of property markets, has resulted in residents with rising incomes wanting larger, more pleasant living spaces. Estonia is not alone in this regard, as these factors also contributed to rapid outward growth (especially in suburban and ex-urban areas) in neighbouring countries such as Latvia and Lithuania.

Moreover, the general trend of economic growth leading to outward development can be seen across the globe in many countries such as Finland, Korea and the United States (US) (OECD, 2018[3]). In general, economic growth also leads to urbanisation, as cities become the drivers of productivity and growth through what is termed agglomeration economies (Glaeser and Gottlieb, 2009[28]). This results in spatial polarisation as cities attract jobs and people at the expense of rural areas. This has been exacerbated by depopulation in Estonia that has brought about greater disparities in economic opportunities between the main cities and their surrounding areas on the one hand and the rest of the country on the other.

However, these factors do not completely explain the development patterns highlighted in the previous section. Countries such as Germany and Ireland that have also experienced economic growth and strong housing demand are not experiencing outward expansion to the degree of Estonia. Arguably, some unique characteristics of Estonia's history and political landscape shape current land use. After independence, Estonia experienced a period of liberal conservatism throughout the 1990s and 2000s, where a general discontent with "planning" stemming from the Soviet era led to low interest and participation in spatial planning. It has been argued that ultra-liberal policy practices and free-market ideologies led to modest regulation of land use, resulting in patchy and scattered land use patterns that were determined based on developer interests (Roose et al., 2013[19]). Estonian strategic spatial planning has been described as lacking political support, being reactive rather than proactive and not being used to address critical trends like shrinking settlements or climate change, with the planners' role diminished to accept any development proposal (Metspalu, 2019[29]). In addition, aspects of Estonia's spatial planning system, such as its fragmented regional framework and municipalities' lack of planning experience, have also contributed to the spatial development patterns seen today. The following section addresses these issues.

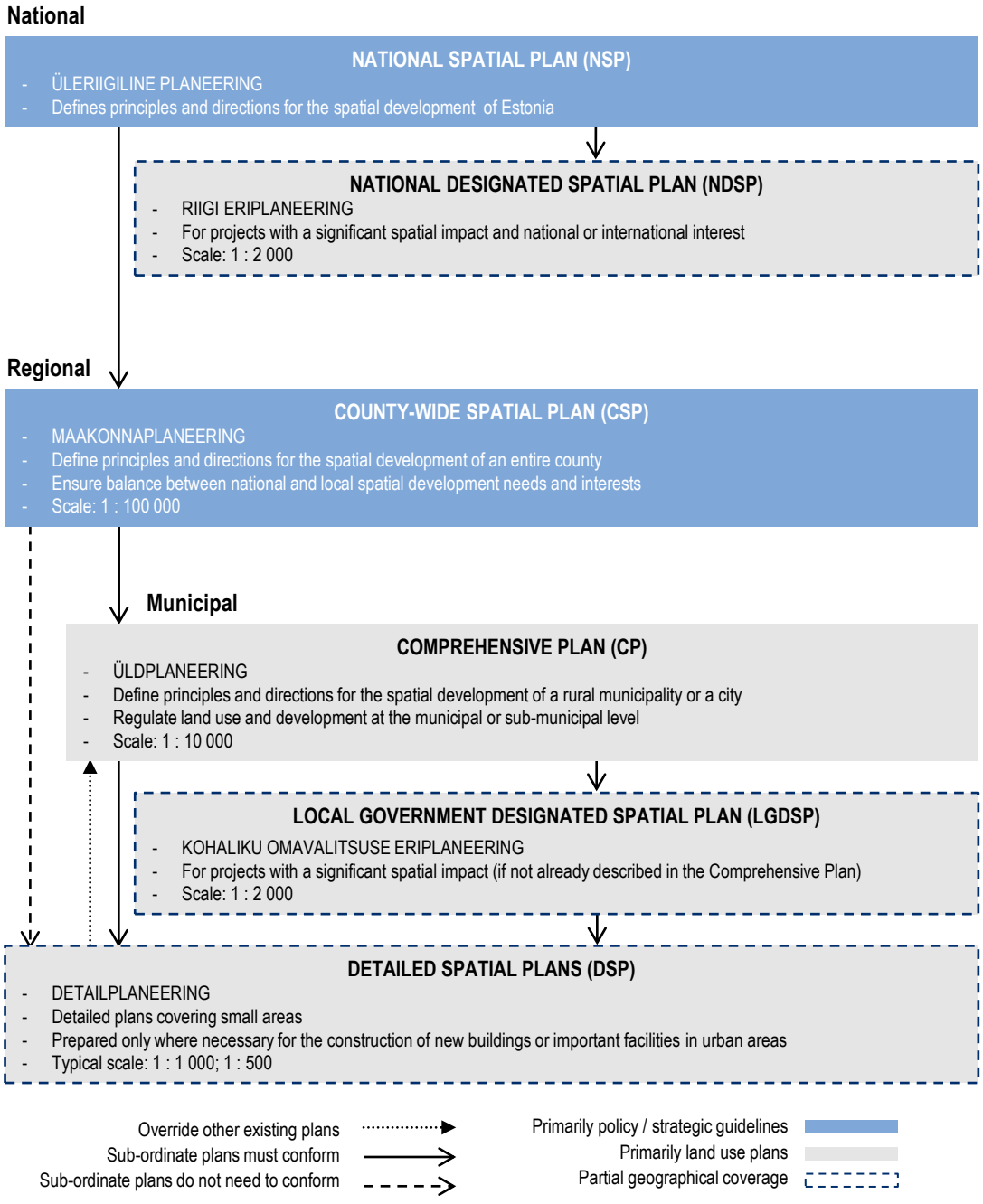
The spatial planning framework of Estonia

Estonia's planning system

After regaining independence in 1991, the Estonian system of land use planning was completely overhauled. The restitution of land occurred according to pre-World War II ownership, leaving municipalities with little land ownership. Even today, municipalities own only 1.3% of all land registered in the cadastre (Government of Estonia, 2021[30]). A shift took place from the top-down tradition of Soviet planning towards a system where municipalities played a larger role in land use decisions. The Planning and Building Act was enacted in 1995, creating a system that follows the Scandinavian model of land use planning. Arguably, this was not accompanied by sufficient competencies and policy instruments on the local level. In 2003, the Planning Act was separated from the Building Act. The Planning Act was overhauled in 2015, aiming to increase the efficiency of planning and building procedures. The reform of 2015 also introduced new types of spatial plans. In addition to the statutory planning instruments, the National Designated Spatial Plan (NDSP) was introduced for the construction of infrastructure or buildings that were of significant national interest and had a significant spatial impact. Local Government Designated

Spatial Plans (LGDSP) were introduced to erect buildings and infrastructures that had a significant spatial impact within the municipality. Figure 2.6 depicts the current spatial planning hierarchy of Estonia.

Figure 2.6. The spatial planning hierarchy in Estonia



Source: Adapted from OECD (2017[4]), *Land Use Planning Systems in the OECD: Country Fact Sheets*, https://doi.org/10.1787/9789264268579-en.

On the national level, the National Spatial Plan (NSP) provides the outlines of spatial policy in Estonia. The national government influences spatial policies directly through the NSP and indirectly through a variety of sectoral agencies, such as the Road Administration, the Environmental Board, the Land Board (responsible for the 42% of Estonian land that is state-owned) and the Heritage Board, together with the

various ministries. At the county level, County-wide Spatial Plans (CSPs) define the principles of spatial development of the county and is prepared, in theory, to express interests that transcend municipal boundaries and balance national and local spatial development needs. They are prepared by the Ministry of Finance (as the successor to county administrations in land use planning issues), in co-operation with ministries and local authorities. The Comprehensive Plan (CP) is the main municipal planning instrument and is prepared by local governments. It aims to define spatial development principles in the municipality, and, by agreement, can be prepared for several municipalities. Finally, Detailed Spatial Plans (DSPs) are designed to implement the CP and to create a spatial solution for the planning area. They form the basis for issuing building rights. Notably, DSPs have the authority to override the CP in certain instances.

In Estonia, horizontal co-operation occurs primarily through the involvement of the different national sectoral agencies in the planning process on all levels of government. The Ministry of Finance is responsible for the implementation of the Planning Act and the preparation and implementation of the NSP and CSP. Co-operation occurs generally on an ad hoc basis as no governmental body is explicitly dedicated to either horizontal or vertical co-operation. However, in local municipality planning, land use planning dispute mechanisms are in place and gone through before plan enforcement in case disputes are not solved in the planning process.

County-level spatial planning is fragmented

The aim of a CSP is to define the principles and directions of spatial development at the county level, while also fulfilling the functions that emanate from the NSP. In addition to promoting balanced and sustainable development, the Planning Act outlines the functions of the CSP to include, among others, determining locations of transport networks, waste treatment sites and sites serving national defence purposes. As such, CSPs are not required to cover other important infrastructure and service areas such as health, education or power generation. In addition, CSPs do not cover the spatial development aspects of economic and social development, which instead are delegated to various sectoral policies that are outlined below.

Estonia is currently undergoing changes to its regional development policy after the municipal reform of 2017. The former national Regional Development Strategy is being replaced with a Regional Policy Programme as a planning instrument. However, this programme is not horizontal, as it does not apply to sectoral policies or ministries, only addressing the activities of the Ministry of Finance, which is in charge of regional policy and spatial planning (ESPON, 2021[31]). In addition to this plan, a new Regional Policy Action Plan (RPAP) is set to be established. The RPAP is a horizontal policy document addressing sectoral policies and is expected to define roughly ten key challenges for regional development Estonia faces, along with key activities for sectoral policies to mitigate these challenges.

Furthermore, the introduction of the NDSP in 2015 brought about a shift in the functions of the CSP. Previously, CSPs could be used to select locations for construction projects that could be located across municipalities. The new Planning Act took away this power from CSPs, transferring authority to NDSPs. As a result, there is currently a lack of a clear instrument for projects that are not in the national interest but important for regional spatial planning, such as network infrastructure (Estonian Ministry of Finance, 2020[32]).

There is also separation between spatial and strategic planning at the county level. The Local Government Organisation Act (paragraph 37-3) mandates counties to enact development strategies covering economic, social and also population health themes. They provide the basis for jointly directing county development by the local authorities and co-operation partners, while also planning jointly made investments. Critically, however, such strategic development strategies are planned outside of the scope of CSPs and the spatial aspects of these development strategies are not emphasised. This weakens the link between strategic goals related to economic and social development, and spatial development within regions.

As a whole, county governance in Estonia is complex. The fragmentation of various development strategies and a patchwork of plans makes it difficult to co-ordinate county-level spatial planning. Such difficulties are augmented by the recent reforms made to the Planning Act that has weakened the decision-making power of CSPs. In addition, the disconnect between strategic objectives related to economic and social development and spatial planning has hampered the development of coherent county spatial policies.

Local government spatial plans are ill-equipped to adapt to demographic change

Comprehensive Plans (CPs) are the primary instrument for land use planning in Estonia. In theory, they define spatial development principles in the municipality, taking into account higher-order plans such as the CSP and NSP. The Planning Act identifies a long list of functions that CPs are to fulfil, including determining general land uses and the location of infrastructure networks and utilities, setting building conditions and uses, determining minimum lot sizes and designating valuable land in need of protection. In addition to the CP, the DSP exists at a smaller scale to implement the CP by determining detailed land use functions at the plot level.

Land use and spatial planning at the municipal level are still relatively new in Estonia compared to other Scandinavian countries. During Soviet occupation, planning processes were centralised and local administrations had little authority to do anything other than implement orders from the state. However, with independence came a change in planning practices that favoured decentralisation and Western planning principles. The early 1990s were characterised by setting the framework for municipal planning, together with defining property rights. At this time, there was no master planning and development was based on construction permits (Roose et al., 2013[19]). The enactment of the Planning and Building Act in 1995 paved the way for spatial planning at the municipal level by charging local governments with the development of CPs.

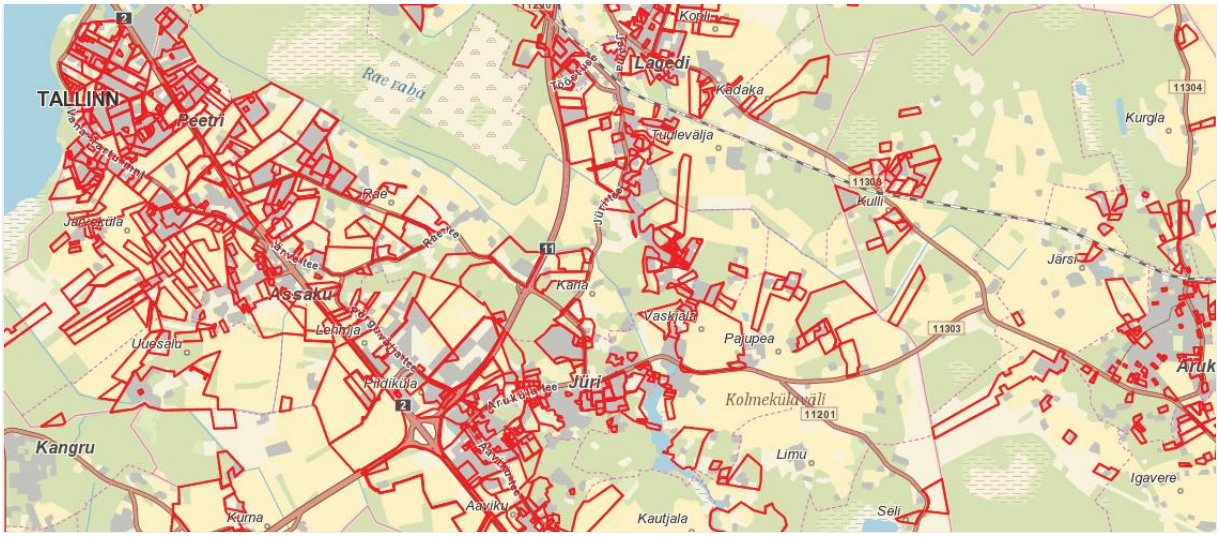
It has been argued that local governments, now challenged with the role of implementing planning policies for which they had little experience and knowledge of, were unable to devise coherent land use and spatial plans, often being influenced by strong local actors pursuing private interests (Samarüütel, Steen Selvig and Holt-Jensen, 2010[20]). Supporting this claim is the fact that the development of new settlements is often determined by fragmented, small-scale DSPs prepared and adopted separately and in random chronological order (Figure 2.7). While in theory, the authority that arranges the preparation of DSPs is the local government, in practice the initiation of DSPs is most often requested by property developers for a particular development and the content of these is steered by the developers.

As a result, CPs struggle in their function of promoting coherent spatial development within the municipality. Importantly, they fail to address the problem of depopulation through a re-evaluation of settlement boundaries or densification of central areas. This is due to the fact that while population projections exist, they are not well integrated into spatial strategies and are not acted upon. CSPs in particular are vague in setting spatial guidelines for land use at the local level based on county-level population trends. This results in CPs having difficulty implementing spatial development guidelines based on realistic assumptions. In addition, single-use zoning still dominates CPs, with more flexible approaches such as mixed-use zoning or permitting temporary usage remaining rare. The rigidity of CPs in mainly setting rules and regulations results in land use being inflexible, making it difficult for local governments to adapt to changing demographic trends or economic opportunities. As a result, CPs have seldom been used to steer spatial development, rather being used for setting land use regulations (Estonian Ministry of Finance, 2020[32]).

In addition, the process to devise CPs and have them approved is arduous. As a result, many local municipalities lack the capacity to prepare CPs in-house, and their preparation is often outsourced to external private consultants. Hiring external consultants is not always a bad practice, as many consultants have a greater experience that can prove to be valuable in the planning process. However, this becomes problematic when local planning authorities retreat from their leading roles and leave the process of

balancing interests, making discretionary decisions and reaching agreements with these hired experts (Estonian Ministry of Finance, 2020[32]). Such has become common practice in recent years, often resulting in CPs that are not substantive enough to be an appropriate tool for local governments to guide spatial development. Too often, important spatial decisions at the local level are made by actors upholding private interests.

Figure 2.7. A patchwork of DSPs



Note: Red (darker) borders indicate the boundaries of DSPs in the rural municipalities of Raasiku and Rae.
Source: Sooväli-Sepping, H. (ed.) (2020[12]), *Estonian Human Development Report 2019/2020: Spatial Choices for an Urbanised Society*, Estonian Cooperation Assembly.

Legal frameworks encourage sparse development

Land taxes

Property taxes are a key tool that can be used by governments to facilitate sustainable land use policies, provided that they are well structured. Estonia utilises a pure land value tax, opting out of taxing buildings. Municipalities choose land tax rates within the limits set by the central government, which are at present between 0.1% and 2.5%. In reality, most municipalities apply the highest permitted rate. As taxable land values have not been re-evaluated since 2001, land tax revenue has not increased even in nominal terms since 2012 and land taxes form only 4.4% of municipal tax revenue (see Chapter 3 for further information).

A pure land value tax that does not take into account the value of buildings may help contain sprawl. This is because land values are independent from what the land is used for (e.g. empty brownfields versus skyscrapers) and thus land that is underdeveloped becomes comparatively more expensive to maintain. As such, Estonia's current property tax system is correctly specified, in principle, given its circumstances. Nonetheless, the aforementioned lack of regular re-evaluation of taxable land values, together with incentives that encourage sparse development, deter efficient spatial development. Land tax exemptions exist for residential land plots where the owner's permanent residence is located. The exemption extends up to 0.15 hectares in densely populated areas such as cities and towns, and up to 2.0 hectares elsewhere. The much larger exemptions for residential land in rural areas, coupled with already low land prices in these areas, incentivises residential land owners to locate in rural and remote regions.

Expropriations

Expropriation is a balancing act between public interests and private property rights. In certain circumstances, governments have a legitimate need to take private property for public purposes. For example, in environmental emergencies, authorities may need to resettle people who are located in contaminated areas. In other instances, governments expropriate land for the "public good" to build infrastructure. Estonia's spatial development patterns have resulted in a high percentage of old and vacant dwellings, many of which are in need of demolition or remodelling. To do this, expropriation needs to take place as private incentives for demolition or remodelling do not exist in declining areas because of low property values. Without such measures, half-empty apartment buildings detract from pleasant living environments and contribute to sprawl and migration. Vacant houses also increase the per capita cost of providing essential services such as district heating, water and sewerage, aggravating the fiscal burden placed on local governments.

While some municipalities have been dealing with these issues and the central government is beginning to address these problems through studies and pilot projects, legal barriers regarding expropriation, together with a lack of experience is hampering efforts. Legislatively, the Immovables Expropriation Act was superseded by the Acquisition of Immovables in the Public Interest Act (hereafter Acquisition of Immovables Act) in 2018 in Estonia. By law, expropriations are only possible under strict conditions and expropriation for "public interest" or "public use" is not allowed, unlike in the majority of OECD countries (OECD, 2017[4]). Thus, expropriations in Estonia are strictly limited to the purposes outlined in the Acquisition of Immovables Act, which are generally confined to public infrastructure construction, such as ports, utilities or roads. Compared to other OECD countries, expropriation restrictions in Estonia are comparatively strict (Box 2.3). The revision of 2018 did however begin to allow expropriations of apartment buildings where more than half of apartments had been abandoned. Nonetheless, the agreement procedures for expropriation of apartments in such cases has proven arduous and time-consuming. Furthermore, even today, the expropriation of abandoned detached housing is not allowed.

Box 2.3. Expropriations in neighbouring OECD countries

Denmark

Expropriations for the common good are possible under strict conditions and with full compensation of the land owner. The Commission of Expropriation, an independent authority represented by ministries and municipalities, carries out the process in cases of national or state expropriations. In local cases, the municipal council is the main authority and expropriation procedures are carried out involving relevant professionals, independent parties, the owner and the municipality. Typically, land is expropriated for infrastructure construction but provisions exist for expropriations related to urban development in the Planning Act.

Finland

According to the Expropriation Act, expropriation is allowed for a public need. Expropriations are possible for a variety of reasons, such as the provision of public infrastructure, housing and the establishment of nature protection areas. In addition, land may be expropriated when its uses do not conform to local land use plans. Expropriation for private land uses is not possible yet the state can, in theory, expropriate land and sell it to private developers. As a general rule, the compensation is monetary. However, it is possible to substitute monetary compensation for other forms of compensation such as land readjustment, land exchanges and land banking.

France

France has a long history of expropriations dating back to the Declaration of Human and Civic Rights that was passed during the French Revolution in 1789. Expropriation is permissible if it is in the public interest. Public interest is broadly defined and there are no specific justifications for expropriation defined in law. Thus, the scope of expropriations depends on judicial interpretation and has evolved over time. The state and subnational governments, along with public entities and private entities (in limited circumstances), are allowed to expropriate.

Latvia

Article 105 of the Constitution of Latvia allows expropriating property for public purposes. The need to ensure public purposes is the only reason that needs to be justified for the expropriation of immovable property. The Expropriation Act provides an extensive but not an exhaustive list of purposes, such as national defence, environment protection, infrastructure construction and to "ensure other public needs" when these needs cannot be reached by other means. One of the most essential elements in expropriation proceedings is fair compensation, which is regulated by the Expropriation Act and the Cabinet Regulation.

Poland

Expropriation is regulated by the Real Estate Management Act of 1997. Expropriation is possible if a public purpose cannot be achieved in any other way than by restriction of property rights. Permitted purposes include infrastructure, utilities, protection of places of national remembrance and national defence. In addition, if revised or newly established land use plans restrict the development potential of land, land owners may demand compensation from public authorities. During negotiations, a replacement property may be offered, in lieu of monetary compensation.

Sweden

In Sweden, at least 20 enactments separately address restrictions on land use in various situations. The Expropriation Act provides the general framework for expropriations and specifies broader reasons for expropriation, such as infrastructure projects, housing developments and resource extraction. The Real Property Formation Act gives municipalities the right to expropriate land in specific circumstances and also gives cadastral authorities the right to order the transfer of a property or parts of a property to another property to facilitate plot formation and re-allotment of agricultural or forest properties. The Planning and Building Act allows for expropriation when implementing detailed development plans.

Source: Balodis, K. (2017[33]), Expropriation of property for public purposes: Common interests of the public and protection of owner's rights", *Juridiskā zinātne/Law*, Vol. 10, pp. 112-129, https://doi.org/10.22364/jull.10.09; Nuuja, K. and K. Viitanen (2007[34]), "Finnish Legislation on Land Use Restrictions and Compensation", *Washington University Global Studies Law Review*, Vol. 6/1; OECD (2017[4]), *Land-Use Planning Systems in the OECD: Country Fact Sheets*, https://doi.org/10.1787/9789264268579-en.

Fiscal instruments used to target land use

Land-based fiscal instruments can be an effective way to steer spatial development in a more sustainable and compact manner. They consist of instruments that, in essence, provide incentives to individuals and businesses that encourage or discourage particular uses of land. For example, impact fees are levied to landowners for the construction of infrastructure that directly services their plots. In this way, the hidden costs of living in a particular area are monetised and landowners are incentivised to locate in areas that are close to current infrastructure networks. Such instruments can complement an effective fiscal framework for shaping land use.

A wide range of policy instruments are applied to control, regulate and stimulate desired development outcomes in OECD countries. Many fiscal instruments operate as taxes and exactions levied on developers to raise revenues and mitigate the negative impacts of development. Some common tools include brownfield redevelopment incentives, historic rehabilitation tax credits, transfer of development rights, use-value tax assessments, development impact fees and betterment levies (OECD, 2017[21]). The limited implementation of such land-based fiscal instruments in Estonia provides a disincentive for compact development.

While Estonia uses impact fees to levy costs related to upgrading technical infrastructure (based on the Planning Act, paragraph 131), its implementation is limited only to instances where the development falls under a DSP. Other instruments are not used in Estonia. The lack of a scheme to internalise the costs of infrastructure and service provision in remote areas makes living in these areas cheaper, further encouraging spread-out development. As a consequence, many rural homes in Estonia are second residences inhabited only during certain months of the year.

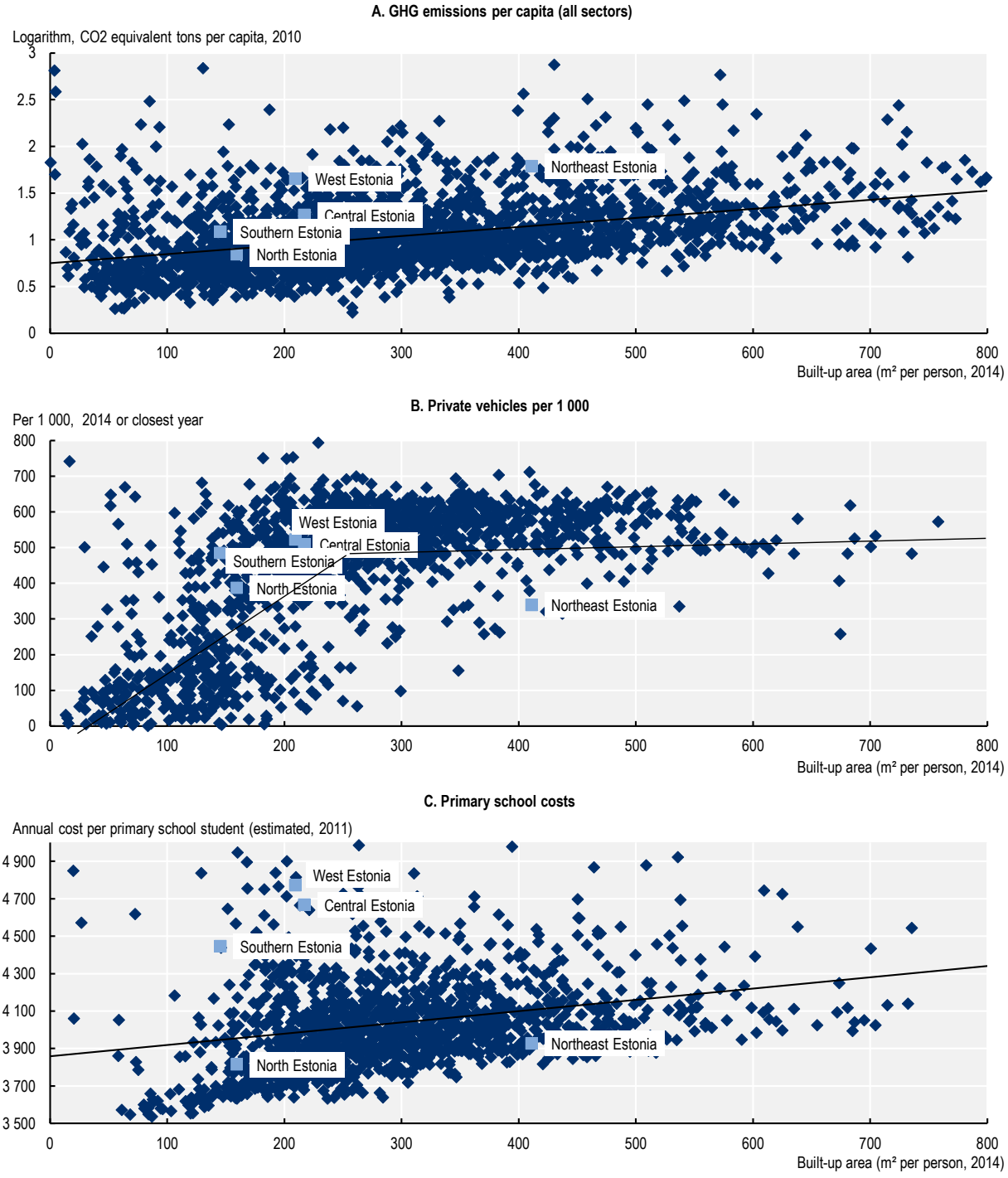
A related instrument often used with infrastructure development initiatives is land readjustment. Land readjustments do not transfer property rights from one owner to another but rather reshape existing plots in order to allow for more efficient use. It is defined as a process where land plots are pooled and shaped into more efficient plots, which are then redistributed to owners such that their value corresponds to that of the former plot. Land readjustment often entails the provision of public infrastructure and facilities in the process, which means the absolute size of the readjusted plots is reduced. However, the efficient plot allocation together with densification and the provision of a good built environment leads to an increase in the value of land. In Estonia, the Land Consolidation Act (paragraphs 16-29) highlights the procedures for land readjustment. However, its implementation has been limited to date, mainly being utilised to facilitate the Rail Baltica project. There is potential to implement readjustment measures to facilitate densification and the provision of infrastructure and services, especially in small towns in rural municipalities.

Sparse development is unsustainable

The environmental problems related to outward development have been documented extensively in the literature (OECD, 2018[3]). They concern the three dimensions of global environmental challenges: climate change, biodiversity loss and the degradation of land. For these, United Nations Framework Conventions on Climate Change call for wide-ranging measures to reduce emissions and increase protected natural habitats. Land in Estonia is particularly valuable for conservation for these environmental objectives (IIASA et al., 2021[35]).

Sparse development leads to more cars and increased travel demand because travel distances are longer. Sparse areas are also difficult to serve with public transport, which requires minimum densities to be operated efficiently. Thus, sparse development increases carbon emissions from transport (OECD, 2021[36]). Analyses based on active mobile positioning data from Estonia have shown that the carbon load of transport is lowest in smaller cities, rather than Tallinn (Poom, 2017[37]). This may be explained by the fact that in Tallinn, peoples' points of interest (anchor points) may be scattered over a considerable area, promoting car use. Per capita transport and residential emissions are estimated to be higher in rural regions, where they have risen the most since 2010. Figure 2.8, Panel A, illustrates the positive relationship between built-up area per capita and greenhouse gas (GHG) emissions. This relationship holds when controlling for income levels and country-specific effects. Thus, the positive correlation is not due to higher incomes positively affecting both GHG emissions and built-up area per capita.

Figure 2.8. Greater built-up area per capita is costly and unsustainable, TL3 regions



Note: Annual costs per primary school student includes the sum of estimated expenditure in all simulated primary schools based on 2011 population information.

Source: Crippa, M. et al. (2021[38]), *EDGAR v6.0 Greenhouse Gas Emissions (dataset)*, http://data.europa.eu/89h/97a67d67-c62e-4826-b873-9d972c4f670b; Goujon, A. et al. (eds.) (2021[39]), "The demographic landscape of EU territories: Challenges and opportunities in diversely ageing regions", EUR 30498 EN, Publications Office of the European Union, Luxembourg; Jacobs-Crisioni, C. et al. (n.d.[40]), "Development of the LUISA Reference Scenario 2020 and production of fine-resolution population projections by 5 year age group"; OECD (2021[18]), *OECD.Stat (database)*, https://stats.oecd.org (accessed on 8 July 2021); OECD/EC-JRC (2021[41]), *Access and Cost of Education and Health Services: Preparing Regions for Demographic Change*, https://dx.doi.org/10.1787/4ab69cf3-en.

Land development is one of the main causes behind the loss of biodiversity. This is because development reduces the overall size of natural habitats and also because it fragments them into a patchwork of areas that are too small. This is particularly relevant in the case of Estonia where outward growth is occurring not only near urban areas but also in rural and remote areas. Relatedly, sparse development also detracts from food supply as agricultural land is converted for development. Again, this is especially relevant for Estonia where the bulk of development occurs through the transition of agricultural land (Sooväli-Sepping, 2020[12]). Covering vegetated land with artificial surfaces also results in the permanent degradation of land and the ecosystem services vegetated land provides, including carbon sinks, soil regeneration and biodiversity. These impacts may be reinforced if existing forests are affected and the afforestation potential reduced. Afforestation is a key lever to reach net-zero GHG emissions by 2050 and maintain net-negative carbon dioxide (CO_2) emissions in net-negative territory thereafter, as needed to limit global warming to 1.5 degrees. Moreover, biomass from sustainable forest management is a key material and energy resource as fossil fuels are phased out in the context of moving to net-zero GHG emissions.

Land intensive development also pollutes the air. Air pollution is a major cause of premature deaths across OECD countries, although population exposure to small particle air pollution is still low in Estonia (OECD, 2016[42]). Sparse development contributes to air pollution through increased car use and longer driving distances. Evidence suggests that an increase in residential density increases the modal share of public transport while reducing the modal share of car-based transport (Balcombe et al., 2004[43]). Figure 2.8, Panel B, not only illustrates the effect greater built-up area per capita has on infrastructure burden but also air pollution, as a greater number of cars on the road directly results in increased air pollution.

The environmental context of land use should be considered in relation to Estonia's unique circumstances related to energy production and consumption. Estonia has the most carbon-intensive economy among OECD countries, with 533 kg of CO_2 emissions per USD 1 000 of gross domestic product (GDP) in purchasing power parity in 2014 (OECD, 2017[44]), well above second-place Canada at 370. This is due in large part to the fact that oil shale accounted for 72% of Estonia's total domestic energy production, 73% of total primary energy supply and 76% of electricity generation. Electricity production from oil shale is the most CO_2-intensive among all combustion technologies, which is why Estonia's power and heat production has the second-highest CO_2 intensity of all International Energy Agency (IEA) countries after Australia (IEA, 2019[45]).

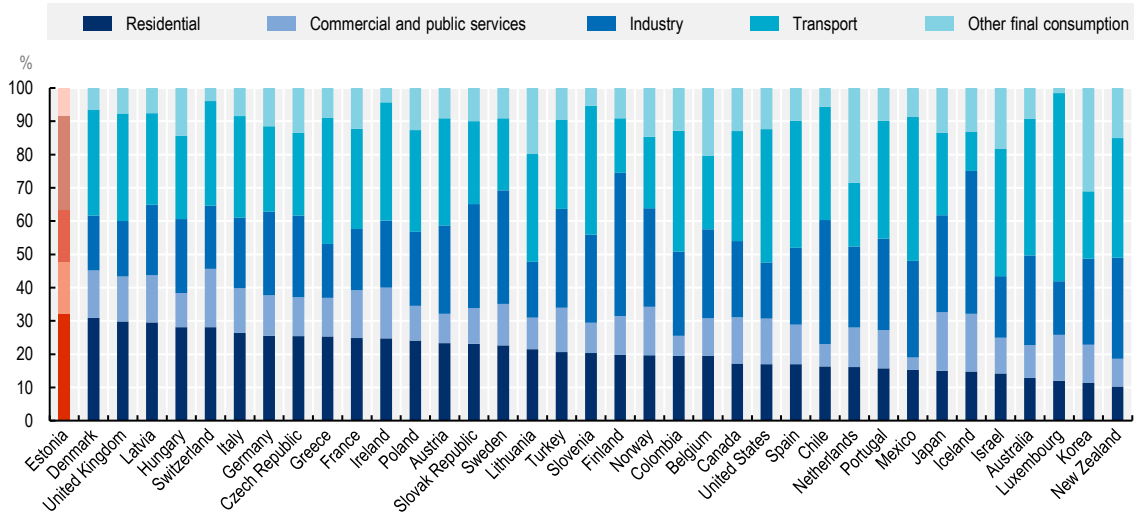
Sparse land use is strongly related to residential and transportation energy consumption (OECD, 2018[3]). Sparsity results in more detached houses that consume more energy per m² and are farther away from each other, increasing travel distances. Figure 2.9 shows how Estonia ranks first among OECD countries in the residential sector's share of total final consumption (TFC) of energy. This is partially attributed to Estonia's land use patterns, along with the country's old and energy-inefficient building stock (IEA, 2020[46]): 32.1% of TFC in Estonia comes from the residential sector, and when combined with transport, Estonia ranks 6th among OECD countries, at a combined 60.3% of TFC. The residential and transport sectors are consuming a disproportionately large share of electricity that is more carbon-intensive to produce. Reducing energy demand is a key priority in the context of moving to net-zero GHG emissions, a target the EU has set for 2050, as most energy demand needs to be electrified and electricity generation moved to renewables. Lowering energy demand makes this process more manageable and less costly.

Sparse development is costly

One of the consequences of sparse development is the inefficient use of infrastructure. This is the case because most network infrastructure such as roads, telecommunication, electricity, water and sewerage are provided for by first incurring fixed, upfront costs that are not related to the intensity of which the network is utilised. The less dense the land use, the fewer people can use the same infrastructure, resulting

in greater usage of infrastructure per capita. This not only increases the costs of providing for such infrastructure on the part of governments but also increases operating and maintenance costs.

Figure 2.9. Sectoral share of total final consumption of energy (2019)



Source: IEA (2021[47]), *World Energy Balances (database)*, https://www.iea.org/data-and-statistics/data-product/world-energy-balances-highlights (accessed on 24 September 2021).

The situation is similar for public services, including education and health. Sparse development patterns result in the need for smaller, more spread-out public facilities because the number of people living within their catchment areas is much smaller. As is the case for infrastructure, this increases the costs of public services because they are subject to economies of scale (e.g. it is cheaper to operate 1 school for 1 000 students than 10 schools for 100 students each). For other services such as waste disposal and postal services, the distances between people directly affect the costs of delivering the service. For example, sparse development and lower population densities require more mailmen per resident served because each mailman must cover greater distances.

Figure 2.8, Panels B and C, illustrate this argument using actual subnational data (including for Estonia) on built-up area per capita and the number of private vehicles per 1 000 residents (Panel B) and estimated cost per primary school student (Panel C) respectively. A strong positive relationship exists between the amount of built-up area per capita and both the number of private vehicles and annual primary school costs. For Panel B, it can be seen that private vehicle ownership increases sharply up to around 250 m² per person of built-up area and levels off afterwards, due to the number of vehicles per person approaching saturation. A greater number of vehicles on the road indicates the need for more road infrastructure, which is directly related to the costs of road provision. Even when the absolute number of vehicles is low (such as in rural regions), an increase in vehicles results in higher costs for maintenance and upkeep. Again, this positive correlation remains after controlling for income levels and country-specific effects. For Panel C, it can also be seen that a positive correlation exists between built-up area per capita and primary school costs. Regions with a greater amount of built-up area per capita also pay more to provide education for primary school students. This relationship also continues to hold when controlling for the share of the elderly population (65 years and above) and country-specific effects, meaning that the positive correlation is not due to a greater number of elderly people positively affecting both built-up area per capita and school costs.

Sparsity and polarisation result in building vacancies and an old and energy-inefficient housing stock

The pattern of sparse development shown in Figures 2.2 and 2.3, combined with depopulation results in a lack of a functioning real estate market and high building vacancies in rural and remote areas. Estonia's vacancy rate is estimated at 24.5% (Government of Estonia, 2021[30]). At the county level, Harju has the lowest vacancy rate at 20.2%, followed by Ida-Viru at 21.2%. Lääne and Lääne-Viru had the highest vacancy rate at 32.2% and 32.9% respectively. Japan and Eastern Germany (well-known areas experiencing decline) had vacancy rates of 13.6% (2018) and 10-12% (2013) respectively (Hattori, Kaido and Matsuyuki, 2017[48]). In the face of depopulation, vacancy numbers will continue to increase.

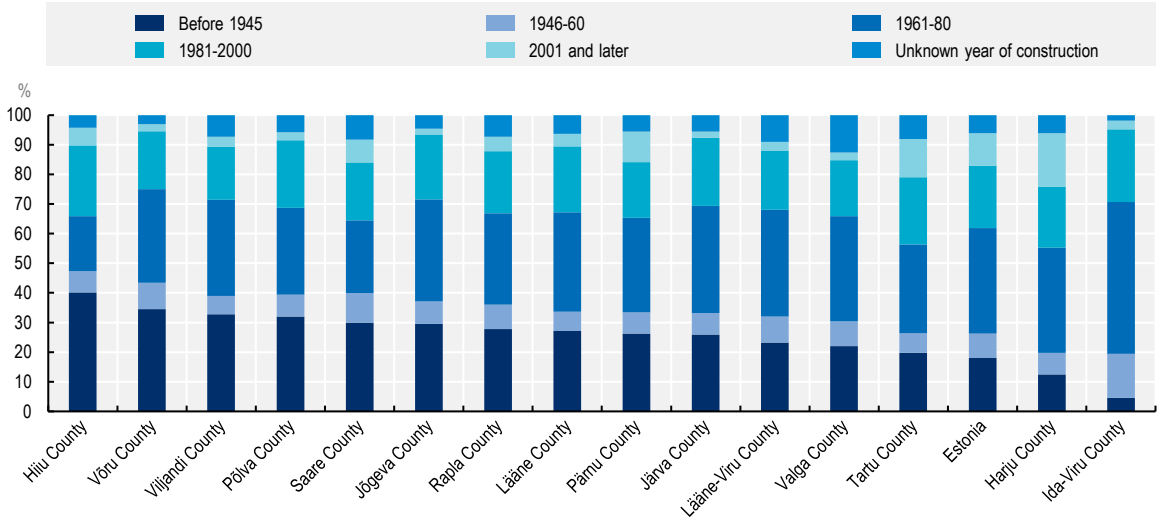
High vacancy rates cause serious problems related to the built environment. They detract from pleasant living environments, reinforcing the exodus from depopulating areas. High vacancies and poor living environments further decrease population, leading to lower municipal revenues that strain resources to maintain a suitable built environment. In addition, empty dwellings negatively affect the price of surrounding real estate, increase crime and decrease the attachment of residents, thereby hindering the vitality of the city. As properties are abandoned for long periods of time, perceptions of surrounding neighbourhoods become more and more negative, which further depress housing prices while deterring potential residents (Han, 2013[49]). Interviews with local governments suggest that many of them suffer from the decline of their city centres, yet have not been able to effectively respond to this problem due to complicated and slow procedures related to expropriation and demolition, insufficient administrative and planning capacity, and general lack of political will. While the central government is beginning to address these problems through studies such as the Vacant Housing Survey and the demolition pilot project, efforts are still made difficult due to legal barriers regarding expropriation and complex ownership structures together with a general lack of experience and available data.

The housing stock is old and energy-inefficient

As most new construction and renovation investments are concentrated in the large cities of Tallinn and Tartu, the gap in housing quality is widening, notably with respect to energy efficiency standards, which are lower for older buildings. Figure 2.10 illustrates this argument. For Estonia as a whole, about 60% of the housing stock was supplied during the Soviet Union prior to 1990. The rural and remote regions have much higher percentages of dwellings that were completed before 1960. It can be seen that the concentration of relatively new constructions after 2001 is especially concentrated in the main urban areas of Harju, Pärnu and Tartu. Noteworthy is the fact that roughly 30% of the dwellings in rural areas were constructed before 1945. Dwellings constructed in that era were mostly built of wood, lacked basic sanitation and heating was provided with firewood. After independence in 1991, many people abandoned these old wooden dwellings, moving into apartments abandoned by Russians (Tintěra, 2019[50]). The management of this stock of old dwellings requires a place-based spatial strategy and implementation plan to direct demolition and preservation efforts.

As shown in Figure 2.9, the energy consumption share of Estonia's residential sector is the highest of all IEA countries. Within the residential sector, heating accounts for the largest share of energy consumption at around 75%. Due to Estonia's old dwelling stock, the energy demand for space heating per surface area in residential buildings is among the highest in the EU (IEA, 2019[45]). Even accounting for Estonia's cold climate, Estonia's consumption is significantly higher than in many of the neighbouring Nordic and Baltic countries, pointing to other factors including the age of the building stock that drive the inefficient use of energy in the residential sector.

Figure 2.10. Dwellings by year of construction



Note: Adapted from indicator KVE02: Conventional dwellings by year of construction and county (after the 2017 administrative reform), 1 January (http://andmebaas.stat.ee/Index.aspx?DataSetCode=KVE02).
Source: Government of Estonia (2021[30]), *Statistics Estonia*, https://www.stat.ee/en (accessed on 10 September 2021).

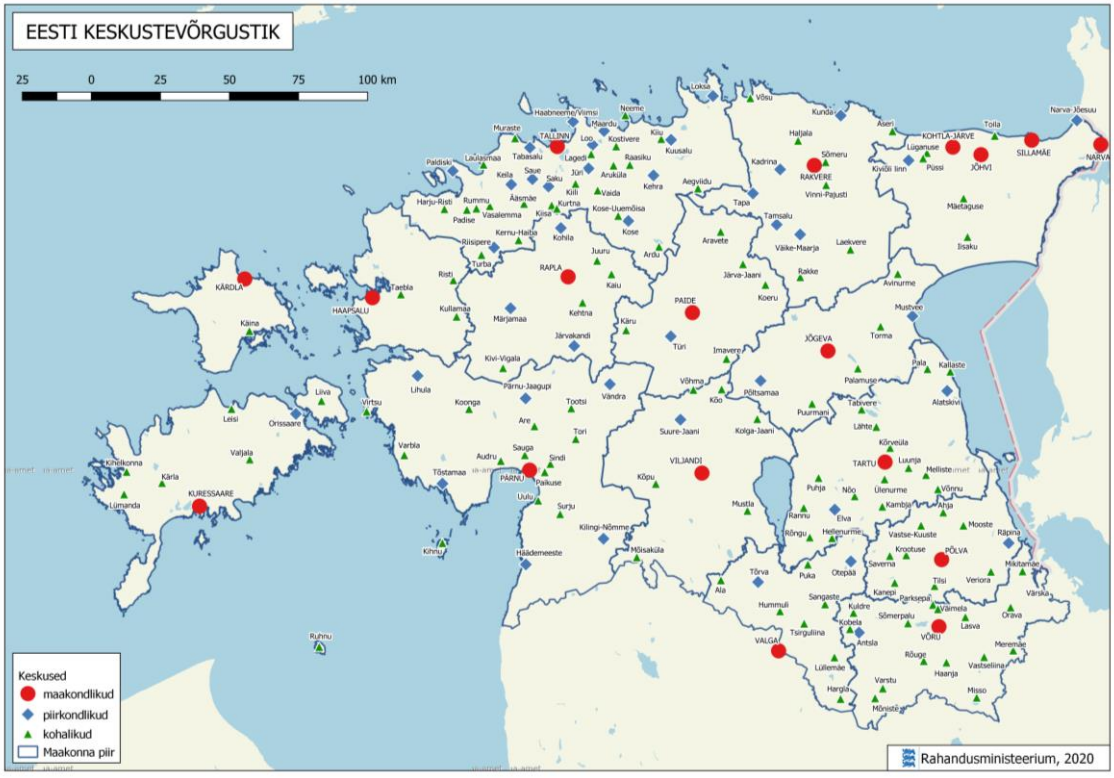
In Estonia, more than 60% of the population uses district heating. Estonia has 239 district heating systems with 1 430 km of heat pipelines, the majority of which are operated by private companies at the municipal level. While the Estonian Competition Authority regulates district heating prices, the price of district heating varies from roughly EUR 35 per MWh to EUR 87 per MWh, with prices typically being higher in small network regions with annual sales volume below 10 GWh (IEA, 2019[45]). This means that residents living in remote areas pay more for the same unit amount of energy, all the while living in dwellings that are less energy-efficient (OECD, 2021[36]). While renovating buildings can reduce heating demand, it is worthwhile to note that the less energy-efficient buildings in Estonia are owned by people with limited financial resources. While loan guarantees and grants are available for renovations, nonetheless renovating old buildings requires significant resources and is not attainable for many households, in particular in rural areas where real estate values are low. Moving to climate neutrality by 2050 requires renovating all buildings that will remain in use and equipping them with net-zero carbon emission consistent equipment. Reducing vacancies and clarifying which residential buildings should remain abandoned and which should be preserved and maintained within a spatial framework would help limit refurbishment work that will require government subsidies.

Public services and network infrastructure lack planning coherence

The lack of a substantive regional spatial planning framework that integrates spatial and strategic planning and encompasses relevant policy sectors has contributed to the inefficient delivery of public services. The former Ministry of Internal Affairs developed a concept of a hierarchical network of service centres in 2015 (Figure 2.11), taking into consideration the regulatory frameworks, economic viability and the frequency of visits and travel distances. According to this plan, settlements are classified into four levels within a distance that can be reached in one hour by public transportation and the necessary service facilities are presented according to the size of the settlements at each level. While this network was developed within the framework of CSPs, their implementation has been hampered due to a lack of co-operation between ministries in charge and also a lack of interest from local governments as follow-up administrative and financial implementation plans were not devised (Sepp et al., 2015[51]). For example, many educational

cultural, sports and welfare facilities are operated by municipalities. The lack of a coherent regional framework has hampered consolidation and cost-sharing efforts among local governments. In reality, public services, in general, have not been reviewed and restructured according to the service network.

Figure 2.11. Network of service centres

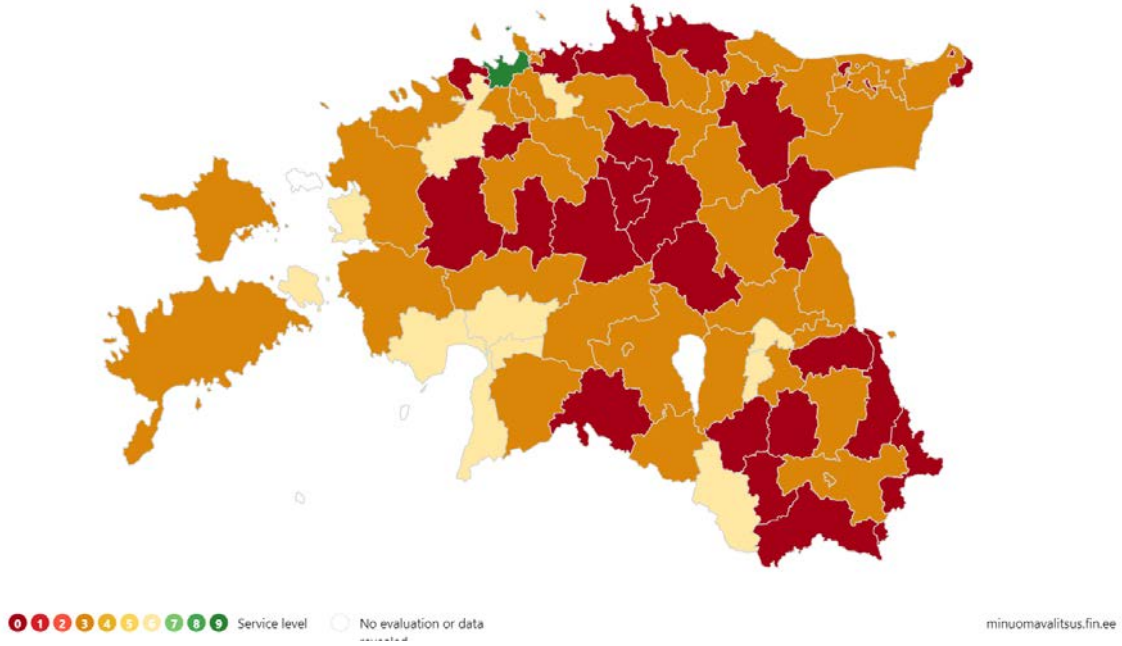


Note: County centres: red circles; regional centres: blue diamonds; local centres: green triangles.
Source: Estonian Ministry of Finance (2020[52]), *Maakonnaplaneeringud*.

Transportation

The situation is similar for network infrastructure. The International Transport Forum (ITF) highlights key challenges for Estonia's transportation sector that include: i) a lack of co-ordination with spatial planning agendas; ii) low public transport quality in peripheral and rural regions; iii) low road pavement ratio; and iv) low investment efficiency (ITF, 2021[53]). Figure 2.12 shows how satisfaction with public transportation is particularly low for the rural and remote regions of Estonia (Government of Estonia, 2021[54]). The main issue is the fact that there are no clear links between spatial planning and transport policy. For example, there are no rules that make the provision of public transport links a compulsory requirement for new developments within or outside urban areas. In addition, many municipalities do not have a comprehensive overview of ongoing developments (e.g. in the form of an electronic database). They also lack the capacity to enforce specific rules regarding density or proximity to public transport on developers.

Figure 2.12. Satisfaction with public transport



Source: Government of Estonia (2021[54]), *Minuomavalitsus (My municipality)*, https://minuomavalitsus.fin.ee/en/kov (accessed on 10 October 2021).

Although Estonia is aiming to introduce demand-responsive transport (DRT) through pilot projects and a public transport application (Government of Estonia, 2020[55]), progress is slower than in neighbouring countries (Box 2.4). Fragmented governance of public transport is a major obstacle. For example, public transport is operated by public transport authorities while social transport is handled by local governments. Rigid five-year contracts with private carriers are major obstacles (Kirsimaa and Suik, 2020[56]). A more coherent project evaluation process would also raise the efficiency of road investments (ITF, 2021[53]) and make it easier to integrate environmental objectives, such as moving to climate neutrality. For example, the road administration is preparing for a predicted 50% increase in traffic volume for main state roads by 2040, even when population projections contained in the NSP predict a population decrease of nearly 10%. The absence of an official analysis agency and a public corporation specialising in road construction and maintenance have been cited as potential causes for such a disconnect (ITF, 2021[53]).

Box 2.4. Innovative approaches for public transport

Demand-responsive transport (DRT)

The municipality of Niepołomice in Poland had the goal to make its public transport routes more efficient and convenient for users, whilst also driving down costs and emissions by reducing the number of unnecessary journeys. Their solution was the Tele-Bus system, an on-demand bus service with no regular routes or timetable, operating in three districts with low population densities. Users can request a journey between any 2 of 77 stops in the coverage area, up to 30 minutes before the required departure. The main user groups are commuting workers, students and elderly people. Despite some initial opposition to the cancellation of traditional bus services, the DRT system now has an average of

more than 3 500 users per month, from around 300 when the system was launched in 2007, thanks to ongoing communications efforts and a focus on good service.

Co-operation with other services

In countries such as Switzerland and the United Kingdom (UK), the postal service is a major bus operator. Existing postal vehicle runs collect mail from local post offices and transport them to regional sorting offices, most often in a nearby town. Such routes provide two-three runs per day on weekdays, depending on the frequency of postal collections. Approaches that replace a small postal van with a minibus has allowed public transport services to "piggyback" on postal operations.

Source: Interreg (2018[57]), *A Policy Brief from the Policy Learning Platform on Low-carbon Economy Demand-responsive Transport*, http://www.interregeurope.eu/regio-mob/ (accessed on 15 February 2021); OECD (2016[58]), *OECD Territorial Reviews: Japan 2016*, https://dx.doi.org/10.1787/9789264250543-en.

Water and sanitation

Water networks are exposed to issues similar to that of district heating, such as large differences in rates between regions and increasing unit costs of service provision. These issues must be addressed in the face of shrinking and ageing, as municipalities deal with lower fiscal resources and a more spread-out population. Estonia's water supply is fragmented, with 1 165 suppliers operating in 2011. Of these, only 52 have more than 2 000 customers. Water networks differ widely in terms of size; the largest serves the capital city Tallinn providing services to more than 438 341 people and the smallest serve only several hundred. While 90% of Estonian cities are served by fully publicly owned water companies, smaller towns and rural municipalities are often served by a variety of entities, including specialised water companies with mixed (public and private) ownership, private companies and, in some cases, directly by local government agencies (Tooming, 2011[59]). There is an ongoing process of consolidation of water companies in Estonia, together with government support in the form of financing for regional companies (OECD, 2020[60]). When completed, consolidation would not only improve efficiency in the face of shrinkage but also allow better access to external capital such as EU funds.

Policy recommendations

Given the land use and spatial planning circumstances in Estonia, the policy recommendations are generally geared towards reducing land consumption sustainably and promoting gradual densification of central areas in rural and remote regions. Rural and remote regions experiencing population decline and ageing should aim to increase land use efficiency, taking into account infrastructure and service delivery capacities. The benefits include lower service delivery and infrastructure costs for municipalities and lower environmental impacts from spread-out development. Furthermore, denser places are on average more productive due to agglomeration economies, with the population density of a region being a strong predictor of economic performance.

In addition, the recommendations stress a need for co-operation across policy sectors, along with co-operation across levels of government. An approach to managing land use and spatial development using a more integrated approach is critical to overcome sectoral silos and avoid policies that are potentially at odds with each other. In addition, co-operation, both horizontally and vertically, across governments is crucial in enabling sustainable service provision, promoting coherent spatial development that goes beyond administrative boundaries and getting the spatial frame for planning right.

County-wide Spatial Plans (CSPs) should be the central platform in guiding regional development

In theory, the aim of a CSP is to define the principles for coherent spatial development within county boundaries. Its primary role is to formally express interests that transcend local municipal boundaries and to balance national and local needs and interests regarding spatial development. In this way, CSPs are the ideal platform to address regional issues related to shrinkage, as most all of these issues (e.g. land use, infrastructure, services) need to be solved collectively at a higher spatial scale. In practice, however, CSPs are weakly implemented and lack proper details regarding the scope and procedures for inter-municipal co-operation (IMC). This is in part due to the reduced powers of county governments over time, along with a lack of political support for regional-level policies in favour of sectoral policies.

The recent changes Estonia has undergone in its county governance have brought about fragmentation in county strategies. The Regional Policy Programme and Regional Policy Action Plan (RPAP) should be streamlined to provide one coherent regional policy framework that integrates spatial objectives with strategic objectives. Importantly, this policy framework should be well integrated within the NSP such that it provides a clear framework that can be implemented by individual CSPs. NSPs should also present policy and planning priorities based on spatial patterns of development and demographic change. Furthermore, the NDSP should also be well integrated into the NSP so that CSPs can better take national level construction projects into account when devising county-level spatial planning strategies.

CSPs should be a *de facto* platform for which regional issues relating to spatial development are outlined. CSPs need to outline a clear division of roles between the central government and municipalities for tackling issues that span municipal boundaries, in order to reduce confusion and prevent inefficiencies in implementing regional strategies. In addition, CSPs should expand the scope of functions to determine the conditions for IMC in other policy areas pertinent for tackling depopulation and ageing, including education, health and other critical services and infrastructure. To this end, the central government and municipalities need to review the appropriateness and feasibility of the current hierarchical service network and outline clear implementation plans with timelines in CSPs. For spatial planning, CSPs should better outline areas for IMC with regards to the function of the network of centres and clearly determine principles for municipalities in co-ordinating development patterns. There is also a need to combine strategic planning with spatial planning at the county level. In this regard, county development strategies and CSPs should be well integrated, possibly by subsuming county development strategies within CSPs. Discussions on the correct spatial scale of regional spatial planning should also continue, as planning within administrative boundaries versus functional boundaries both have their weaknesses and strengths. Administrative boundaries make co-operation administratively easier and less burdensome, yet many spatial issues span across administrative boundaries. If feasible, CSPs could be allowed to be flexible in their reach, for example by encouraging multiple counties to prepare a unified spatial plan.

Land taxes and land-based financing instruments should be revised to deter spread-out development in rural areas

Land tax rate limits should be relaxed to allow municipalities greater autonomy in collecting revenues and to encourage efficient land use. Land taxes should not incentivise spread-out development and the ownership of single-family homes over multi-family homes. Tax exemption for residential land in remote areas should be abolished, or at least reduced, while exemptions in denser areas within rural municipalities could be relaxed further. The additional revenues collected from land taxes should be reinvested towards improving amenities in shrinking regions. Importantly, these measures would need to come hand-in-hand with the re-evaluation of taxable land values, as the current low valuations make such measures ineffective. Differentiated land tax rates depending on how land is used could also be utilised. For example, Germany has proposed a land use tax, which differentiates land tax rates depending on how land is used and the

associated environmental costs. In the Netherlands and the US, there have been discussions on a tax on the welfare loss associated with the loss of open space due to development.

Alternative fiscal instruments could be used to better align land use with desired spatial outcomes. Importantly, impact fees should be actively utilised to not only apply to developments in dense areas but also to sprawl areas in remote regions, with the rationale being the internalisation of additional costs related to service and infrastructure delivery. Money gathered from impact fees should be used to improve the quality of the built environment by investing in public infrastructure and services.

Demolition and renovation projects should take place at a larger scale, through coherent planning, fiscal support and legislative changes

Current efforts to improve living conditions and residential environments through demolition and renovation projects in Estonia, while ongoing, are still in their infancy. For example, the *Hea avalik ruum* programme in Estonia has been implemented since 2014 and the rejuvenation of ten town centres has been completed. They have been successful in achieving their goal of improving the built environment of central areas yet these projects have been implemented in a piecemeal fashion at the site level. It is necessary to establish a system in which these projects can be implemented at a larger scale through co-operation between government levels, ideally within the spatial planning framework through the CPs and CSPs. Importantly, these programmes should be implemented in a participatory and horizontal manner. This would not only improve their efficiency but also better align regeneration efforts with strategic objectives.

Most importantly, demolition and renovation projects should be aligned with spatial planning objectives outlined in CSPs and CPs. The CSPs should outline which areas are in need of demolition and renovation based on population projections and spatial development trajectories. The CPs should outline the settlement boundaries, allocate land uses (e.g. residential, industrial, commercial) and development densities, directing demolition and renovation projects according to these plans. The demolition and renovation projects should follow a process of “shrinking from the outside in” (Box 2.5), where the building stock in the periphery is reduced and renovation efforts are concentrated in town centres.

Box 2.5. Addressing shrinkage in East Germany: The Urban Restructuring Programme (*Stadtumbau Ost*)

Background

The reunification of Germany in 1990 brought economic hardship to Eastern Germany. The unemployment rate had reached double-digit levels by the early 1990s and rose sharply to an alarming 17.8% in 1998. The difficult employment situation affected migration: between 1989 and 2002, almost 2.8 million people moved from east to west. At the beginning of the 21st century, a clear division in the housing market situation also became evident. By 1998, the share of vacant housing in Eastern Germany was more than 2 times higher than in Western Germany and, by 2000, Eastern Germany had a vacancy rate of 14%. As a response, the federal government introduced a new policy called the Urban Restructuring Programme (*Stadtumbau Ost*) for Eastern Germany in 2001. Unique within the framework of federally supported urban policies, *Stadtumbau Ost* was the first to explicitly address the issue of shrinkage.

Phase 1 (2001-09): Demolition dominated

The introduction of *Stadtumbau Ost* was based on the work of an expert commission, which had been affected by the interests of the housing sector to a large extent. The programme aimed to eliminate roughly 350 000 dwellings by 2010 with the support of public subsidies. Upgrades to the housing stock were also recommended. *Stadtumbau Ost* had a budget of EUR 2.5 billion in public subsidies during

the period of 2001-09, of which about EUR 1 billion were federal government funds. It was formally decided that demolitions and upgrading should each receive 50% of the subsidies at the federal level, although municipalities did not have to follow such rules. What made *Stadtumbau Ost* particularly distinctive among other federally supported urban policies in Germany at that time was the preferential treatment for demolition projects. While demolitions were financed completely by the federal government and federal states (each contributing 50%), upgrading projects required a one-third contribution from local authorities. Considering the financial difficulties of shrinking municipalities at the time, the financing rules made demolitions more attractive. By June of 2010, about 283 000 dwellings had been demolished.

The urban restructuring strategy followed a spatial concept called "shrinking from the outside in" (*Schrumpfen von außen nach innen*). The strategy aimed for a reduction of the housing stock (i.e. demolition) in the periphery, while inner city districts would be the focus of upgrading projects. About 70% to 80% of residents affected by demolitions were relocated within the same neighbourhood. The effort, while with its fair share of troubles, was nonetheless a general success. In Leipzig, by 2009, 74% of residents of the largest prefabricated housing estate declared to be satisfied with their place of residence, compared to 35% in 1992.

Phase 2 (2010-16): Shift towards renovation and cultural heritage protection

Even before the German parliament's decision to extend *Stadtumbau Ost* for the period from 2010 to 2016, the overall direction of the policy had begun to shift from demolitions towards upgrading. In regard to spatial development, more attention began to be paid to the inner city districts. Starting in 2007, it became mandatory for municipalities to use 50% of subsidies on upgrading. Notably, *Stadtumbau Ost* interpreted the meaning of "upgrading" in a broad way. Earlier policies had tended to be narrowly focused on the physical modernisation of houses while neglecting the wider urban context. By contrast, upgrading funds for *Stadtumbau Ost* were also utilised for the improvement of urban infrastructure, the re-use of vacant lots and public space improvements, as well as for the preparation of urban development concepts.

Following the new policy orientation, new forms of subsidies became available that allowed for the temporary preservation of houses in a technically safe condition in expectation of future demand. No municipal contribution was required for these subsidies, which was important given the difficult financial situation of many municipalities. Over time, the practice of using preservation funds became more widespread. Having been of only marginal significance until 2009, projects within this new priority accounted for almost 15% of the total funds spent within *Stadtumbau Ost* between 2012 and 2015.

Phase 3 (2017 onwards): Permanent fight against housing vacancies in the East, integration support in the West

In 2017, *Stadtumbau Ost* was merged with *Stadtumbau West*, a parallel initiative in Western Germany that was started in 2004 to tackle demographic change in western regions. The combined annual budget was estimated to be approximately EUR 260 million. As a result of the evaluation of previous urban redevelopment programmes, instruments that focused on safeguarding and upgrading old buildings and other buildings that characterise the cityscape were introduced for all urban development support programmes with a reduced municipal contribution. Urban redevelopment measures in 1 081 municipalities had been funded by both programmes by the end of 2016, with 494 municipalities in *Stadtumbau Ost* and 586 municipalities in *Stadtumbau West*.

Source: Radzimski, A. (2016[61]), "Changing policy responses to shrinkage: The case of dealing with housing vacancies in Eastern Germany", http://dx.doi.org/10.1016/j.cities.2015.10.005; Radzimski, A. (2017[62]), "Involving small landlords as a regeneration strategy under shrinkage: Evidence from two East German cases", http://dx.doi.org/10.1080/09654313.2017.1391178.

As mentioned in the Estonia Reconstruction Strategy 2020, the estimated annual investment needed for demolition and renovation is 4.5 times larger than that of current investments. The central government should prepare a sufficient and stable financing mechanism, possibly through the Estonian Credit and Export Guarantee Fund (KredEx) or by establishing a housing investment fund, and increasing annual investment scales. In addition, mid-to-long-term investment plans including the amount of funds available should be agreed upon between the national and local governments as early as possible so that local governments and the private sector are able to promote projects in advance with a long-term view. Importantly, it is necessary to continue to give funding priority to non-metropolitan regions, as private financing in metropolitan regions is generally more feasible. If residential environments in non-metropolitan regions can be improved, the national cost burden can be reduced as local real estate values will be better maintained, reducing the population exodus to large cities. Additional bonuses or higher grant percentages could also be awarded to projects reflected in the CSPs or CPs.

Legislation regarding expropriation should be revised to allow for the easier demolition of vacant buildings. Estonia's expropriation laws are much stricter compared to neighbouring OECD countries (Box 2.3). Expropriations should be allowed for the demolition of empty detached housing, while the expropriation of apartment buildings should be streamlined. Expropriation initiatives should be integrated with land use plans through the CP and CSP, thus allowing expropriations to be carried out at a larger scale based on demographic projections and settlement boundaries. This would require expropriations to be allowed based on land use decisions, such as in countries including Denmark, Finland, Latvia and Poland.

When expropriation proves difficult, strategies such as land readjustment or land banking could be utilised. Land readjustment strategies could provide residents with an alternative residence in the vicinity of their current plot that is more valuable due to infrastructure and built environment improvements but smaller in area. This would not only provide for infrastructure and increase land values but also promote densification as built-up areas could be reduced significantly. "Land banking" or the practice of assembling plots of undeveloped or abandoned land for further development or sale, could be useful in declining areas. Land banks help municipalities to identify, prepare and redevelop vacant sites and, when done by publicly owned land banks, can be a particularly effective tool in promoting coherent development of abandoned areas.

Comprehensive Plans (CPs) should steer spatial development, while subordinate plans should adhere to spatial planning objectives

According to the Planning Act (paragraph 142), the DSP, despite being the subordinate plan in the planning hierarchy, has the authority to override the CP (Figure 2.6). This authority is often exercised in practice when preparing DSPs. While such arrangements are not uncommon in OECD countries (e.g. Belgium, Norway, Portugal), this poses issues in the case of Estonia as DSPs are most often requested for initiation by developers and thus are influenced by private interests. As DSPs are mainly initiated at the small-scale level of a development site, the overriding of the CP in favour of a more detailed plan influenced by private interests carries the danger of detracting from a more coherent spatial development strategy (Sooväli-Sepping, 2020[12]).

Two underlying causes of such planning practices can be identified. First, it may be the case that the CP itself is prepared in too much detail, being inflexible and hindering the nimble development of areas. Exacerbating this is the fact that the process of developing CPs is arduous and lengthy, meaning that in many cases CPs are already out of date when approved for implementation. Second, it may be the case that changes to spatial development principles outlined in the CP are allowed to be altered too easily. This can be the result of many factors, including the lack of experience and capacity on the part of local governments to implement spatial planning strategies and Estonia's historical traditions that put a strong emphasis on private property rights.

Rearranging the hierarchy of local plans is necessary to promote coherent spatial development at the local level. This is especially important because in addition to DSPs, LGDSPs and design criteria also exist to set building regulations and land uses, which without streamlining can result in misunderstandings and confusion regarding planning processes. The CP should confirm its role as the higher-order plan that sets out strategic initiatives for land use and development. The subordinate plans and codes should conform to the CP and complement it by implementing building and land use details based on these agendas.

Alterations to the CP by subordinate plans should be disallowed or at the minimum allowed only in exceptional circumstances. In return, CPs should refrain from "over-planning" by moving away from setting detailed building codes and specific uses, and rather focusing on planning the strategic location and amount of land use categories, housing, infrastructure and service networks based on population projections and demographic trends, while also setting strict development boundaries. This would have the added benefit of easing the requirements of what constitutes a CP and shortening approval processes. Furthermore, the following subsections highlight how increased flexibility in CPs is advantageous to effectively adapting to depopulation and demographic change.

CPs need to integrate population projections into land use planning and adjust development boundaries accordingly

Without population projections, land use plans tend to overestimate the future demand for land. This is especially the case when regions are declining, as plans tend to be overly optimistic in estimating land demand compared to population forecasts. Certainly, local governments are entitled to set their development objectives based on self-governance principles, especially in light of decentralisation trends. However, the appropriate spatial scale also needs to be considered, especially when local governments have an incentive to develop more and more land in the absence of regional-level guidelines. In order to prevent a "race to the bottom", CPs should incorporate the population guidelines set in CSPs and implement them into land use plans and regulations, encouraging densification of core areas. Local land use plans should consider the forecasted demand for housing, infrastructure and other uses, as well as allow for the adjustment of densities and development boundaries as needed. If needed, Statistics Estonia could provide municipal level population projections that CPs could utilise for land use decisions.

A strategy of proposing settlement boundaries and service limits while providing various incentives for investments within those boundaries helps in deterring spread-out development in rural and remote areas. Instruments such as urban growth boundaries, urban service boundaries and greenbelts are commonly used to set temporary limits on urban expansion. They are effective at increasing infill development and limiting spread-out development. Such boundaries should be clearly laid out and enforced in CPs, in harmony with strategic objectives and socio-economic development plans. These boundaries should then be adjusted as needed to better contain development in areas that face population decline. When coupled with fiscal incentives, these boundaries are capable of improving the quality of the built environment within the limits, which can attract residents and businesses.

Such strategies have been effective to a certain degree in OECD countries. For example, various states in the US use a combination of incentives and regulations to deter sprawl (Table 2.2). In Maryland, an incentive-based policy of providing government subsidies and support programmes together with infrastructure investment is used within urban containment boundaries, or so-called Priority Funding Areas (Howland and Sohn, 2007[63]). Such efforts have been able to attract new residents and businesses to these areas, although their success depends on co-operation between adjacent municipalities. Other states such as Minnesota and Tennessee utilise a regulation-oriented policy, where urban growth boundaries restrict development outside of designated limits but flexibly adjust these limits according to development demand and sometimes allow development in condition for infrastructure installation. Other countries such as Japan and Korea have utilised greenbelts with success to contain development within designated areas.

Table 2.2. State-level urban containment boundaries in the US

State	Urban boundary	Adopted (year)	Legislation
Arizona	Requirement to adopt 10-year growth boundaries	Introduced and defeated in 2001	Proposition 202
California	Urban growth boundary	Introduced and defeated in 2001	AB 1514
Colorado	Urban growth boundaries	Introduced and defeated in 2000	Amendment 24
Kentucky	Urban growth boundaries	Introduced 2000-01, passed but not signed by the governor	HB 524
Maryland	Priority Funding Areas	Passed in 1997	Smart Growth Areas Act
Minnesota	Urban growth boundaries	Introduced and defeated in 2001	SF 786 and HF 882
Pennsylvania	Urban growth boundaries	Issued in 1998 but not enacted	Proposed by the Governor's 21st Century Environmental Commission
Oregon	Urban growth boundary	Enacted in 1973, adopted in Portland in 1980	Senate Bill 100
Tennessee	Urban growth boundary	Enacted in 1998	Growth Policy Law, Public Chapter 1101
Washington	Urban growth boundary	Enacted in 1990	Growth Management Act

Source: Adapted from American Planning Association (2002[64]), *Planning for Smart Growth: 2002 State of the States*, http://www.miami21.org/PDFs/Planning%20for%20Smart%20Growth.pdf (accessed on 12 October 2021).

Local plans should be more flexible to adapt to demographic trends and economic opportunities

Zoning should be sufficiently flexible to allow neighbourhoods to change over time according to evolving population patterns and changes in housing demand. Flexible zoning plans allow underused areas to be allocated to new uses, possibly even through temporary uses. For example, the authorisation agreement ("*Gestattungsvereinbarung*") in Germany allows for the limited-term public use of private property while still maintaining owners' building rights (Rall and Haase, 2011[65]). This can increase the density of development and improve environmental sustainability while reducing burdens on transport infrastructure. Flexible zoning also ensures efficient patterns of spatial development, especially in low-density areas and along public transport corridors.

Importantly, however, flexibility in land use planning should not lead to uncontrolled land use that does not internalise the potentially harmful externalities stemming from developments. When allowing for more flexibility, zoning regulations and planning should target nuisance levels, with uses that create fewer nuisances than the maximum level allowed for a zone being permitted. A good example of such an approach is the national zoning system of Japan (OECD, 2017[21]). Indeed, all types of residential buildings are allowed in a commercial zone but hotels are only allowed in denser residential areas. Relatedly, while warehouses and garages are allowed in commercial areas, factories are not. In addition, none of the zones are strictly single-use and control land use instead through more flexible floor area ratios and building coverage ratios.

Flexible zoning districts or special-purpose bodies (SPBs) could improve the adaptability of land use in instances where new developments need to be implemented quickly. Many OECD countries have adopted extraordinary measures for such cases. For example, in Poland, Special Infrastructure Acts suspend common planning law for key projects. While the acts have been instrumental in helping Poland take advantage of investments funded through EU Structural Funds, nonetheless these acts can be implemented even where they are contradictory to the aims of a local spatial strategy (OECD, 2017[21]). Thus, in the case of Estonia, such zoning districts, if implemented, should only be utilised in cases where a significant investment or opportunity arises for which quick development is necessary to take advantage

of available resources. As mentioned, these districts should also adhere to the spatial planning objectives set out in CPs.

Relatedly, restrictive zoning regulations should be avoided in most cases. Single-use zoning should be used mainly for specific purposes such as hazardous industrial areas, while other areas should actively utilise mixed-use zoning. Density regulations should be upward flexible to allow the gradual densification of central neighbourhoods, in line with infrastructure and service delivery capacity. Mixed uses and flexible density regulations have the benefit of not only allowing land use to be sustainable and more adaptable to changing demographic conditions but also benefit the environment and deter sprawl by reducing demand for vehicles and shortening travel distances between residential areas and other land uses. This is important especially in rural and remote regions where reliance on personal vehicles is high. Thus, when utilising mixed uses and flexible density regulations, the priority should be to establish well-functioning public transport networks including DRT services through transit-oriented development (TOD). Such land use patterns also result in a reduction of service per capita and infrastructure delivery costs. This is critical for rural and remote areas and small towns facing decline, as their fiscal capacity to provide for an extensive infrastructure network that spans thinly developed areas is limited.

The central government should aid municipalities by providing data and open information systems together with administrative support

Establishing data and open information systems for vacant houses and buildings in particular is necessary to provide information on the spatial distribution and status of depopulation across regions. A database documenting the costs and outcomes of main municipal services should be established to support benchmarking of service provision across municipalities. Relatedly, existing and planned platforms such as “My municipality” (*Minuomavalitsus*) and the e-construction platform could be expanded to include key aspects of spatial planning and the built environment, to regularly evaluate and monitor the quality of life in regions. For example, the UK’s Ministry of Housing, Communities and Local Government has developed and published online a relative deprivation index based on 39 separate indicators at the municipal level that is used to gauge the living conditions of residents across multiple domains (UK Government, 2019[66]). A dedicated e-platform could also integrate data from various government sources, such as the land portal and the building register.

Such information is necessary for effective spatial planning, policy establishment and execution, as well as performance measurement in the face of depopulation. For example, information on education services could be used to help municipalities plan and reorganise school networks. Information regarding empty houses could be shared with the private sector to identify various business opportunities, including temporary use contracts, by checking empty houses and publicly owned idle facilities. Importantly, these information systems could be utilised to raise awareness in municipalities regarding the added costs of shrinking populations and spread-out development and to aid them in planning land use and reorganising service and infrastructure networks accordingly.

In light of local governments’ short history of land use planning, it is also important for the central government to aid in the capacity building of local governments to effectively design CPs. For example, the central government could train and maintain a national pool of certified planning and architectural experts that would aid local municipalities in devising CPs as needed and serve as consultants for the planning authority. This would provide local planning officials with the administrative capacity to co-operate on planning efforts, balance the interests of various stakeholders and overall ensure that a comprehensive spatial solution is prepared for the municipality.

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Note

[1] Some differentiation already exists in Estonia. Financial support for apartment renovation is differentiated regionally (https://kredex.ee/et/teenused/ku-ja-kov/rekonstrueerimistoetus-2020#oluliseks-tingimused). Some measures supporting transport and education infrastructure are directed at urban areas (https://www.riigiteataja.ee/akt/106032015030?leiaKehtiv), while the "distributed settlement programme" is targeted towards sparsely populated areas (https://www.riigiteataja.ee/akt/107012021004).

3 Financing local public services and infrastructure in Estonia: Challenges and ways forward

Estonia's population is projected to decline by 2040 in all but two counties. While the whole country will lose about 2% of its population by 2040, most regions will lose more than 20% of their population. A shrinking and ageing population will change the demographic composition of municipalities, erode local tax bases and alter the demand for local public services. Based on research literature and international practices, this chapter analyses the Estonian multi-level governance model, municipal spending assignments and revenue sources. The chapter makes several recommendations on inter-municipal co-operation, the transfer system and central-local relationships.

Introduction

The effects of the downward trend of the projected population on the cost of public services and infrastructure will be considerable in the rural and remote municipalities, but also in many small towns and cities of Estonia. Although the 2017 administrative reform reduced the number of municipalities from 213 to 79 and increased the median municipal population size from 1 823 to 7 372 inhabitants, nearly 60% of municipalities still had shrinking populations in 2020. With a diminishing and ageing population, the pressure on further structural reforms at the municipal level remains.

While Estonia's territory allows for relatively short distances and travel times between the main towns, the challenge is that Estonia's population density is relatively low (among the lowest in the European Union [EU]). Furthermore, Estonia's degree of urbanisation (69%) is below the EU average (75%). If the urbanisation process in Estonia picks up with the EU trend during the coming years and decades, the resulting internal migration will probably mean an even faster population decline of remote rural municipalities and small towns.

Estonia is not alone in this development. Shrinking population is a European and global issue. Population decline challenges the conventional wisdom for multi-level governance and how public service provision is organised. Without adjusting measures, municipalities affected by population decline will experience shrinking tax bases and higher per capita costs, forcing cuts on spending, accumulating debt and increasing local tax rates. This can lead to a deteriorating path of local development. Although the most significant effects of the shrinking population are encountered in local communities, the issue is also of wider social and economic significance, for example on local innovation systems and social cohesion. Therefore, there is a need for adaptation strategies at both local and national government levels.

The traditional policy response to declining regions has been growth policy combined with increased financial support, aiming to reverse shrinking trends and stimulate population growth. While such measures may play a role for particular regions that have distinct comparative advantages, given overall population trends and projections, such policies will not work as a general solution for all regions. Thus, relying solely on growth policies may actually result in poorly managed shrinkage rather than regional and local growth. The alternative, the so-called "smart shrinking" policy, means, first, that the decline is accepted and, second, that a systematic plan is developed on how to deal with it. Such a strategy must be tailored to local needs and circumstances. The key elements include a combination of inter-municipal co-operation (IMC) and collaboration with civil society but also the concentration of service units, budget cuts and increased taxes. At the national level, it should be ensured that the normative regulation allows an efficient local response. This includes a clear legal basis for IMC and rules that are flexible enough to facilitate local experimenting and innovative solutions. In addition, financial interventions may be required at the national level to support municipalities in handling the challenges related to shrinking, as has been applied in some other countries facing similar challenges (for example in Germany, Japan, Sweden, Japan, Germany). Such measures could include support to municipalities to handle unused or only partially used buildings, financial support for upgrading public buildings that are still needed.

Municipal financing is the cornerstone of any successful adjustment at the municipal level. The local tax base together with the transfer system should enable balanced budgets in subnational governments. Municipalities should also be given a realistic timeframe for adjusting their service structure and maintain good service quality, despite shrinking resources.

The purpose of this chapter is to discuss the Estonian multi-level governance and municipal financing model, especially from a shrinking population point of view. The chapter starts with a short description of the main municipal spending assignments and revenue sources. The chapter then briefly discusses the main fiscal impacts of a shrinking population and provides some examples for solutions. The chapter then compares the Estonian multi-level governance model to international peers. The final section of the chapter

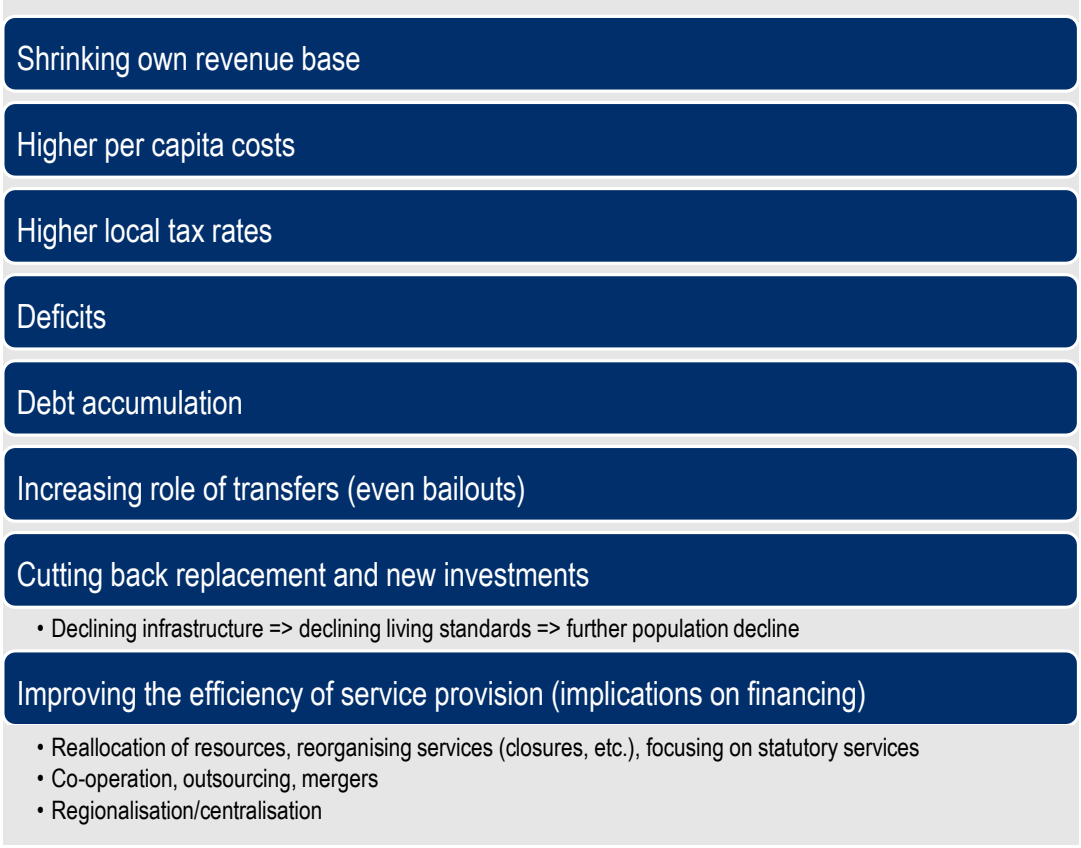
makes proposals on how to address the key challenges to Estonian multi-level governance and municipal government financing from the shrinkage aspect.

Fiscal effects of population decline at the subnational government level: An overview

Shrinking populations will affect governments across Europe. Declining fertility and increased out-migration alter the demographic structures. A declining population is likely to negatively affect economic activity, resulting in less government revenue. Shrinking workforces will affect the labour market and productivity (Rouzet et al., 2019[1]). At the same time, expenditure may not fall commensurately. The change of demographic structure of the population will strongly affect education, health and long-term care services, but also public infrastructure. In particular, public spending on age-related programmes will increase.

At the subnational level, migration flows are typically stronger, as they include migration flows across regions. The declining population will change the demographic composition of localities more, exacerbating fiscal impacts. It will also erode tax bases, alter the demand for local services and affect grants received from higher levels of government. Usually, municipalities must choose between raising tax rates, cutting spending and increasing borrowing (or using all of them) (Wirth et al., 2016[2]) (see also Figure 3.1).[1]

Figure 3.1. Potential effects of shrinking population on Subnational Government financing



Source: Author's elaboration of Das, B. and M. Skidmore (2018[3]), "Asymmetry in municipal government responses in growing versus shrinking counties with focus on capital spending", *Journal of Regional Analysis and Policy*, Vol. 48/4, pp. 62-75; Haase, A. et al. (2012[4]), *Shrinking Areas: Front Runners in Innovative Citizen Participation*; Hospers, G. and N. Reverda (2015[5]). *Managing Population Decline in Europe's Urban and Rural Areas*, Springer; Komarek, T. and G. Wagner (2021[6]), "Local fiscal adjustments from depopulation: Evidence from the post–cold war defense contraction", http://dx.doi.org/10.1086/712917.

The main fiscal impacts of a shrinking population at the subnational government level

In shrinking subnational governments, resource constraints make it more difficult to maintain infrastructure. Insufficient replacement investment further contributes to declining living standards, thus potentially triggering further population decline (Komarek and Wagner, 2021[6]; Wirth et al., 2016[2]). None of these changes are straightforward, however, as subnational governments differ considerably across countries and in their institutional arrangements, such as spending assignments, revenue composition, fiscal rules and degree of regional and municipal self-government.

Fiscal rules affect how municipalities respond to population decline. For instance, balanced budget rules or rules forbidding borrowing to pay for current expenditure are likely to speed up the municipalities' response to declining tax revenues with equal expenditure cuts (Das and Skidmore, 2018[3]; Komarek and Wagner, 2021[6]). The state grant system can also play a major role in municipalities with a declining population. This is especially important in the Nordic countries for example, where the subnational governments have a major role in public service provision. For example, in Finland, the rural and remote municipalities have suffered from the shrinking population for many decades (Box 3.1). The state grant system has protected municipalities from financial collapse with their equalisation systems. Equalisation systems in the context of shrinking populations are discussed in more detail below.

Box 3.1. Shrinking rural areas in Finland: The Juuka municipality of Northern Karelia

Juuka is a remote and rural municipality located in eastern Finland, about 500 km from the capital city of Helsinki. Juuka´s population is 4 527 inhabitants (2020 situation) and the land area of the municipality is over 1 800 km².

Juuka has experienced population decline for many decades. From the 1970s until today, Juuka's population has halved from 9 000 inhabitants. Juuka is still projected to lose about 30% of its population between 2020 and 2040. Currently, about 35% of Juuka's inhabitants are 65 years or older.

The population shrinkage in Juuka was fuelled by out-migration in earlier decades but a natural decrease is currently the main reason for population decline. The main employer, a mining company, has recently experienced a downturn, which has led to high levels of unemployment.

Juuka's current strategy is to adapt the public services and local infrastructure to shrinkage. Juuka does not actively try to attract new residents. Instead, the focus is on ensuring good living conditions and service infrastructure for the existing residents. Nevertheless, beginning in 2019, the municipality started to pay a "baby bonus" of EUR 1 000 to families having a(nother) child.

Like many other small municipalities in Finland, Juuka is engaged in extensive IMC in education, health and social services, as well as in regional planning. Juuka's strategy is to co-operate especially with the other rural and remote municipalities in the North Karelia region. Indeed, co-operation with a neighbouring municipality, Lieksa, in education services has proven to be an effective way to reduce costs and the two municipalities were also jointly able to save a school from closure. At the same time, however, the rural municipalities also compete with each other for residents and funding. Juuka recently resigned from the membership in the regional development company and the municipality increased its activities in the field of business and co-operation with the private sector.

Juuka has responded to shrinking resources with efficiency-improving measures, such as service reorganisation and constant cost-cutting. The local income tax rate in Juuka is slightly lower than the national average. Grants from the central government currently form about 52% of the total revenues of Juuka, which is 5 percentage points higher than in 2015, and the share is also much higher than the national average grant share (38%). Central government grants have ensured a stable revenue source for Juuka and the time needed to adjust its operations.

Source: Fritsch, M., P. Kahila and J. Sinerma (2020[7]), *European Shrinking Rural Areas: Challenges, Actions and Perspectives for Territorial Governance. Case Study Juuka, North Karelia, Finland*.

Even so, municipalities have also adjusted their spending and increased their own income, notably by raising property tax rates. Typically, local tax rates are the highest in municipalities with a decreasing population. They have also raised debt (Valkama and Oulasvirta, 2021[8]). Central governments have encouraged municipalities to improve efficiency in welfare services, especially by promoting voluntary municipal mergers and IMC. Eventually, each municipality develops its own strategy to deal with shrinkage. In Sweden for example, where municipalities also have important service responsibilities, municipalities have responded to population decline with cutbacks in spending and with increased efficiency, especially through school closures and inter-municipal collaboration (Syssner, 2016[9]).

IMC as a response to shrinkage

IMC means that two or more municipalities work together to provide some specific tasks. There are voluntary and compulsory types of co-operation. In the former, the municipalities are free to establish long- or short-term co-operation and to withdraw from co-operation. Mandatory co-operation is defined by law and compliance is monitored and sanctioned by the central government. IMC usually implies sharing. In this case, municipalities provide joint services and share the costs. IMC can also include joint efforts on the revenue side, although this is less common[2] (Slack, 1997[10]). For voluntary IMC, the rationale often is simply to enable more efficient and better services for the local inhabitants. In order to reach these ultimate goals, utilising economies of scale and creating better capacity in terms of know-how or human resources is essential.

IMC is not the only way to utilise economies of scale in municipal service delivery. Municipal mergers or outsourcing to private companies can also lead to a larger scale and cost savings but may have their own problems. For one, municipal mergers can be politically difficult. Furthermore, it is not clear that municipal mergers automatically lead to costs savings (Blom-Hansen et al., 2016[11]; Moisio and Uusitalo, 2013[12]). Municipalities provide a wide variety of services and the optimal production scale varies by type of service. Municipal mergers may then lead to economies of scale in some services but diseconomies in others. In addition, outsourcing is not always a feasible alternative because of legal reasons or the lack of private markets. Regions and municipalities are also in a very different position in the ability to utilise private markets. Often the need to enhance economies of scale is greatest in small and remote regions and municipalities, where little suitable private provision may be available.

Compared with municipal mergers, IMC seems an attractive option especially because it is relatively straightforward to establish. Voluntary IMC involves minimal government restructuring, likely explaining why it has been so popular in many countries (Bird and Slack, 2007[13]; OECD, 2019[14]). Due to the simplicity of the arrangement, a municipality can easily engage in many different co-operative deals at the same time without high administrative costs. IMC is also a flexible solution. As times change, co-operation can be strengthened, scaled back or ended according to the needs of co-operating partners. Joint service provision can be a gate to deeper engagement: a successful IMC in one service area may lead to widened co-operation in other services and in some cases even to a later voluntary merger.

Economies of scale undoubtedly form the major benefit of IMC. Capital-intensive public services (e.g. utility systems such as water, waste, energy) often require a certain minimum size for efficient service delivery. In such a framework, IMC can be a feasible solution because it enables both improved economies of scale and tailoring of services to local needs. IMC may also help secure local democracy because the number of elected local politicians does not diminish as a result of co-operation.

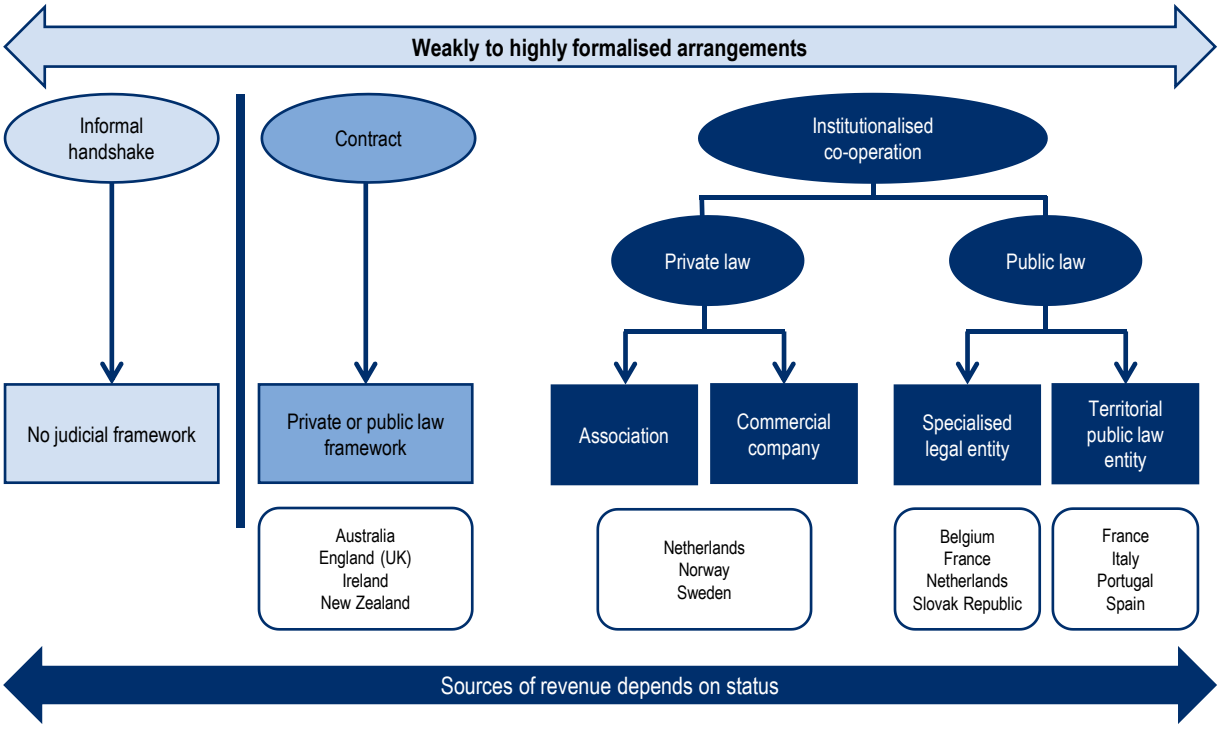
IMC is not without challenges. An extra tier in the hierarchy is introduced and may increase administration and monitoring costs. IMC may also result in a democracy deficit, as inter-municipal organisations are usually governed by representatives that are nominated by the member municipalities. This may reduce the accountability and transparency of local decision-making, compared with municipalities' own production and with directly elected councils. The latter challenge can be partially addressed, for example, by appointing elected persons to the co-operation bodies.

An important challenge of IMC is also that the member municipalities engaging the co-operation inevitably have less power to affect the services than if the service was provided by their own organisation. It has also been argued that IMC may create a harmful common resource, increasing demand. This can lead to increased costs and inefficiency. Depending on the size of the pool, monitoring of IMC by member municipalities may be lower if the IMC fails to create appropriate incentives (Allers and van Ommeren, 2016[15]).

International examples and experiences of IMC

Three main models of IMC can be identified: i) informal voluntary agreements based on private law; ii) legally defined and regulated voluntary co-operation based on public or private law; and iii) mandatory co-operation based on public law (Figure 3.2). OECD countries have often started with a private law model, for example by giving local authorities the freedom to opt for certain formulas, such as contracts, associations and commercial enterprises. The public model means that co-operation is regulated in some detail by public laws, including contractual and financing arrangements, the type of delegated functions, governance structure, and supervision and control. Different degrees of regulation are usually applied for voluntary and mandatory co-operation (OECD, 2019[14]).

Figure 3.2. Formats for inter-municipal co-operation



Source: Author's elaboration.

The examples for informal co-operation include shared service arrangements or shared programmes in Australia, Ireland, New Zealand and the United Kingdom (UK). Voluntary but legally structured co-operation is practised in several countries, for example in Finland, France, the Netherlands and Sweden. Examples of compulsory co-operation with delegated functions can be found in Finland, France, Portugal and Spain (see OECD (2017[16]) and (2019[14])). In some countries, such as Finland, compulsory IMC has been a substitute for an intermediate level of government, notably in specialised healthcare and regional development.

IMC is practised in many service areas, from technical issues like waste and sewerage to healthcare, education and regional development and strategy (OECD, 2017[16]). For example, in Germany, IMC is strongly encouraged by the *Länder* for their respective municipalities for waste management, sewerage, water or transport. The Czech Republic promoted voluntary municipal associations and microregions in education, social care, health, culture, environment, tourism. Poland introduced "territorial contracts" in 2014. These aim at strengthening partnerships and improving co-ordination (OECD, 2019[14]).

Irrespective of the model of co-operation the inter-municipal bodies are almost without exception managed by nominated councils or boards. While in principle nothing would prevent arranging elections to select the decision-makers for the inter-municipal co-operative bodies, such elections could considerably increase the administrative burden. Among the few examples of co-operative arrangements that involve elections are the UK's devolution deals. Devolution deals are agreements that move funding, powers and responsibilities from central to local government in return for governance reform at a local level, typically through the creation of combined authorities and directly elected mayors (Green, 2018[17]). Elected mayors are responsible for the tasks and report to both central government and local councils. The devolution deals have covered tasks such as public transport, skills and employment, health, land and housing and financing. The first devolution deal was announced by the British Government and the Greater Manchester Combined Authority in 2014 (Sandford, 2018[18]). By early 2018, devolution deals with 12 areas had been agreed upon. Three of the deals have collapsed and two have collapsed and then partially revived (Sandford, 2018[18]).

Municipal co-operative organisations are usually financed by member municipality contributions and transfers from the central government but, in some countries, like for example in France, IMCs can also collect taxes or levy user fees to pay for services. In the Nordic countries, municipalities co-operate also in financing investments. In Denmark, Finland, Norway and Sweden, joint municipal credit institutions have been formed by the local authorities. The joint credit institutions borrow money from international financial markets and lend it to their member organisations (municipalities, counties and companies owned by local authorities). For example, the Swedish Kommuninvest was created in the 1980s in response to difficulties that the municipalities had faced to raise financing for their investments. The Swedish Kommuninvest, like the other similar Nordic credit institutions, has high creditworthiness because all members have the liability for Kommuninvest's obligations. Besides, there have never been any credit losses in the operations since the Kommuninvest's inception. It currently accounts for more than 40% of the Swedish local government sector's borrowing (Kommuninvest Sweden, 2019[19]). In Finland, the share is even higher, at nearly 70%.

There is little evidence on the effects of voluntary IMC on municipal spending or service quality. Moreover, the results of existing studies are somewhat mixed (Allers and van Ommeren, 2016[15]). In France, a recent study found no effect of co-operation on the total spending of French municipalities (Frère, Leprince and Paty, 2014[20]). In contrast, in Spain, IMC created economies of scale especially in the smallest towns and municipalities, leading to lower costs for waste collection. Co-operation also raised the collection frequency and improved the quality of the service in small towns (Bel and Mur, 2009[21]). In the Netherlands, inter-municipal associations paid higher interest rates for their loans compared with independent municipalities (Allers and van Ommeren, 2016[15]), perhaps suggesting that co-operative arrangements were considered inefficient by creditors. In Finland, breaking up municipal health centre federations in the 1990s increased costs and outputs, so the break-ups had no statistically significant effect on inefficiency (Kortelainen et al., 2019[22]).

Grant systems and shrinking population

Inter-governmental grants and in particular the equalisation grants can help limit the negative fiscal effect of shrinkage, giving the local governments more time for adjustment. The link between equalisation and shrinkage is because active people with higher earning potential are likely to out-migrate, while inactive

people requiring more social spending are likely to stay. Equalisation grants can be designed so that they take into account both the population change and the effect of shrinkage on demographic composition.

Inter-governmental transfers comprise conditional and unconditional grants. Conditional grants aim to incentivise municipalities to spend funds on specific projects. Conditional grants are typically used by central governments to internalise spatial externalities, to ensure that the recipient municipality or region will take into account the effects of the funded activity on other jurisdictions. Conditional grants can be problematic for municipalities with a shrinking population, especially if the conditional grant is a matching grant, i.e. an own funding share of the recipient municipality is required. This is because the municipalities with a shrinking population often suffer from weak tax bases, making it hard for them to raise enough own revenue to utilise conditional grants.

Unconditional grants give more decision-making freedom. Often, the unconditional grants also aim to ensure equitable and efficient financing of subnational governments. There are three main types: general per capita grants, revenue equalisation grants and expenditure equalisation grants. With a general per capita grant, a municipality with a shrinking population will see its transfer diminish. The plain per capita grant does not consider the (tax) revenue capacity or the expenditure needs of the municipality. Equalisation grants have been developed to take these into account. Revenue equalisation grants assist municipalities whose tax capacity is lower than some level, usually the average. Expenditure equalising grants aim to take into account the service needs (e.g. number of students, demographics, length of roads) and circumstantial factors (e.g. population, population density, remoteness) of expenditures ensure that every municipality can provide at least a standard level of service by levying a standard tax rate.

Both the revenue and expenditure equalisation is usually formula based. In a simple form, the tax equalisation formula can be written as:

$$Tax\ equalisation_i\ =\ POP_i\ \times\ [tax\ rate_j\ \times\ (tax\ base_j\ -\ tax\ base_i)]$$

where $Tax\ equalisation_i$ is the tax equalising grant for municipality i, POP_i is the number of inhabitants in municipality i, $tax\ ratej$ is the country average municipal tax rate, $tax\ base_j$ is the average municipal per capita tax base, and $tax\ base_i$ is the per capita tax base of municipality i. In this example, the tax capacity is equalised to the country average.

An example of a simple expenditure equalisation formula for one public service can be written as:

$$Expenditure\ equalisation^{k_i}\ =\ POP_i\ \times\ [SEk_i\ -\ SEk_j],$$

where $Expenditure\ equalisation^{k_i}$ is the equalisation entitlement for expenditure type k for municipality i, SEk_i is the standardised per capita expenditure of public service k for municipality i, and SEk_j is the average national per capita standardised expenditure for public service k. Equalisation systems are often complicated, consisting of several indicators for service needs and circumstantial factors.

The relationship between municipal population changes and equalisation is less straightforward than in the case of per capita grants. While a population decrease will directly decrease the amount of equalisation grant, population change can also have other implications on equalisation grants. For instance, in the case of tax equalisation, depending on the incomes of the out-migrated (or retired) taxpayers, a shrinking population may mean a lower tax base per capita compared to the national average and thereby higher equalisation. A lower population may also mean higher per capita expenditure, for example, if the out-migration of the working-age population will change the demographic composition of the municipality compared with the national average. Municipalities with a shrinking population will also have lower population density, making them better positioned to receive expenditure equalisation grants.

In most countries, there is no special indicator in expenditure equalisation to consider the negative population change. Perhaps the main argument against using an indicator for a shrinking population in expenditure equalisation is that such an indicator would not incentivise municipalities to improve their

efficiency. In Japan, the inter-governmental grant formula includes a “modification coefficient” to protect municipalities from a sharp reduction in grants in case of a strong population decline (Miyazaki, 2016[23]; Mochida, 2011[24]). While such modification coefficients have received criticism for adding the complexity of the transfer system, they have been defended for being based on calculations that municipalities cannot affect directly so do not distort their incentives (Miyazaki, 2016[23]).

In Sweden, a specific indicator for population decline has been used in the municipal grant system as an indicator for additional support to municipalities. The purpose has been to compensate the municipalities for fixed capital costs that cannot be reduced with the same rate of reduction of inhabitants and revenues. The municipality received an increase in its grant if its population had decreased by more than 2% in the last 10 years. Furthermore, in 2000, Sweden introduced a grant which was based on the decrease in the number of school-age children. This compensation was conditioned on the negative population change during the past 3 years (with a 2-year lag), which had to be larger than -2% (Dahlberg et al., 2008[25]).

In the US, some states receive “small state minimum” federal grants. Although not directly a grant for negative population change, it is interesting to note that the small state minimums are intended to ensure that small states receive a basic level of funding under each federal grant. In effect, the small state grants seem to ensure that a grant per person in the recipient states exceeds the national average.

Municipal financing in Estonia

Estonian municipalities are responsible for a wide variety of tasks (Table 3.1). Overall, the spending assignments of Estonian municipalities are relatively clear without major overlapping assignments with the central government. The main exception is secondary education, where the state has taken more responsibility.[3] Currently, both the municipalities and the central government provide for upper secondary education. While the purpose of such arrangements is to ensure equity of access to education, such a situation may not be optimal from an overall service delivery aspect. Other shared responsibilities include services for disabled persons, ports, disaster management, new buildings and prevention strategies.

Table 3.1. Mandatory and voluntary municipal tasks

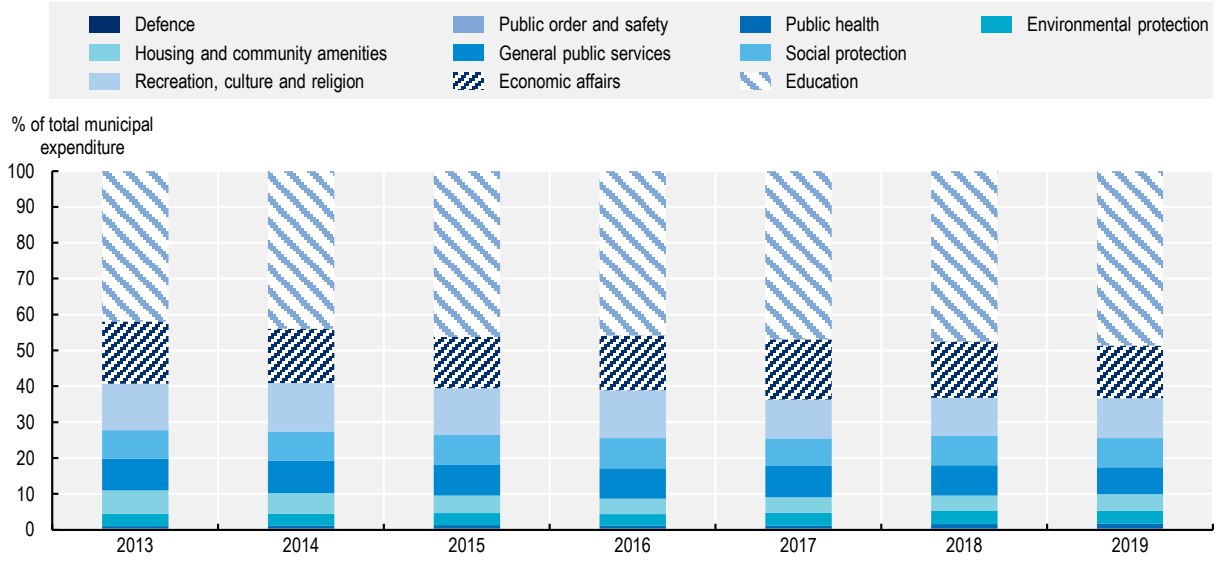
Task	Central government	County-level co-operation	Municipality	Private sector
Public transportation		X	X*	
Local roads			X*	
Water			X*	
Sewerage			X*	
Nursery, pre-school, primary school			X*	
Primary health	X		X*	
Social housing			X*	
Child protection		X	X*	
Social assistance			X*	
Support for disabled persons	X		X*	
Metropolitan planning		X	X*	
Local planning			X*	
Drainage (operation and maintenance)			X*	X
Public libraries			X	
Street vendors			X	
Parks, metropolitan			X	
Parks, local			X	
Public lighting			X	
Ports	X		X	X
Logistical areas			X	X

Task	Central government	County-level co-operation	Municipality	Private sector
Industrial parks			X	X
Enterprise zones			X	X
Development of economic clusters			X	X
Secondary education, education for special and adult groups	X		X	
Tertiary education	X		X	
Neighbourhood development			X	X
Forestation	X		X	X
Drainage, construction, public squares			X	X
Recreation and sport facilities			X	X
Managing disasters	X		X	
Prevention strategies	X		X	
New buildings	X		X	

Note: * denotes a mandatory municipal task.
Source: Author's elaboration based on OECD questionnaire to Estonian experts.

The most important municipal task is education (primary and secondary schooling), which represented over 49% of all municipal expenditures in 2019 (Figure 3.3). The next most important tasks are economic affairs (15%), recreation (11%) and social protection (8%). All municipalities, irrespective of population size or type, are expected to provide the same basic services.

Figure 3.3. Municipal expenditure in Estonia by 10 COFOG groups, 2013-19



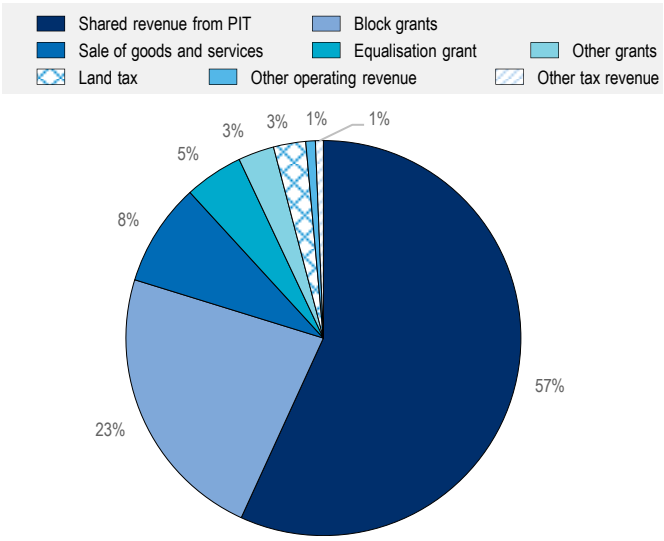
Note: Classification of the Functions of Government (COFOG) is a classification defined by the United Nations Statistics Division.
Source: Statistics Estonia (2021[26]), *Local Budgets Expenditure by Region/Administrative Unit [Statistical database]*, https://andmed.stat.ee/en/stat/Lepetatud_tabelid__Majandus. Arhiiv__Rahandus. Arhiiv/RR301 (accessed on 1 February 2021).

Revenue assignments

Municipal income in Estonia consists of tax revenue (61% in 2019), central government grants (28%), sales revenue (10%) and other revenue (1%) (Figure 3.4). Over time, the share of grants and shared personal income tax (PIT) revenue (which is classified as a transfer by the OECD) of total municipal revenue has become larger (Figure 3.5). This is because between 2012 and 2020 the municipalities' own

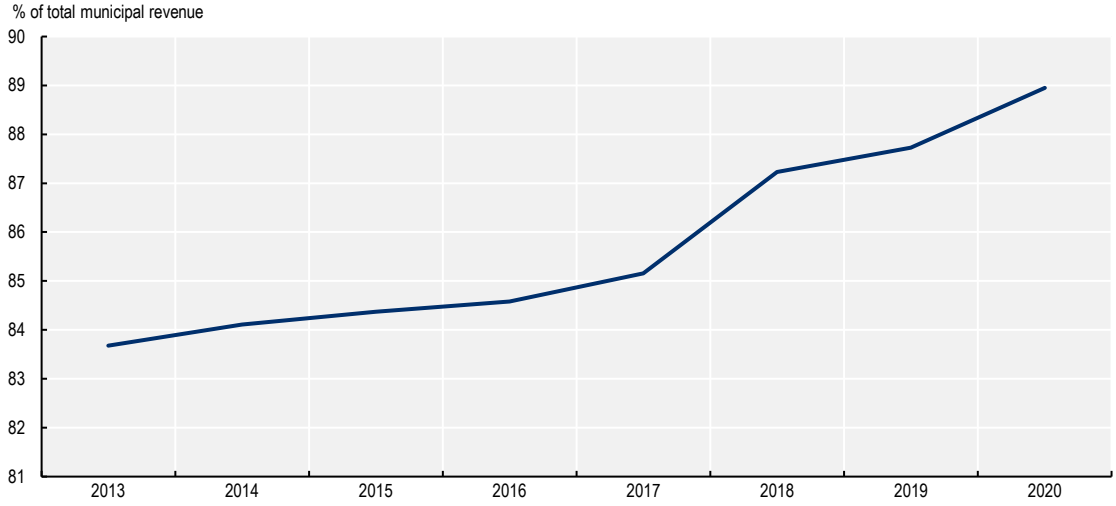
revenues have remained virtually unchanged, while at the same time the state grants and shared tax revenues have increased.

Figure 3.4. Municipal revenue by the main source



Source: Statistics Estonia (2021[26]), *Local Budgets Expenditure by Region/Administrative Unit [Statistical database]*, https://andmed.stat.ee/en/stat/Lepetatud_tabelid__Majandus. Arhiiv__Rahandus. Arhiiv/RR301 (accessed on 1 February 2021).

Figure 3.5. Transfers and municipal share of PIT revenue



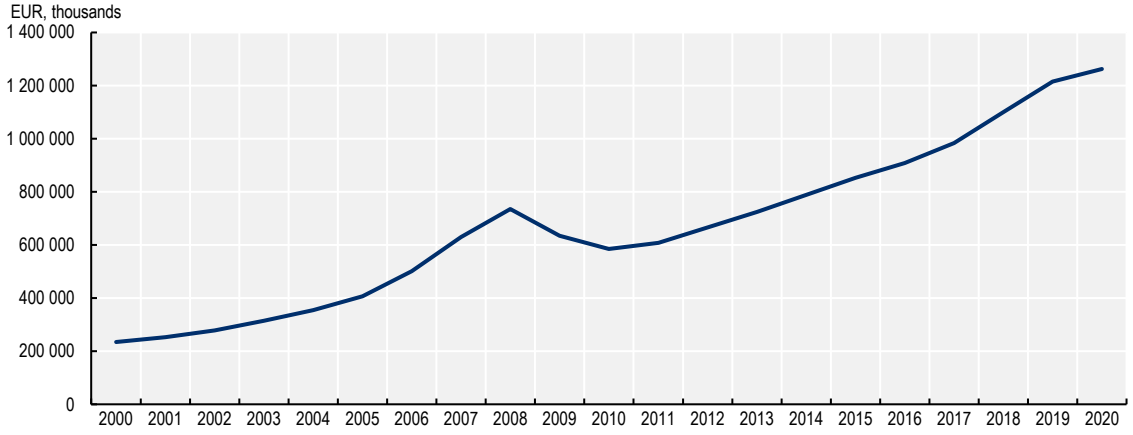
Source: Statistics Estonia (2021[26]), *Local Budgets Expenditure by Region/Administrative Unit [Statistical database]*, https://andmed.stat.ee/en/stat/Lepetatud_tabelid__Majandus. Arhiiv__Rahandus. Arhiiv/RR301 (accessed on 1 February 2021).

Tax revenue

The most important source of income for municipalities is PIT (57% of operating revenue in 2020). The income tax is a central government tax, so municipalities have no powers concerning it (tax rates and tax base). The central government decides yearly the income tax rate and the municipal share of the revenue. Currently, the income tax rate is 20% (plus some adjustments according to income)[4] and the rate

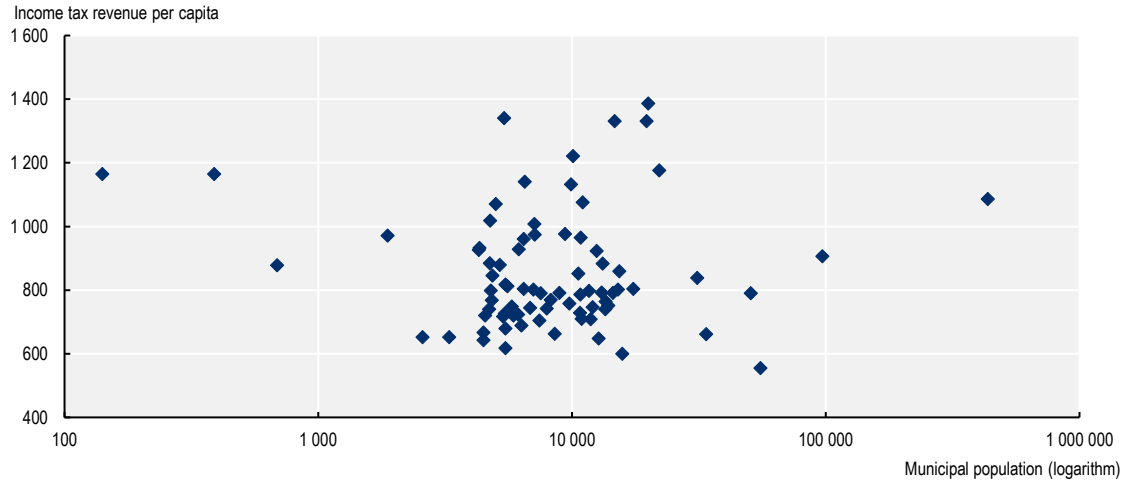
earmarked to municipalities is 11.93%, thus the rate earmarked to central government is 8.07%. Municipal PIT revenue share is based on residents' salaries. Municipal PIT revenue has increased since 2010 (Figure 3.6). Income tax revenue varies considerably between municipalities, yet population size is not strongly associated with the variation[5] (Figure 3.7). Small municipalities are not necessarily among those with the lowest revenues per capita.

Figure 3.6. Municipal share of PIT revenue, EUR thousands



Note: Calculated at current prices.
Source: Statistics Estonia (2021[26]), *Local Budgets Expenditure by Region/Administrative Unit [Statistical database]*, https://andmed.stat.ee/en/stat/Lepetatud_tabelid__Majandus. Arhiiv__Rahandus. Arhiiv/RR301 (accessed on 1 February 2021).

Figure 3.7. Municipal population size and PIT revenue per capita, EUR thousands 2019

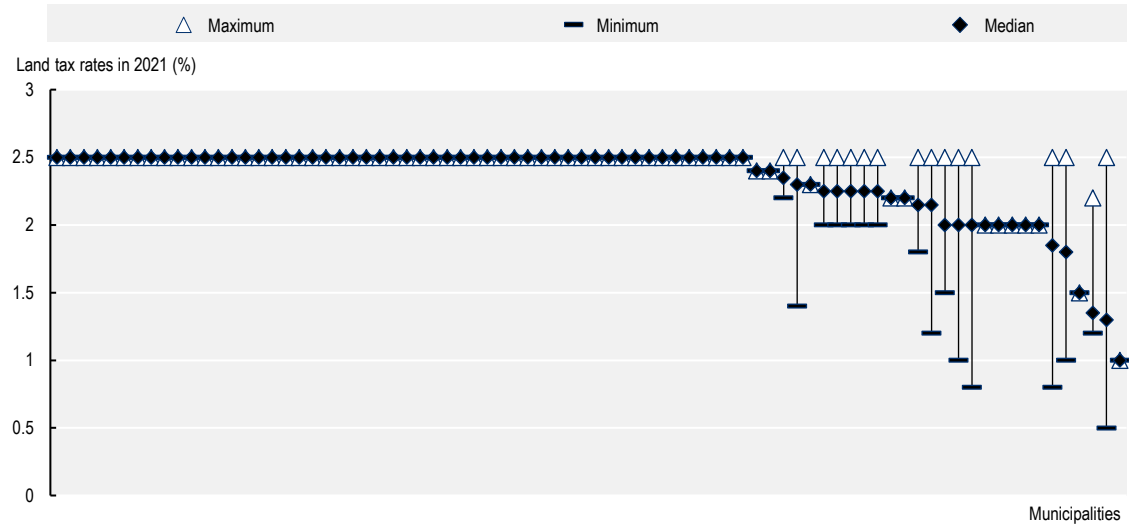


Source: Statistics Estonia (2021[26]), *Local Budgets Expenditure by Region/Administrative Unit [Statistical database]*, https://andmed.stat.ee/en/stat/Lepetatud_tabelid__Majandus. Arhiiv__Rahandus. Arhiiv/RR301 (accessed on 1 February 2021).

The second most important tax for the municipalities is land tax, though it provides only 4.4% of all municipal tax revenue and 2.6% of total municipal operating revenue (tax revenue, grants received, user fees, other operating revenue). Municipalities are free to set the tax rates within limits set by the central government, at present 0.1-2.5%. Municipalities are also free to set different rates within their area and to give tax relief to special taxpayer groups. At present, the land tax rates vary between 0.5 and 2.5 and the

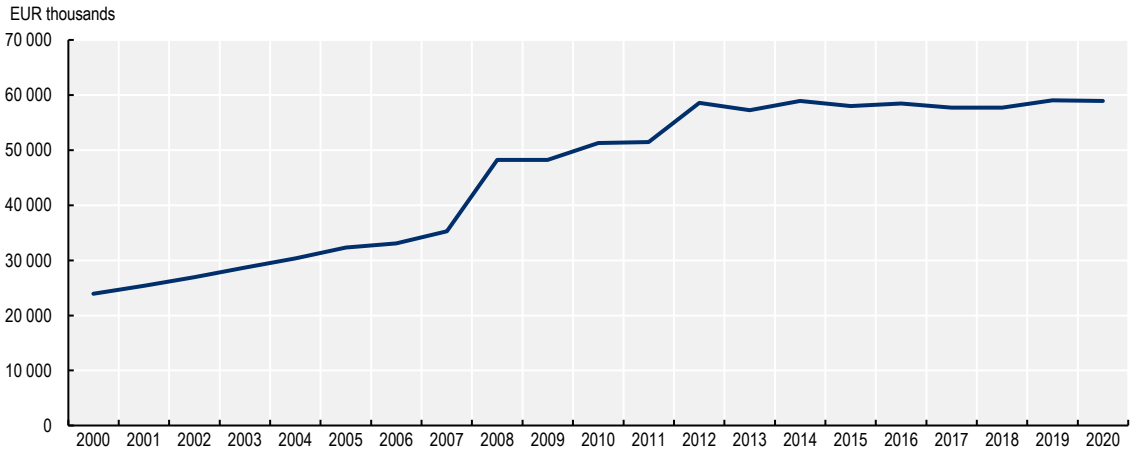
average tax rate is 2.1 when taking into account different land tax zones used by some municipalities. While most municipalities apply the highest rate, a few have chosen a slightly lower rate and some municipalities utilise varying rates depending on the zone (Figure 3.8). Although the taxable land values are still at the level of 2001, the land tax revenues increased between 2007 and 2012, mainly because of increases in land tax rates. Since 2012, land tax rates have not changed markedly. As a result, land tax revenue has not increased even in nominal terms since 2012 (Figure 3.9).

Figure 3.8. Municipal land tax rates by municipality, 2021



Note: Estonia applies a separate land tax for on arable land and natural grassland used for agricultural production, which is not described here.
Source: Estonian Tax and Customs Board (2021[27]), *On Land Tax*.

Figure 3.9. Land tax revenue, 2000-20, EUR thousands at current prices

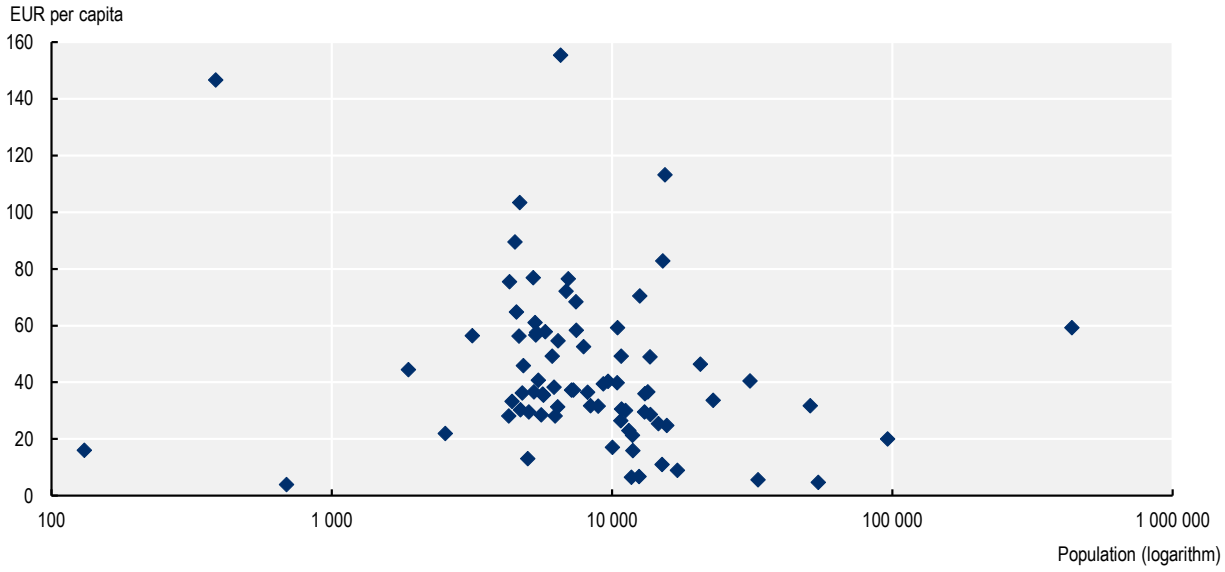


Source: Statistics Estonia (2021[26]), *Local Budgets Expenditure by Region/Administrative Unit [Statistical database]*, https://andmed.stat.ee/en/stat/Lepetatud_tabelid__Majandus. Arhiiv__Rahandus. Arhiiv/RR301 (accessed on 1 February 2021).

There appears to be no clear association between municipal population size and per capita land tax revenue (Figure 3.10). While it appears that the highest per capita land tax revenues are found in the least

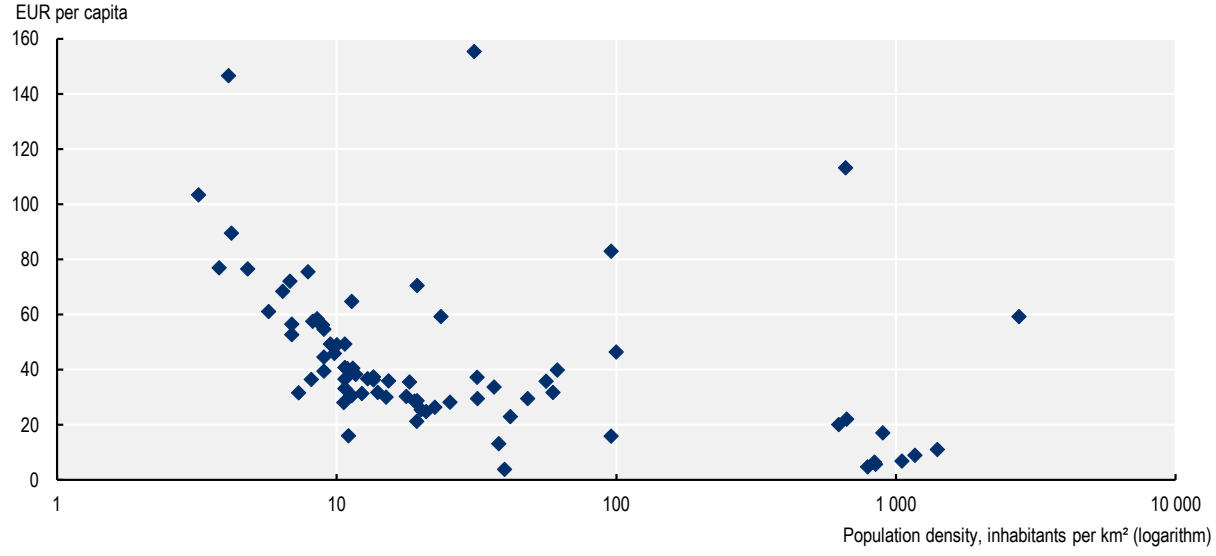
dense municipalities, the differences are nonetheless large among municipalities with similar densities (Figure 3.11).

Figure 3.10. Land tax revenue, per capita and municipal population, 2020



Source: Statistics Estonia (2021[26]), *Local Budgets Expenditure by Region/Administrative Unit [Statistical database]*, https://andmed.stat.ee/en/stat/Lepetatud_tabelid__Majandus._Arhiiv__Rahandus._Arhiiv/RR301 (accessed on 1 February 2021).

Figure 3.11. Land tax revenue, per capita and municipal population density, 2020

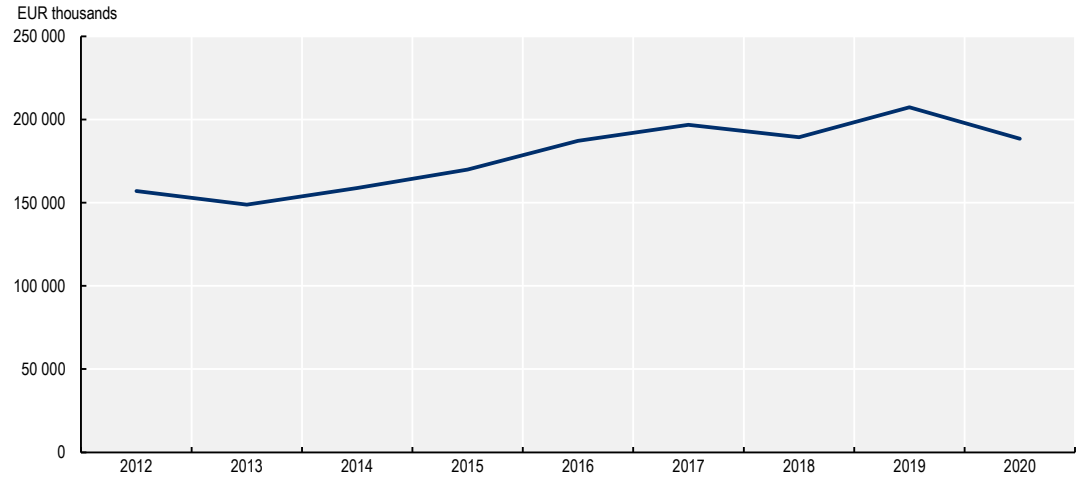


Source: Statistics Estonia (2021[26]), *Local Budgets Expenditure by Region/Administrative Unit [Statistical database]*, https://andmed.stat.ee/en/stat/Lepetatud_tabelid__Majandus._Arhiiv__Rahandus._Arhiiv/RR301 (accessed on 1 February 2021).

Revenue from the sale of goods and services

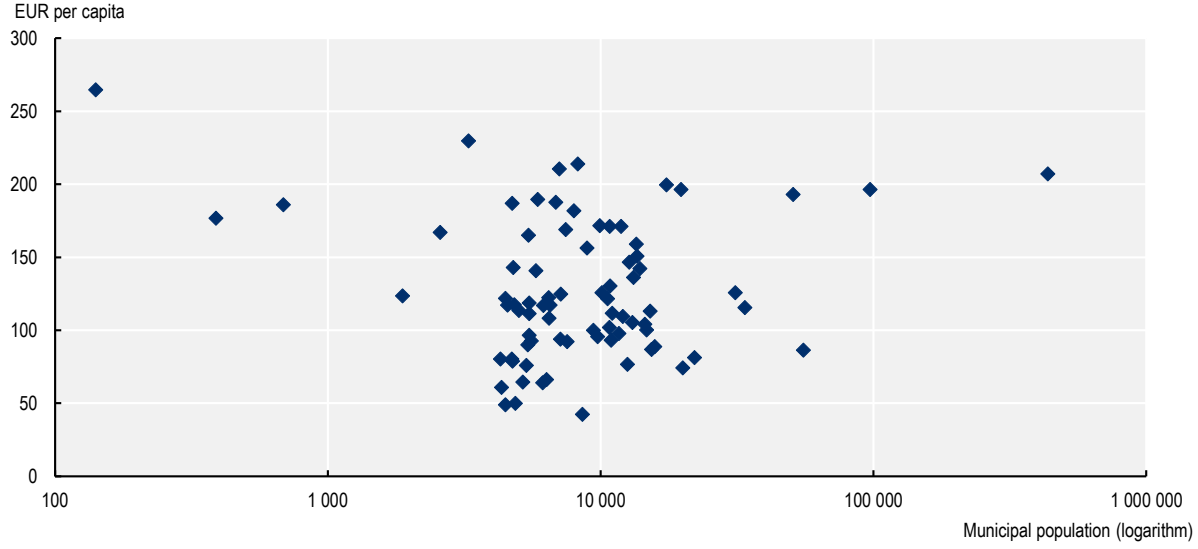
In 2020, about 8.4% of municipal revenue consisted of revenue from user fees and sales of goods and services. According to the available data, the revenue grew from 2013 to 2019 (except in 2018), though less than income tax revenues, and decreased in 2020 (Figure 3.12). Municipal population size seems not to be associated with sales revenue in 2020 (Figure 3.13). Other notable municipal tax revenues comprise advertisement tax, road and street closure tax and parking charges. Taken together, these taxes make 1.1% of municipal tax revenues and 0.6% of total operating revenue (Statistics Estonia, 2021[26]).

Figure 3.12. Municipal revenue from the sale of goods and services, 2012-20, EUR thousands at current prices



Source: Statistics Estonia (2021[26]), *Local Budgets Expenditure by Region/Administrative Unit [Statistical database]*, https://andmed.stat.ee/en/stat/Lepetatud_tabelid__Majandus. Arhiiv__Rahandus. Arhiiv/RR301 (accessed on 1 February 2021).

Figure 3.13. Municipal population size and per capita revenue from sale of goods and services



Source: Statistics Estonia (2021[26]), *Local Budgets Expenditure by Region/Administrative Unit [Statistical database]*, https://andmed.stat.ee/en/stat/Lepetatud_tabelid__Majandus. Arhiiv__Rahandus. Arhiiv/RR301 (accessed on 1 February 2021).

Grants to municipalities

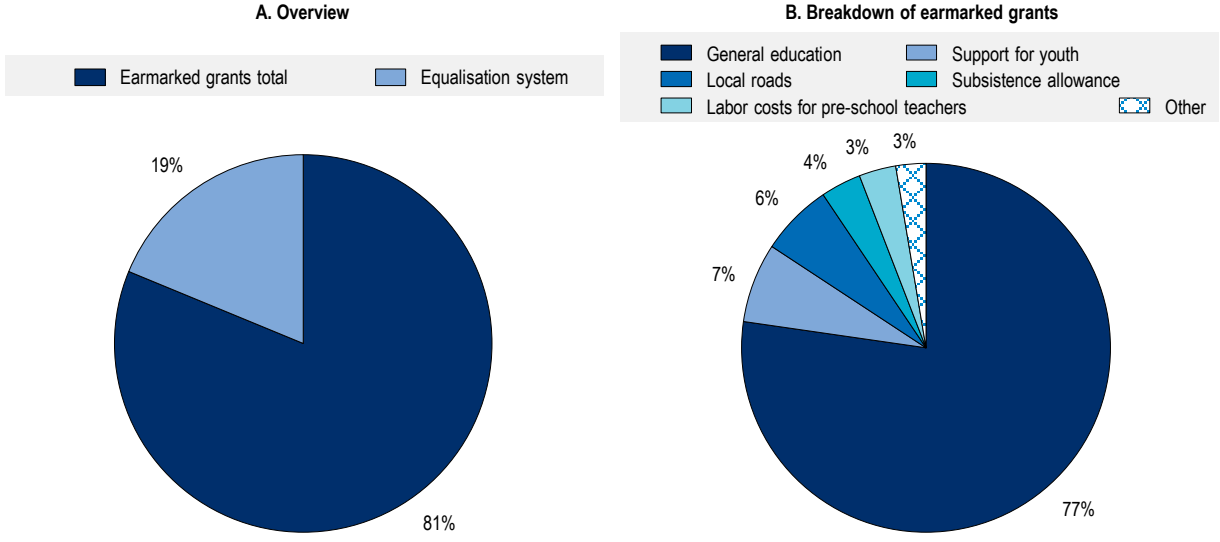
Grants form about 28% of total municipal expenditure. The grant system is formed by two main elements: the block grants (81% of all grants to municipalities) and the equalisation grant (19%) (Figure 3.14, Panel A). While the current grant system has been in place for 15 years, the system has seen some minor changes over the years.

"Block grants"

The grant system consists of several specific grants (Figure 3.14, Panel B). Due to the strong regulation on the use of block grants, the grants are in fact earmarked. The most significant is for general education, which is mainly targeted to finance teachers' and school leaders' salaries (80% of the grant), school lunches (7%) and the study support to pupils with special needs (6%) (Figure 3.15). The grant is based on the number of pupils and several need indicators.

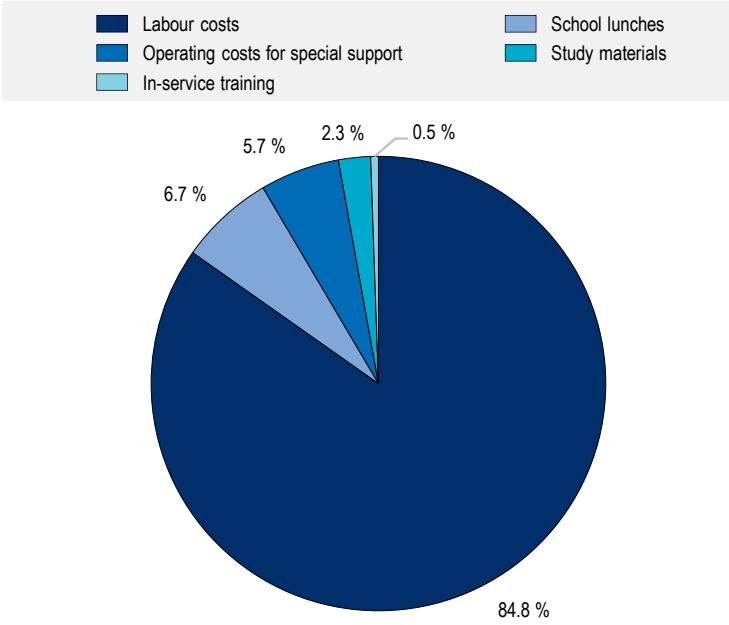
The negative effect of earmarking is that municipalities may have a disincentive to improve the efficiency of the education services. This is because any efficiency-improving changes that could lead to cost savings will automatically result in cuts in grants. This can, for example, create a disincentive for municipalities to merge schools into bigger units. It is also noteworthy that, while the number of secondary schools has decreased between 2012 and 2020, at the same time, the number of basic schools, which form the majority of Estonia's current 506 schools, has increased.

Figure 3.14. The transfer system in 2021



Note: The left panel describes the main components of the transfer system and the right panel shows the distribution of block grants.
Source: Statistics Estonia (2021[26]), *Local Budgets Expenditure by Region/Administrative Unit [Statistical database]*, https://andmed.stat.ee/en/stat/Lepetatud_tabelid__Majandus. Arhiiv__Rahandus. Arhiiv/RR301 (accessed on 1 February 2021).

Figure 3.15. Breakdown of the education grant



Source: Statistics Estonia (2021[26]), *Local Budgets Expenditure by Region/Administrative Unit* [Statistical *database]*, https://andmed.stat.ee/en/stat/Lepetatud_tabelid__Majandus. Arhiiv__Rahandus. Arhiiv/RR301 (accessed on 1 February 2021).

Equalisation grants

The equalisation grant is based on the difference between the estimated average operating cost of the municipality and the estimated own revenue of the municipality (please see the annex for the equalisation formula and the variables used).[6] The estimated revenue consists of the municipal share of income tax revenue and land tax revenue and the estimated expenditure is based on a calculation using the information of expenditure needs. Currently, 90% of the (positive)[7] difference is considered. The equalisation formula also takes into account the possible revenue from mining activities and the "island municipality" status. The formula applied can be summarised as:

$$T = (AK - AT) * k + KK + VT, \text{ where}$$

- T is the amount of the equalisation grant for the municipality.
- AK is the estimated average operating cost of the municipality.
- AT is the estimated own revenue of the municipality.
- k is a coefficient for the level of support with a value of 0.9 if $AT > AK$, else $k = 0$.
- KK denotes the municipal share of mining revenue.
- VT denotes the support for island municipalities.

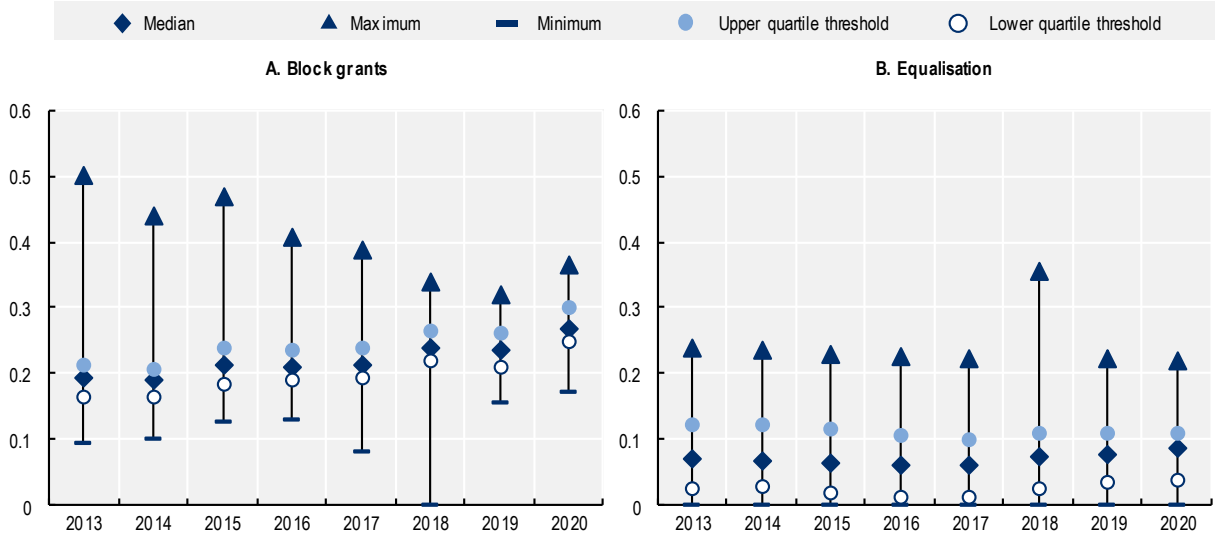
While the estimation of municipal revenue is relatively straightforward, the estimated expenditure is based on complex sub formulas with several variables. For expenditure needs, the following indicators were used in 2020:

- Age 0-6, pre-schoolers.
- Age 7-15, basic education.
- Students in municipal gymnasiums.
- Age 7-18, non-educational costs.

- Age 19-65, working adult.
- Age 65 and over, elderly.
- Disabled people in care (temporary).

In addition, specific coefficients are used to measure the special needs of rural areas and population dispersion. The coefficients used in the equalisation formula are based on regression analyses on different services. The equalisation calculations are published annually on the Ministry of Finance Internet pages.[8] The state budget provides the details of the formula and coefficients.[9] It can be seen that in recent years, the importance of earmarked grants has increased (Figure 3.16).

Figure 3.16. The importance of earmarking is growing



Source: Statistics Estonia (2021[26]), *Local Budgets Expenditure by Region/Administrative Unit [Statistical database]*, https://andmed.stat.ee/en/stat/Lepetatud_tabelid__Majandus. Arhiiv__Rahandus. Arhiiv/RR301 (accessed on 1 February 2021).

Decentralisation in Estonia in international comparison

This section provides a snapshot of multi-level governance and decentralisation in Estonia from an international perspective. From a demographic perspective (Table 3.2), among the “small countries” (with a population below 6 million inhabitants) of the EU and the OECD, Estonia stands out with its relatively small population size (1.33 million), negative population change (-0.3%) and a relatively low population density (30.3 While about the third of the population of Estonia is concentrated in the capital area, the degree of urbanisation (68.7%) is not very high compared with the OECD average (81%) or the average of small EU and OECD countries (74.7%).

Table 3.2. Estonia in comparison with the other small unitary EU and OECD countries: Demographics

	Population (thousand inhabitants)	Area (km^2)	Population growth (average annual rate)	Urban population (% of total population)	Density (inhabitants/ km^2)	Population of capital city as % of the total population
Iceland	343	100 243	0.6	93.8	3.4	63.0
Malta	460	320	0.5	94.5	1 438.4	46.2
Luxembourg	597	2 586	2.2	90.7	230.8	20.1
Cyprus	855	5 695	0.7	66.8	150.0	31.5
Estonia	**1 316**	**43 432**	**-0.3**	**68.7**	**30.3**	**33.2**
Latvia	1 941	64 490	-1.2	67.3	30.1	32.8
Slovenia	2 066	20 145	0.3	54.3	102.5	13.9
Lithuania	2 848	65 286	-1.3	66.1	43.6	18.8
Croatia	4 154	56 594	-0.4	56.7	73.4	16.5
Ireland	4 802	70 280	0.3	62.9	68.3	25.0
New Zealand	4 820	267 710	1.1	86.5	18.0	8.5
Costa Rica	4 906	51 100	1.1	78.6	96.0	27.7
Norway	5 277	385 207	1.2	81.9	13.7	12.6
Slovak Republic	5 438	49 036	0.1	53.8	110.9	7.9
Finland	5 508	338 150	0.4	84.4	16.3	23.2
Denmark	5 767	42 924	0.5	87.8	134.4	23.0
"Small country" average	3 194	97 700	0.4	75	160	25
OECD average	20 942	219 486	0.3	76	171	20

Note: The figures are the latest available year. The table presents data for unitary EU or OECD countries with a population below 6 million inhabitants. The average population size is calculated by dividing the total population by the number of subnational governments.
Source: OECD (2021[28]), *World Observatory on Subnational Government Finance and Investment*, http://www.oecd.org/regional/observatory-on-subnational-government-finance-and-investment.htm.

Due to the recent administrative reform in 2017, the average municipal population size (16 653 inhabitants) is not particularly low in Estonia, although it is well below the OECD average (40 107 inhabitants) and the average of small EU and OECD and countries (30 804 inhabitants). The number of subnational governments at the municipal level is well below the OECD and "small country" averages (Table 3.3).

Table 3.3. Estonia in comparison with the other small unitary OECD countries: Governance

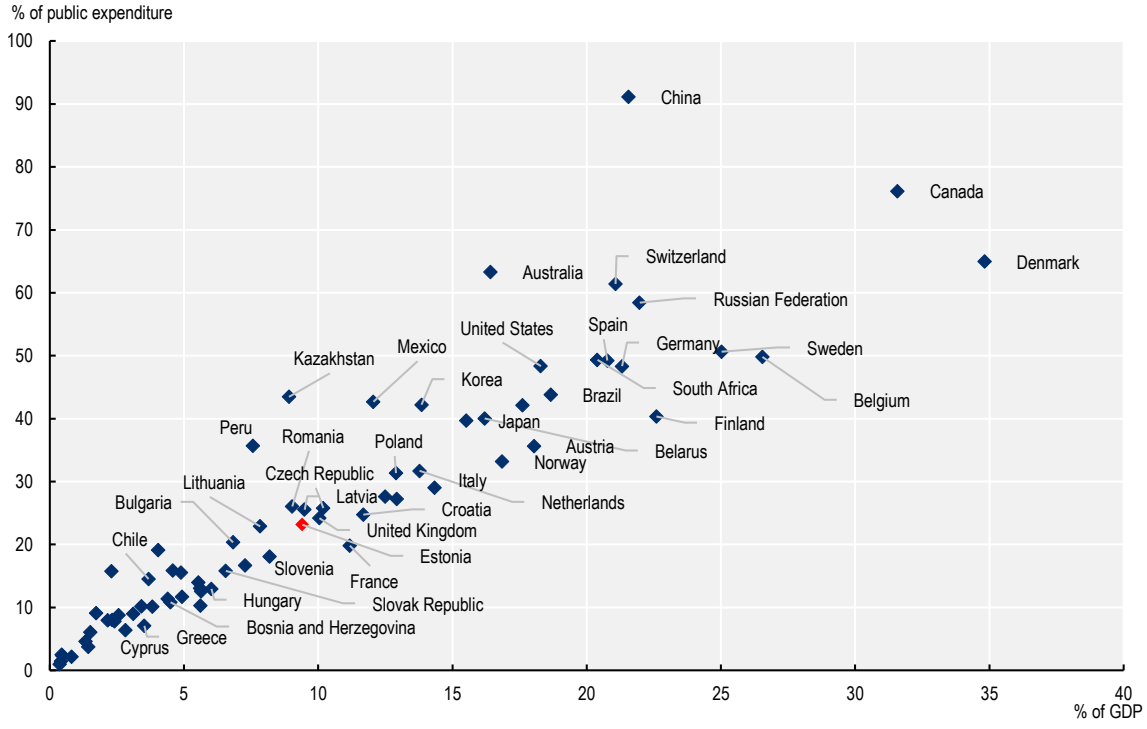
	Average number of inhabitants per municipality	Number of SNGs at municipal level	Number of SNGs at regional level
Iceland	4 640	74	..
Malta	6 500	68	..
Luxembourg	5 850	102	..
Cyprus	2 249	380	..
Estonia	**16 653**	**79**	**..**
Latvia	16 312	119	..
Slovenia	9 744	212	..
Lithuania	47 140	60	..
Croatia	7 472	556	21

	Average number of inhabitants per municipality	Number of SNGs at municipal level	Number of SNGs at regional level
Ireland	154 912	31	..
New Zealand	70 450	67	11
Costa Rica	60 565	81	..
Norway	12 408	422	18
Slovak Republic	1 856	2 930	8
Finland	17 670	311	1
Denmark	58 449	98	5
"Small country" average	30 804	349	11
OECD average	40 107	2 089	20

Note: The figures are the latest available year. The table presents data for countries classified as "high income" and "upper middle income". The average population size is calculated by dividing the total population by the number of SNGs. Number of SNGs at regional level not available for countries with a two tier government structure.
Source: OECD (2021[28]), *World Observatory on Subnational Government Finance and Investment,* http://www.oecd.org/regional/observatory-on-subnational-government-finance-and-investment.htm.

In international comparison, Estonia is clearly among the least decentralised countries, when measured by subnational government share of general government spending and as a share of gross domestic product (GDP) (Figure 3.17). For instance, in Estonia, the subnational government expenditure share of total general government expenditure is 23%, which is lower than the OECD average (32%). Measured with subnational government expenditure of GDP, Estonia´s share (9%) is again lower than the OECD average (13%).

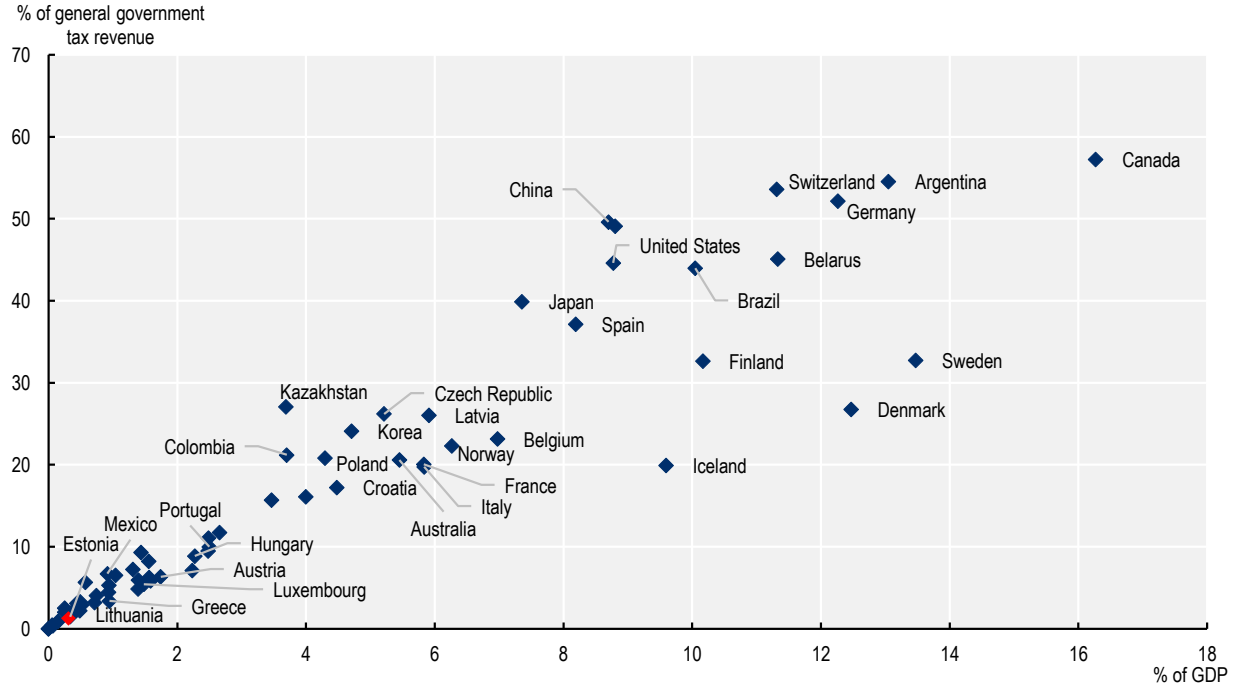
Figure 3.17. Subnational government expenditure as a share of GDP and share of public expenditure



Note: Only countries in groups "high income" and "upper middle income" are included.
Source: OECD (2021[28]), *World Observatory on Subnational Government Finance and Investment,* http://www.oecd.org/regional/observatory-on-subnational-government-finance-and-investment.htm.

The revenue share of the Estonian subnational government is even lower than the expenditure share in international comparison. In fact, in Estonia, the subnational government share of total tax revenue and GDP shows the lowest values of EU and OECD countries (Figure 3.18). Estonia's subnational governments receive 1.5% of total general government tax revenue, which is the smallest share of all OECD countries (the OECD average is 20%). Measured as a share of GDP, the Estonian subnational government share is 0.3%, again the smallest share of all OECD countries (OECD average is 5%).

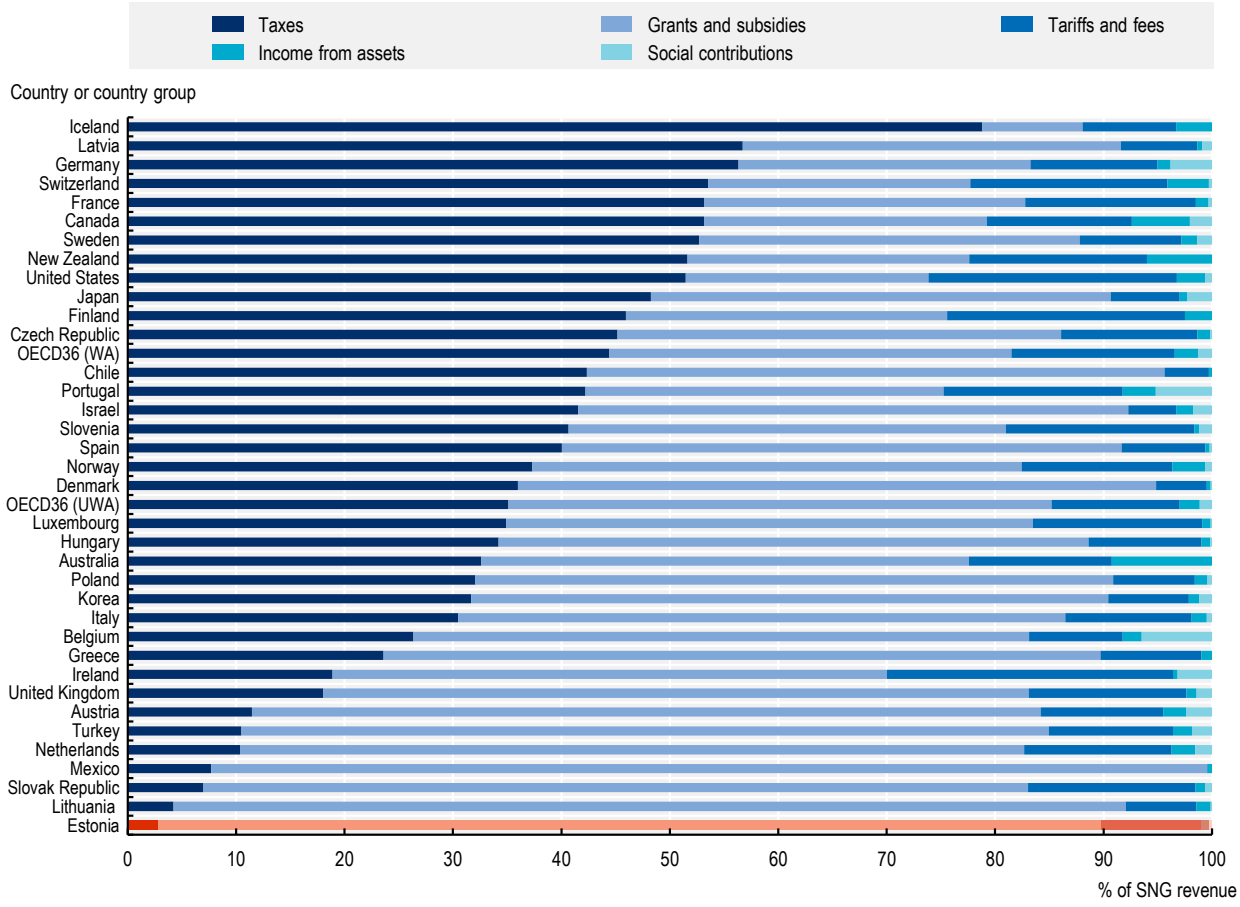
Figure 3.18. Subnational government tax revenue and public expenditure



Note: Only countries in groups "high income" and "upper middle income" are included.
Source: OECD (2021[28]), *World Observatory on Subnational Government Finance and Investment,* http://www.oecd.org/regional/observatory-on-subnational-government-finance-and-investment.htm.

About 3% of subnational government revenue comes from taxes in Estonia (2017 situation). In the OECD, taxes represented 35% of SNG revenue (unweighted average) and 44% (weighted average) (Figure 3.19). Transfers represent 87% of subnational government revenues in Estonia (by OECD definition, the shared PIT revenue in Estonia is classified as grants), compared with 50% (unweighted average) and 37% (weighted average) in OECD countries. As for tariffs and fees, the share of subnational government revenue is 9% in Estonia, compared with OECD averages of 12% (unweighted average) and 15% (weighted average).

Figure 3.19. Subnational government revenue by type in the OECD countries



Source: OECD (2021[29]), *OECD Statistics*, https://stats.oecd.org/ (accessed 12 Oct 2021).

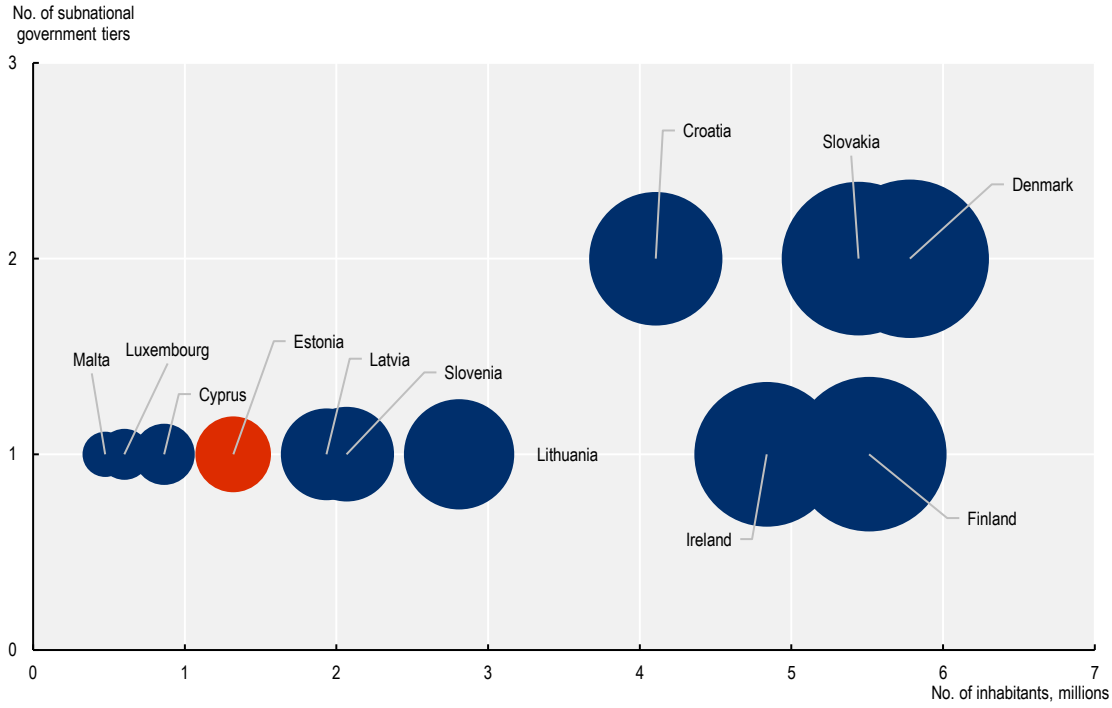
Policy recommendations

This section explores the main challenges caused by shrinkage to Estonia's multi-level governance and subnational government financing. It discusses the main alternative paths for municipal financing in Estonia, considering the current institutional setting, the usual recommendations for local financing reforms and experiences from reforms in other countries. It has a focus on the transfer system because grants from the central government form a major source of revenue for the Estonian municipalities. The section also briefly discusses ways to strengthen local own revenue bases.

Enhancing IMC to utilise economies of scale

Among the EU28 countries, Estonia belongs to the group of unitary countries with one subnational government level (Figure 3.20 and Table 3.4). Despite the recently enlarged municipal size and the existing co-operative arrangements, there is still room for a bigger scale in certain services. Because of the recent administrative reform, it is however not realistic to start immediately a further merger reform in Estonia. Instead, IMC could be a viable approach. However, since only 14% of municipal revenue comes from own revenue sources, municipal incentives for engaging in voluntary co-operation are low.

Figure 3.20. Population size and number of subnational government tiers among the small EU28 and OECD countries



Note: The graph presents data for unitary EU or OECD countries with a population below 6 million inhabitants. The bubble size indicates differences in countries' population.
Source: Author's elaboration of based on Eurostat (2021[30]), *Eurostat Data*, https://ec.europa.eu/eurostat/web/population-demography/demography-population-stock-balance/database and OECD (2021[28]), *World Observatory on Subnational Government Finance and Investment,* http://www.oecd.org/regional/observatory-on-subnational-government-finance-and-investment.htm.

Table 3.4. Subnational government organisation in EU28 countries

	Countries with one subnational government level* (n=11)	Countries with two subnational government levels** (n=10)	Countries with three subnational government levels*** (n=7)
Federations (n=4)		Austria	Belgium Germany Spain §
Unitary countries (n=24)	Bulgaria Cyprus Estonia Finland § Ireland Latvia Lithuania Portugal § Slovenia	Croatia Czech Republic Denmark Greece Hungary Netherlands Romania Slovak Republic Sweden	France Italy Poland United Kingdom §

Note:
* Municipalities; **Municipalities and regions; ***Municipalities, intermediate governments and regions.
§ Spain is a quasi-federal country; Portugal has two autonomous regions; Finland has one autonomous region. By 2023, there will be a regional government level in Finland; The United Kingdom has three "devolved nations" at the regional level.
Source: OECD (2021[28]), *World Observatory on Subnational Government Finance and Investment,* http://www.oecd.org/regional/observatory-on-subnational-government-finance-and-investment.htm.

To better utilise economies of scale and scope of public service provision at the municipal level, the central government could step up the voluntary co-operation between municipalities especially in case of services that benefit from a larger scale (e.g. education and some infrastructure such as roads). Enhanced IMC is important also because the municipalities often appear to compete for central government financing and EU funds and, therefore, without special arrangements, the municipalities may not have a strong financial incentive to enter co-operation.[10] This group consists mostly of countries with small population sizes, such as Cyprus, Finland, Ireland, Luxembourg and Malta, and the three Baltic countries. Small countries rarely have more than one tier of subnational government, although Croatia, Denmark and the Slovak Republic are exceptions. Therefore, the single-tier subnational government model currently applied in Estonia seems well justified.

Due to the recent administrative reform, however, municipalities are still in a process of reorganising their services and administration. As for economies of scale beyond the municipal boundaries, municipalities are currently mandated to co-operate in public transport, spatial planning and county development planning. In the case of these services, the intermunicipal co-operation is organised usually within county borders. Currently, co-operation in development planning has been arranged through 15 counties and municipal co-operative associations have been arranged through 13 counties. There are currently 11 co-operative transport centres, of which 9 are county-based and 2 are region-based.

Despite the recently enlarged municipal size and the existing co-operative arrangements, there is still room for a bigger scale in certain services. Because of the recent administrative reform, it is however not realistic to start a further merger reform immediately in Estonia. Instead, IMC could be a viable approach. However, since only 14% of municipal revenue comes from own revenue sources, municipal incentives for engaging in voluntary co-operation are low.

To better utilise economies of scale and scope of public service provision at the municipal level, the central government could step up the voluntary co-operation between municipalities especially in case of services that benefit from a larger scale (e.g. education and some infrastructure such as roads) (OECD, 2014[31]). Enhanced IMC is also important because municipalities often appear to compete for central government financing and EU funds and therefore, without special arrangements, the municipalities may not have a strong financial incentive to enter co-operation.

To be successful, strengthening the policy for voluntary IMC requires a number of interventions by the central government. These include: i) clarifying the legal base for voluntary IMC; ii) using the transfer system to encourage voluntary IMC by, for example, targeting some transfers to IMC instead of municipalities; iii) outlining processes for co-ordination in the National Spatial Plan and County-wide Spatial Plan (which are legally binding), especially in important areas such as education and infrastructure; iv) utilising piloting and experiments on voluntary IMC to get more experience on best practices of such arrangements; and v) central government support towards municipalities in building administrative capacity to organise IMC. Furthermore, the central government could also help the municipalities to share experts and civil servants, or help create a national pool of municipal experts. This could be a valuable tool in sharing best practices and providing “peer support” between municipalities.

Another issue is that the seriousness of the effects of a shrinking population seems to not yet be widely understood among the municipalities. While the central government planning is systematically based on available projections, at the municipal level, the population forecasting seems to be too optimistic. This could mean that, in such municipalities, the strategy work and service planning is based on unrealistic assumptions.

Raising the awareness in municipalities of the cost and service quality effects caused by shrinking population could entail the central government establishing an advisory service for municipalities to better identify the additional costs caused by shrinking population (mismatch between population base and current infrastructure and service delivery). In addition, a further developed database of the costs and outcomes of main municipal services could be established to support benchmarking between

municipalities. As a direct measure, Estonia could also consider financial interventions at the national level to support municipalities in handling the challenges related to shrinking. Such measures could include support to municipalities in handling unused or only partially used buildings, and financial support for upgrading public buildings that can be used in the medium and long terms.

Rethinking municipal spending assignments for future decades

The main spending task of Estonian municipalities is education, forming nearly 50% of the aggregate municipal expenditure. Other important municipal tasks comprise economic affairs, recreation and social protection. In 2020, investment activities were about 16% of total municipal expenditure.

Currently, both municipalities and the central government finance and manage upper secondary education. While the purpose of such arrangements is to ensure equity of access, such a situation is not optimal from the overall service delivery aspect as it may result in inefficiencies. With population shrinking and ageing, there may be pressure for enhanced central government intervention in other services too, especially if IMC does not become more common.

There is thus a need to rethink municipal spending assignments in light of demographic change, especially given the recent administrative reform. While the municipalities probably need several years to reorganise themselves, the central government should already look ahead to potential further reforms. Accordingly, within the next 5 to 10 years, Estonia could consider carrying out a comprehensive review of municipal service responsibilities. Such a review could help identify services where reassignment of spending assignments between central government and municipalities as well as IMC units would be a viable approach. If agreed, the review could be conducted jointly by central and local government representatives, with support from academia and expert organisations. While each country has its specificities and each must define the practical method for reviewing their spending assignments, the following general aspects should at least be considered in such work: i) identifying duplication in the delivery of some services; ii) ensuring clarity of lines of responsibility and accountability; iii) improving the clarity of legal and institutional arrangements; iv) solving complex delivery of public services; and v) identifying the political and administrative sensitivities associated with spending assignments.

Reforming the municipal financing system to meet the challenges and opportunities of the new municipal structure and shrinking population

The central government currently has the main responsibility of financing the municipalities. Eighty percent of municipal revenue is formed by shared PIT revenue and state grants. Municipal own revenue (land tax, other small taxes, sales revenue and other operating income) makes only about 14% of total municipal revenue.

Shared tax revenues are unevenly distributed between municipalities. There are substantial differences between Estonian municipalities in per capita PIT revenue. The reasons behind such disparities are numerous. The fact that people can live and work in one municipality and be reregistered for tax purposes in another municipality, complicates the situation and makes comparisons difficult. While the available data does not allow precise arguments on this, it is possible that the current practice may result in unfair distribution of PIT revenues. Although the biggest cities are the wealthiest municipalities in Estonia, municipal population size alone does not explain the differences in per capita income tax revenue between municipalities.

The taxable land values are from 2001. While this is about to change, if the law proposal for new valuations by the Ministry of Finance is approved by the parliament, there will still be a long adjustment period for the reform to smooth the change. Therefore, the effect on municipal incomes will be only gradual.

Box 3.2. What revenues for subnational governments?

According to the economics literature on subnational government financing, there are two key decisions to be made with respect to revenue assignment to subnational governments: first, which revenue bases should be allocated to subnational government levels, given the spending assignments; and second, how much responsibility the subnational governments should have in financing their own expenditures.

User charges are considered the most efficient local financing instruments, provided that two conditions are fulfilled: i) the benefits of local public services and goods in question are spatially limited within the borders of the jurisdiction; and ii) the exclusion principle can be applied in pricing. User charges can form the primary source of funding in public utilities, such as water, sewerage and public transport (Bahl and Bird, 2018[32]).

Local taxes should be the primary revenue source for most other local public spending categories, provided that the benefits of these services accrue mostly to the local population. This would secure the principle that those who bear the local tax burden will also receive the benefits from the expenditures that are financed by the local taxes. Such services include general administration, primary and secondary education, maintaining streets, street lighting, drainage, garbage collection, public parks, fire protection, police and recreation services (Bahl and Bird, 2018[32]).

For the services with major externalities and benefit spill-overs to other jurisdictions or the whole country, such as major roads and highways, health services or higher education, intergovernmental transfers should be the primary source of local revenue. This is because local authorities are likely to neglect the potential benefits received by users in other jurisdictions, which would lead to the under-provision of these services from a wider (national and regional) perspective (Bahl and Bird, 2018[32]; King, 1984[33]).

It is generally agreed that the efficiency and accountability of local service provision are best secured if subnational governments finance a considerable share of their spending with their own revenues. While the literature does not provide a blueprint on the target share of own revenues, it is widely accepted that subnational governments should finance their spending with their own revenues at the margin. Such a principle would help ensure that decisions to expand public programmes are made keeping in mind the additional costs (Oates, 2008[34]). Moreover, when residents self-finance the local services through local taxes and charges, they have an incentive to evaluate the costs and benefits of local service provision, and benchmark local government performance against neighbouring jurisdictions. Such "yardstick competition" can encourage local politicians to maximise the welfare of residents instead of promoting their own self-interested goals (Oates, 2008[34]).

Source: Bahl, R. and R. Bird (2018[32]), *Fiscal Decentralization and Local Finance in Developing Countries: Development from Below*, Edward Elgar; King, D. (1984[33]), *Fiscal Tiers: The Economics of Multi-level Government*, Allen & Unwin; Oates, W. (2008[34]), "On the evolution of fiscal federalism: Theory and institutions", *National Tax Journal*, Vol. LXI/2.

The main problem with the current earmarked grant system is that municipalities may have a disincentive to improve the efficiency of the education services. The fact that the Estonian transfer system consists mostly of earmarked grants (80% of all transfers) weakens the municipal decision-making power. Furthermore, as some of the indicators used in the transfer system (equalisation system and earmarked transfers) are based on dispersed population (e.g. the "*tagamaalisuse koefitsient*") and small schools, the incentives for municipalities to reduce dispersed settlement structure may be diminished. The transfer system reform should ensure that financial support that induces sprawl and disperse settlement is abolished.

Estonia should consider strengthening the municipal own revenue base in a gradual manner. High reliance on transfers and shared taxes may have a negative effect on the efficiency of municipal service delivery. After the merger reform of 2018, the municipalities should have the adequate administrative capacity to take bigger responsibility not only for their spending but also for their financing. Measures in that direction could include carrying out a land tax base revaluation (which is already underway), easing the land tax rate regulation by increasing the upper band from the current 2.5% and considering a local income tax in some form, for example, to establish a "piggyback" tax on the national income tax.

Estonia should also seriously consider reforming the municipal transfer system. The current system is complex and, due to overlapping indicators, the equalisation model and earmarked grants system do not work well together. Estonia should abandon, or at least considerably reduce, the complex earmarked grants system. The money saved from earmarked grants could instead be used to strengthen the equalisation system. All municipalities, including the ones with a shrinking population, could benefit from such a reform because they could better allocate the financing according to their local needs and demand. The transparency of the transfer system also needs to be improved and specific circumstantial factors, such as remoteness and low population density, should be taken into account using a maximum of one or two criteria.

The current transfer system contains elements that allow municipalities to influence their own state aid. Replacing the current factors used to support remoteness and low density with more neutral indicators, such as population density, is another important aspect of reform. The advantage of population density as an indicator for state support is that the recipients (municipalities) cannot directly influence the grants they receive with their own measures. Furthermore, population density, as a measure of equalisation, does not discourage municipalities to improve the efficiency of their settlement structure. On the contrary, if the municipality managed to obtain the cost benefit of a denser settlement structure, it could keep the benefit to itself, as the population density would remain unchanged in this case and the state contribution would not be reduced.

Finally, from the perspective of shrinking populations, population change could be taken into account more explicitly in the equalisation system. This could be done for example with a specific indicator on population change. Such an indicator could be used to support not only the municipalities with a shrinking population but also the municipalities that are growing.

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Notes

[1] In a way, the subnational government response to population shrinkage can be compared to that of subnational government adaptation to the economic crisis. An OECD study (OECD, 2010[35]) found that during and after the economic and financial crisis of 2008, sub-central governments faced three policy options to respond to the crisis: i) to cushion the impact of the crisis by sustaining or increasing expenditure, especially on investment, and/or lowering taxes; ii) to take no active policy action and let the automatic stabilisers operate; or iii) to decrease expenditure and investment, and raise taxes to balance their budget. But as municipalities are often restricted by fiscal rules such as balanced budget rules and debt ceilings, the ability of municipalities to increase spending in times of decreasing revenue is limited.

[2] In the Nordic countries, municipalities co-operate also in financing investments. In Denmark, Finland, Norway and Sweden, joint municipal credit institutions have been formed by the local authorities. The joint credit institutions borrow money from international financial markets and lend it to their member organisations (municipalities, counties and companies owned by local authorities).

[3] In some cases, the central government takeover of secondary education has been at the request of municipalities themselves.

[4] See https://www.rahandusministeerium.ee/en/tax-and-customs-policy/taxes.

[5] It is worth mentioning here that the population register does not necessarily reflect the real residence of inhabitants in Estonia. It is not uncommon in Estonia to register one's place of residence where you find it most suitable, not necessarily where you actually live (for instance, at your parents' place in the city, at your summer house, rather than permanent house, etc.).

[6] The equalisation formula does not consider the real service structure, for example the actual school network, to avoid creating incentives for spending increases.

[7] Negative difference, i.e. situation where estimated own revenue exceeds estimated expenditure, is not considered.

[8] See https://www.rahandusministeerium.ee/et/kov/finantseerimine.

[9] See https://www.riigiteataja.ee/akt/121042020059.

[10] Parishes are not counted as separate levels.

Annex 3.A. Municipal equalisation grant formula in Estonia, 2018

The equalisation formula is calculated as follows:

$$\boldsymbol{T} = (\boldsymbol{AK} - \boldsymbol{AT}) * \boldsymbol{k} + \boldsymbol{KK2018} + \boldsymbol{VT}, \text{ where}$$

$$AK = \sum_{n-1} C_n \times P_n \times H_n;$$

$$AT = TM_{2017} \times 0.5 + TM_{2016} \times 0.3 + TM_{2015} \times 0.2 + MM_{ARVEST};$$

$$KK_{2018} = 0.895 \times KK_{2017};$$

$$VT = Waterway \times D + VResident \times E + F;$$

Here,

- T is the amount of the equalisation grant for the municipality.
- AK is the estimated average operating cost of the municipality.
- At is the estimated own revenue of the municipality.
- k is a coefficient for the level of support with a value of 0.9 (if $AT > AK$, $k = 0$).
- $(AK - AT) \times k$ is compensation based on the estimated income and expenditure for the municipality.
- C_n is the number of various population groups in the municipality, according to the population register: pre-schoolers (0-6 years); school-age population (7-18 years); primary school-age population (7-15 years); working-age population (19–64 years); elderly population (from 65 years of age); estimated length of local roads and streets (hard-cover roads with a coefficient of 0.26; hard-cover streets 0.74; non-hard-cover roads 0.047) in km according to the National Road Register at the beginning of the year; the weighted average number of disabled persons maintained and receiving carer's services, the number of pupils in municipal upper secondary schools.
- P_n is the estimated average operating cost measured for various population types (separately for each population type in euros): pre-school-aged, basic school-aged, working-age, elderly persons, handicapped persons and pupils of municipal upper secondary schools. In addition, the estimated operating cost of one km of the estimated length of roads and streets in euros.
- H_n is a coefficient for the remoteness of the municipality, also considering the diversity of the population, such as the number of primary school-age children aged 7-15 and the number of upper secondary school pupils in municipal schools.
- TM is personal income tax received by the municipality for three previous years (special rules may apply for specific years).
- MM_{ARVEST} is the estimated land tax of the municipality in euros.
- KK is compensation for changes in mining rights fees in a corresponding year.
- VT is additional aid for small islands.
- $Waterway$ is the distance in km between the navigable waterway used for regular connections or the port on the small island and the port on the mainland or the major island.

- D is the estimated amount of aid per km of waterway.
- $VResident$ is the number of inhabitants of a small island with permanent settlement and a small island forming part of an insular municipality as at the beginning of the current year.
- E is the estimated amount of aid per inhabitant of a small island with a permanent population and a small island forming part of an insular municipality.
- F is the estimated basic aid per small island. If the population on a small island is less than five, the basic allowance is calculated according to the proportion of the population in the five population.

4 The present and future provision of education in Estonia

Education is the most important service provided by municipalities, comprising half of the expenditures. This chapter discusses the current and future provision of education in Estonia in face of shrinkage, as an example of service network reform. After describing the main features, reforms and trends of the school system, this chapter evaluates whether actual differences in school sizes, resources and expenditure across municipalities align with differences explained by geographic and demographic characteristics. The chapter then offers insights into future policy scenarios of school network adaptation and discusses opportunities and challenges of digital education in rural areas. Finally, the chapter offers a series of recommendations to prepare the education sector for shrinkage, along with policy insights for other service areas stemming from the analyses.

Introduction

Demographic change and depopulation present a challenge for municipalities to adapt their service networks to be more efficient while still providing quality services for all. Across OECD countries, education constitutes one of the largest expenditure items for national and subnational governments (OECD, 2021[1]). Indeed, in Estonia, the education sector represented over 49% of all municipal expenditures in 2019, even greater than economic affairs, culture, social protection and housing services combined (Statistics Estonia, 2021[2]). Furthermore, this share is continuing to increase at a steady pace. As such, municipalities must adapt education services to demographic change as shrinking results in lower municipal revenues.

Today practically all counties of Estonia and most municipalities face the need to re-organise their school networks. The complex decision-making system around school consolidation involving municipalities, the central government and schools to different degrees across educational levels had stalled school consolidation in the past (Santiago et al., 2016[3]). While the need for rationalisation of schools has come to be more accepted by all education stakeholders in the last decade, current difficulties include involving local communities in the restructuring of the school network, finding qualified teachers and ensuring their full workload, and ensuring reorganisation leads to the modernisation of the learning environment.

Available population projections also show that the need for adapting the school network will become more pressing in the next decades. Internationally comparable estimations for 27 EU countries and the United Kingdom (UK) from the European Commission (EC)/OECD report *Access and Cost of Education and Health Services* (2021[4]) showed that already in 2011, Estonia had one of the largest additional costs per student in sparse rural areas in Europe and the largest percentage of students far from schools in sparse rural areas in Europe. By 2035, the number of students in cities is expected to increase, while the number of students in sparse rural areas, villages, towns and suburbs is expected to decrease. These changes mean that Estonia is projected to see the fourth largest increase in annual costs per primary student and the third-largest increase in annual costs per secondary student (OECD/EC-JRC, 2021[4]).

This chapter offers a series of recommendations to align all actors in Estonia around adapting the school network to demographic change while striving to ensure access to high-quality education for all students. Based on the analyses conducted, it also presents insights into other service sectors that also must adapt in the face of shrinkage. The chapter draws mainly from the 2016 OECD School Resources Review of Estonia (Santiago et al., 2016[3]) and an OECD mission questionnaire to focus on the question of school network adaptation and digital transition, with a special focus on rural and suburban areas. The first section of the chapter sets the scene by describing the most relevant elements for adaptation on governance, funding and access. The second describes geographical patterns and trends of the school network, resources (teachers), quality and expenditure, focusing on changes in the last decade and rural-urban differences. The third benchmarks actual data to estimations based on an efficient allocation of schools and teachers to identify areas with potential for policy interventions. The fourth presents more detail on the future projections based on simulated data, including a comparison between policy scenarios for adaptation. The fifth discusses current opportunities and challenges for digital education provision. Finally, the last section presents six policy recommendations for Estonia's consideration.

School network governance, reforms and trends

The basic school network in Estonia is composed of all schools formally licensed by the government and thus entitled to public funding. Estonia makes a distinction between basic schools offering ISCED levels 1 and 2 (Stages I, II and III/Grades 1-9) and higher-level schools offering ISCED level 3 (Grades 10-12), which can be either general or vocational.

Three acts regulate the Estonian school network: i) the Basic Schools and Upper Secondary Schools Act; ii) the Vocational Education Institutions Act; and iii) the Private Schools Act. The Basic Schools and Upper

Secondary Schools Act[1] of 2010 (henceforth the "Schools Act") provides the legal basis for the formation, functioning and development of the education system. Key educational policies, including school consolidation and digitalisation, are contained in the "Education Strategy 2021–2035", a follow-up of the Estonian Lifelong Learning Strategy 2020. In relation to education adaptation to demographic change, the most relevant goals in the strategy include:

- "to define more clearly the distribution of responsibilities at the level of upper secondary education by giving more responsibilities to the government and continuing the consolidation of the network of upper secondary schools"
- "to mandate local authorities to ensure the provision of basic education close to home at least at the first and second stage of basic school. In regions with declining populations, concentrate the provision of lower secondary education to larger centres, providing, where appropriate, services to support participation, such as transport"
- "to support regional development and offer special solutions for regions that need a boost to development, including collaboration between educational institutions and local companies".

The central government has taken concrete steps to achieve these goals in the past years, including ensuring there is a state gymnasium offering high-quality general secondary education and at least one optimised basic school in each county. The central government is also in the process of defining and implementing regional education centres to better co-ordinate higher education actors in counties. Moreover, the central government has been encouraging the cross-use of basic public education infrastructure, including infrastructure for digital learning. The reminder of this section discusses institutional aspects related to education responsibilities and provisions on access to schools.

Governance and funding

The current governance scheme of the educational system comprises three levels: the national government (represented by the Ministry of Education and Research), municipal governments and educational institutions (schools/school principals). Among their main responsibilities, schools have a high degree of autonomy in school-related decisions including hiring and firing of teachers and are in charge of managing the school budget. In turn, the main responsibilities of municipalities include providing and managing all pre-primary education and most of the basic education, and establishing, re-arranging and closing general education schools. Finally, the national government is in charge of funding education and providing it at the upper secondary level (Table 4.1) (Santiago et al., 2016[3]).

Associations of local authorities created after the disappearance of county governments are another actor in education provision with co-ordination responsibilities. Currently, 15 associations of local authorities (1 national and 14 regional) that represent their members' interests in relations with central authorities are in charge of promoting co-operation between municipalities. These associations also have the role of co-ordinating discussions and actions towards the improvement of education provision, including co-ordinating discussions about school network reorganisation strategies at the county level.

On funding, the Schools Act stipulates that school managers are responsible for covering school's running costs, which in practice means this responsibility lies with municipalities using funding received from the central government and other sources. Municipalities receive funding based on the number of students they serve in municipal schools, so funds depend on students' place of study and not their place of residency. The Private Schools Act ensures similar subsidies for current expenditure are made available to private general education schools. In 2018, 62% of current expenditure on basic education from private institutions (30.1 million out of 48.5 million) was covered by government funding sources, 61% of which went to cover staff compensation and 7.5% to capital expenditure. Importantly, to preserve the autonomy of municipalities' decisions, the allocation cannot include conditionality provisions on how the municipality spends the funds.

Table 4.1. Distribution of education responsibilities in Estonia

Level	Responsibilities
Education institutions (schools/school principals)	• Hire and dismiss staff • Manage the school budget • Adapt the national curriculum to the local context
National government	• Fund primary and secondary education • Manage an information system on local and school-level processes • Oversee inspection services • Define student learning objectives • License education providers • Provide education (at the upper secondary level)
Municipalities	• Manage all public provision of pre-primary education, most general education provision and a small share of vocational education provision • Fund municipal schools • Establish, re-arrange and close general education schools • Keep account of the number of compulsory attending children • Ensure school attendance control • Make arrangements for school transport and the provision of school meals • Ensure the quality of their education services, including the planning of services, provision of support to schools, quality assurance, maintenance and development of infrastructure • Manage human resources (including wage-setting and hiring and firing of teachers) • Invest in municipal school buildings

Source: Author's elaboration based on Santiago, P. et al. (2016[3]), *OECD Reviews of School Resources: Estonia 2016*, https://dx.doi.org/10.1787/9789264251731-en.

Funding formulas have historically included coefficients to account for geographical differences in class sizes attached to the size and remoteness of municipalities. Between 2008 and 2014, the per capita formula was calculated based on efficiency criteria. Since 2014, municipalities with a small number of students receive a funding supplement on top of the per student funding through a fixed coefficient applied to teachers' salaries to ensure small municipalities can pay wages close to the national average. The state budget support for teachers' salaries at the basic school level amounted to more than EUR 20 million in the last school year.

The decentralised setting of responsibilities in Estonia means the central government does not have direct decision power over school closures. Instead, the Ministry of Education and Research can resort to funding incentives promote concentration if it aligns with its objectives. Since 2014, any savings derived from school consolidation remain within the municipality and should be used to pay teachers' wages. Additionally, as provisioned in the Schools Act, since 2018, the beginner's allowance for teachers has been mainstreamed and extended to all municipalities.[2] Municipalities facing teacher shortages may offer other incentives such as financial incentives or accommodation.

Provisions on access to school

According to the Schools Act, rural municipalities are mandated to provide all students with educational opportunities and arrange transport or compensate for the student's travel expenses if these are not already covered as per the public transport act (e.g. by the use of public buses).

Since 2018, travelling by bus in Estonia is free within most countries and is partly financed from the state budget. According to the 2015 Public Transport Act, public transport planning in Estonia requires a certain level of multi-level governance co-operation as transport is managed by rural municipalities and city councils, rural municipalities and city governments, the Estonian Road Administration and the national government. The co-ordination of rural public transport services is, however, the responsibility of local authority bodies.

The Schools Act also establishes 60-minute maximum travel times for at least 80% of basic school students. According to the Schools Act, municipalities are in charge of organising school transport to ensure access to basic schools as needed. To ensure accessibility of the youngest students, consolidation efforts in basic education have focused mostly on lower secondary education and is manifested in many cases in a lower grade offer per school instead of a school closure.

While the Schools Act stipulates that the number of upper secondary schools must align with student numbers to adapt to demographic change, it also includes a provision for the central government to maintain at least one upper secondary school per county. Accordingly, the government's strategy has been focused on investing in high-quality basic schools and gymnasia (upper secondary schools) using European Union (EU) Structural Funds (which amounted to EUR 332 million in the last funding round) together with local funds.

Basic and upper secondary education trends

In 2020, the school network in Estonia encompassed 512 schools, including 354 basic schools and 158 general education schools offering upper secondary education. The large majority of schools are owned by municipalities (420 out of 512) and a small percentage are private (59 schools) or owned by the state (33 schools). The school network served about 150 000 pupils in 2020/21, 75% of which reside in urban areas according to the national classification of settlements.[3]

This section discusses school network trends with a focus on geographical differences. It first focuses on student, teacher and school trends and evaluates the pace of consolidation in basic and upper secondary across degrees of urbanisation. It then discusses geographical differences in quality outcomes and school resources across administrative units and by degree of urbanisation (see Box 4.1). Finally, the section focuses on expenditure trends, including levels and changes in wages across municipalities.

School network geographical distribution and trends

In aggregate terms, the number of students declined steadily in the 2000s and started to grow again in 2013 (Figure 4.2). According to the national classification of settlements, pupil-to-teacher ratios are higher in cities and small towns (13.3 and 13.1) than in rural areas (9.1). Across countries, pupil-to-teacher ratios varied from 8.5 in Hiiu County to 12.1 in Tartu in 2019/20. Available internationally comparable data for 2018 shows that student-to-teacher ratios in Estonia are smaller in rural schools compared to city schools by about 4 students per teacher, the fifth-largest difference across 30 OECD countries (OECD, 2021[1]; OECD, 2020[7]). Similarly, class sizes were around 10 students per class smaller in rural schools compared to city schools, the fourth largest difference among 30 OECD countries.

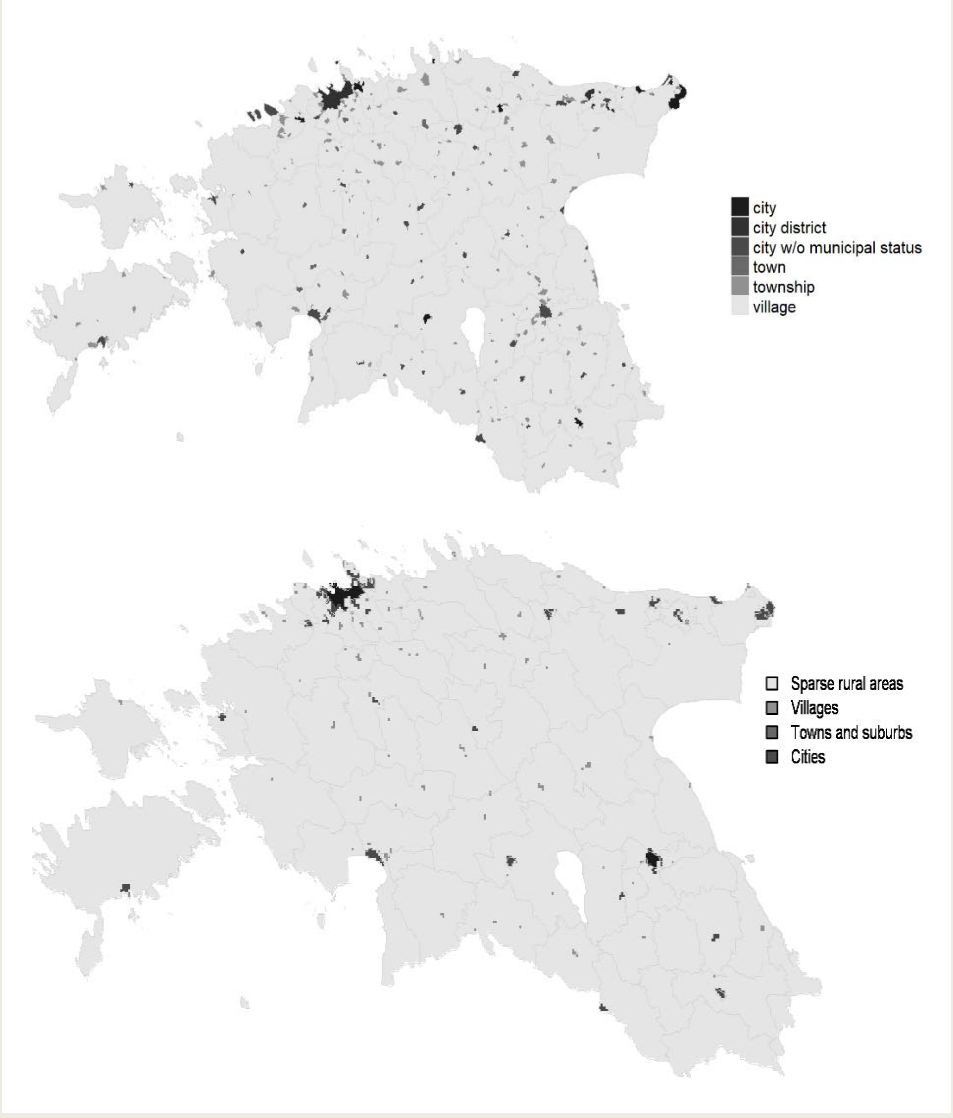
Still, in 2020 the network served 57 080 fewer students compared to 2000. Before 2012, the rate of decline in the number of teachers was slower than the rate of decline in student numbers. After 2012 when student numbers started to increase, the number of teachers tended to increase at a similar pace. In contrast, the decline in the number of schools has been fast even in periods of expansion in the number of students. However, these aggregated figures are not per full-time equivalent (FTE) and consequently also include part-time teachers.

While the consolidation of schools picked up pace in 2013, it recently slowed down in line with higher demand, especially in urban areas. Already between 2005 and 2013, 9% of schools – including 78 general education municipal schools – were closed, while a number of other schools were restructured or merged (Santiago et al., 2016[3]). By 2020, there were 173 fewer schools compared to 2000. Meanwhile, the number of teachers has not changed as fast: available data shows there were only 530 fewer teachers in 2020 compared to 2005, even though the number of students decreased by 18 718 students in the period. This means there has on average 1 teacher less for every 35 fewer students in the network.

Box 4.1. Classifying settlements based on their degree of urbanisation

The analysis in this chapter makes use of the degree of urbanisation classification, as it is particularly useful to disentangle different types of settlements in rural areas. This classification, based on 2015 population data, is also compatible across the globe and is suitable for international comparisons, as it does not rely on administrative borders and uses the same criteria for all countries (see Annex 4.A for details). For instance, according to the national classification illustrated in Figure 4.1, the largest part of the territory of Estonia is classified as a "village". The degree of urbanisation classification also has a "village" category but distinguishes this type of small clustered settlement from sparse rural areas that have the lowest density levels (less than 50 persons per km^2).

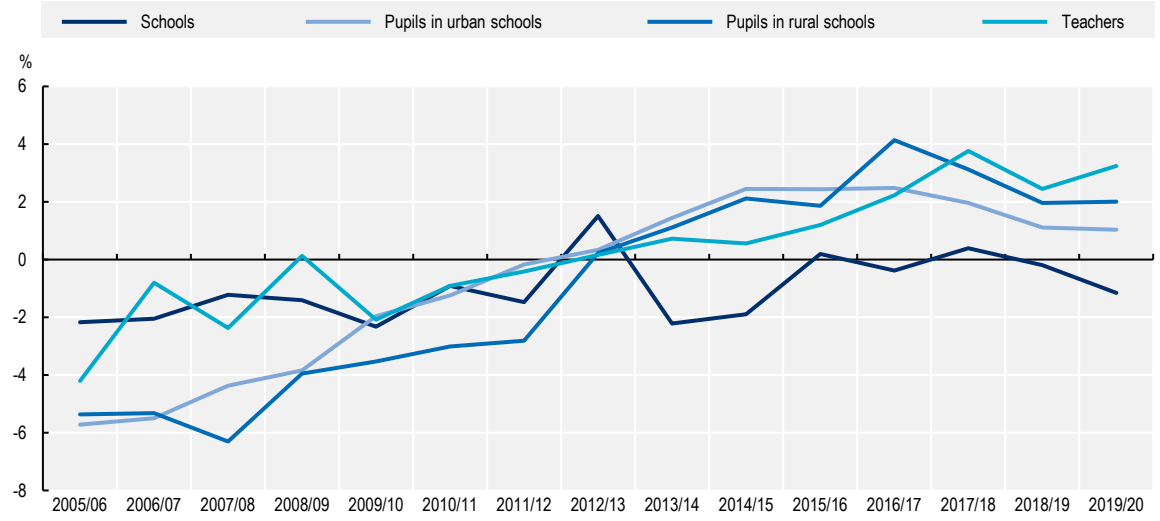
Figure 4.1. Classification of settlements according to their degree of urbanisation, Estonia



Note: See Annex 4.A for a definition of the degree of urbanisation areas. Municipal borders in light grey.
Source: Geoportal (2021[5]), *Administrative and Settlement Division*, https://geoportaal.maaamet.ee/eng/Spatial-Data/Administrative-and-Settlement-Division-p312.html (accessed on 1 February 2021) and authors' elaboration based on the GHSL database.

According to the national classification of settlements, pupil-to-teacher ratios are higher in cities and small towns (13.3 and 13.1) than in rural areas (9.1). Across countries, pupil-to-teacher ratios varied from 8.5 in Hiiu County to 12.1 in Tartu in 2019/20. Available internationally comparable data for 2018 shows that student-to-teacher ratios in Estonia are smaller in rural schools compared to city schools by about 4 students per teacher, the fifth-largest difference across 30 OECD countries (OECD, 2021[1]; OECD, 2020[6]). Similarly, class sizes were around 10 students per class smaller in rural schools compared to city schools, the fourth largest difference among 30 OECD countries.

Figure 4.2. Change in schools, pupils in rural and urban schools, and teachers, 2005-20



Note: Year-on-year growth rates. Rural-urban split between pupils based on national settlements classification.
Source: Author's elaboration based on data from Statistics Estonia (2021[7]), *General Education*, https://www.stat.ee/en/find-statistics/statistics-theme/education/general-education (accessed on 20 August 2021).

Across degrees of urbanisation, sparse rural areas concentrate slightly more than one-third of all students (34%), about three-quarters of all schools (73%) and 4 out of 10 teachers in basic education. In comparison to schools in towns and suburbs and cities, schools in sparse rural areas have about six students less per class and about three students less per teacher. Both smaller average school sizes and a smaller proportion of students to teachers in these areas reflect the presence of a higher share of small schools. At the same time, the share of teachers with qualifications is 4 percentage points below in sparse rural areas (82%) compared to towns and suburbs (86%) (Table 4.2). It is worth noting that the sparse rural classification of some schools located at the fringes of urban areas may not accurately reflect the situation in 2020, as the degree of urbanisation classification used 2015 population data and suburbanisation has advanced rapidly in the past years.

In contrast, schools in sparse rural areas concentrate less than one-quarter of students in general schools offering all educational levels and upper secondary schools (21%), while the largest share of students in this level attends schools located in cities (42%) and towns and suburbs (31%). Unlike basic schools, the proportion of students to teachers in upper secondary schools is similar across types outside cities. Still, class sizes are smaller in sparse rural areas compared to other areas, with a gap of 15 students per class with respect to towns and suburbs.

School-level figures for 2011 and 2020 by the degree of urbanisation show that most school closures accrued upper secondary schools outside sparse rural areas, in line with decreased demand and the ongoing upper secondary consolidation. In sparse rural areas, where demand for upper secondary education increased (by 1 808 additional students), there was in fact 1 school less for every 904 additional

students. At the same time, the number of teachers expanded so in these areas there was 1 additional teacher for every 29 additional students. Meanwhile in villages, where the number of upper secondary students dropped (by 1 559 fewer students), the change in teachers was more aligned with the decline in students.

Table 4.2. Distribution of schools, teachers and schools by degree of urbanisation, 2020

Degree of urbanisation	Schools	Share (%)	Students	Share (%)	Teachers	Share (%)	Students/ teachers	Average number of students in classes	Share of teachers with qualification (%)
	Basic education (ISCED 1 and 2)								
Sparse rural areas	260	73	44 793	34	4 627	40	9.7	11.0	82
Villages	12	3	8 744	7	744	6	11.8	14.5	85
Towns and suburbs	42	12	35 543	27	2 818	25	12.6	17.1	86
Cities	40	11	41 824	32	3 275	29	12.8	17.2	84
Total	**354**		**130 904**		**11 464**				
	Upper secondary education (ISCED 3)								
Sparse rural areas	50	32	4 972	21	423	23	11.8	18.6	89
Villages	17	11	1 415	6	131	7	10.8	20.7	89
Towns and suburbs	37	23	7 387	31	559	31	13.2	33.7	90
Cities	54	34	9 814	42	689	38	14.2	25.7	92
Total	**158**		**23 588**		**1 803**				

Note: Degree of urbanisation classification based on 2015 data. Teachers refer to FTE equivalent teachers. ISCED 3 schools include schools offering ISCED level 3 education and possibly other levels.
Source: Author's elaboration based on data from Estonian Ministry of Education and Research (2021[8]), *Estonian Education Information System (EHIS) (database)*, and EC (2021[9]), *GHSL - Global Human Settlement Layer – GHS-SMOD*, https://ghsl.jrc.ec.europa.eu/download.php?ds=smod (accessed on 1 February 2021).

Table 4.3. Change in school, students and teachers by educational level and degree of urbanisation, 2011-20

Degree of urbanisation	Change in schools	Change in students	Change in teachers	Change in student-to-pupil ratio
	Basic education (ISCED 1 and 2)			
Sparse rural areas	15	18 930	1 620	1.1
Villages	**-3**	**-3768**	-301	-0.2
Towns and suburbs	8	1 462	167	-0.2
Cities	13	3 350	543	-1.3
Total	33	19 974	2029	-0.3
	Upper secondary education (ISCED 3)			
Sparse rural areas	**-3**	1 808	59	3.0
Villages	**-19**	**-1559**	**-170**	0.9
Towns and suburbs	**-23**	**-583**	**-177**	2.3
Cities	**-20**	**-1252**	**-211**	1.6
Total	**-65**	**-1586**	**-499**	2.0

Note: Degree of urbanisation classification based on 2015 data. Negative values are indicated in bold. Teachers refer to FTE equivalent teachers. ISCED 3 schools include schools offering ISCED level 3 education and possibly other levels.
Source: Author's elaboration based on data from Estonian Ministry of Education and Research (2021[8]), *Estonian Education Information System (EHIS) (database)*, and EC (2021[9]), *GHSL - Global Human Settlement Layer – GHS-SMOD*, https://ghsl.jrc.ec.europa.eu/download.php?ds=smod (accessed on 1 February 2021).

Basic schools – particularly those in sparse rural areas – concentrated most of the increase in students in the last decade. In sparse rural areas, the increase of 18 930 more students in 2011-20 was met with previous schools and 15 new schools (on average 1 new school for every 1 262 additional students). In contrast, cities added 3 350 students in the period and there was on average one new school for every 66 additional students in cities. Most of the 33 basic schools added to the school network between 2011 and 2020 were located in sparse rural areas (15 schools) and cities (13 schools). Out of 33 additional basic schools, 18 were private schools (including all 8 new schools in Tallinn).

Geographical differences in school resources and quality

While pupil-to-teacher ratios have remained stable at the national level in the last decade, they have decreased in some rural municipalities and generally increased in upper secondary education. Nationally, the pupil-to-teacher ratio in general schools changed from 12.2 in 2010/11 to 12.0 in 2019/2020, with the largest reductions in Hiiu (10.1 to 8.5) and Jõgeva (10.8 to 9.4) Counties. The concentration of upper secondary schools resulted in around 3 more students per teacher in sparse rural areas and 2.2 more students per teacher in cities. Currently, pupil-to-teacher ratios range from 8.5 pupils-per-teacher in Hiiu County to 12.1 pupils-per-teacher in Tartu. Internationally comparable data for 2017 shows that Estonia has pupil-to-teacher ratios in lower secondary education below the OECD average, slightly higher ratios for upper secondary education and similar ratios for primary education (OECD, 2021[1]).

Table 4.4. Population density, pupil-to-teacher ratios and education quality indicators by county, 2018

	Population density	Pupil-to-teacher ratio	PISA average test results	Share of repeaters in general education (%)	Share of discontinuers in general education (%)
Hiiu	9.09	8.5	523	1.2	1.0
Lääne	11.30	9.1	549	2.9	2.1
Järva	11.33	9.4	505	1.9	2.4
Pärnu	15.86	9.6	518	1.8	1.6
Jõgeva	11.29	9.8	507	1.4	1.8
Võru	12.90	9.9	527	1.5	1.7
Valga	14.80	10.2	506	2.5	1.7
Lääne-Viru	16.05	10.4	507	1.5	2.0
Viljandi	13.56	10.7	522	2.6	1.6
Saare	11.27	10.8	547	1.4	2.2
Rapla	12.045	11.0	512	1.9	1.5
Ida-Viru	45.85	11.5	493	0.6	1.5
Põlva	13.71	12.1	518	1.6	1.1
Tartu	45.67	12.1	531	1.4	1.3
Harju	138.23	13.4	534	1.0	1.4

Note: Students over FTE number of teachers in 2019/20 based on teachers' workload. Data of teachers and pupils are as of 10 November 2018. All general education schools plus teachers and pupils in general education classes of two vocational educational schools considered. All teachers and pupils regardless of the forms and methods of study. Includes only teachers with valid contracts except for teachers whose contract has been temporarily suspended (e.g. teachers on maternity leave). Pupil-to-teacher ratios include all teachers and class teachers plus school heads, head teachers and support specialists who are involved in teaching, and all teachers and pupils regardless of the forms and methods of study.

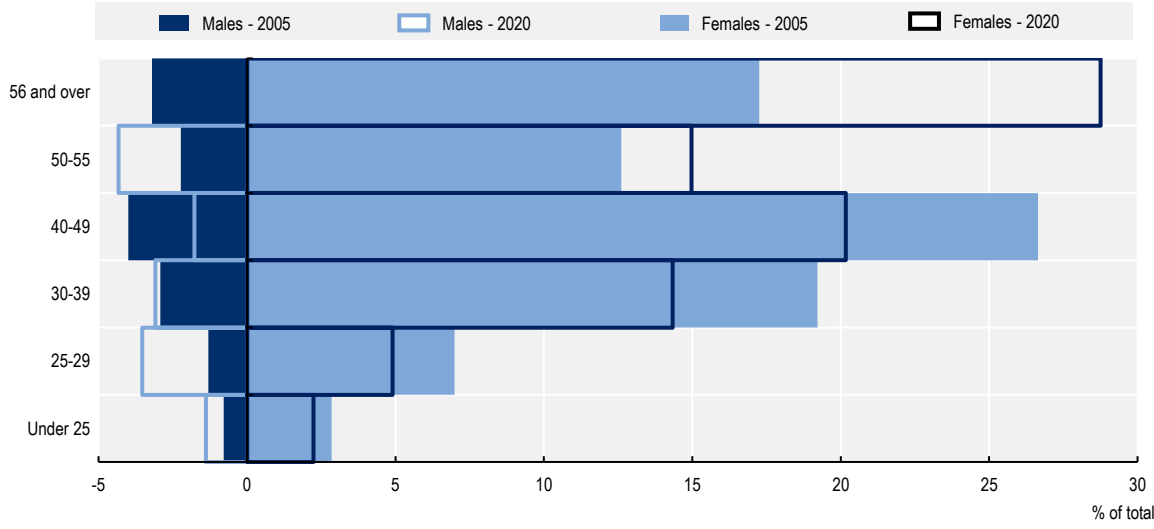
Source: Author's elaboration based on data from Estonian Ministry of Education and Research (2021[8]), *Estonian Education Information System (EHIS) (database)*, OECD (2020[6]), *PISA 2018 Results (Volume V): Effective Policies, Successful Schools*, https://dx.doi.org/10.1787/ca768d40-en, Statistics Estonia (2021[10]), *Main Demographic Indicators*, http://andmebaas.stat.ee/ (accessed on 8 February 2021) and Statistics Estonia (2021[7]), *General Education*, https://www.stat.ee/en/find-statistics/statistics-theme/education/general-education (accessed on 20 August 2021).

Available data on education quality by county as measured by the OECD Programme for International Student Assessment (PISA) 2018 test scores reveals a low correlation between population density and pupil-to-teacher ratios at the county level on the one hand and PISA test scores on the other. In fact, counties with a significant share of the rural population such as Lääne on the west coast and the island of Saare had the highest average scores in the country, above the average scores of Harju and Tartu where density levels are much higher. The largest and most persistent difference in PISA across schools in Estonia is between schools in Ida-Viru County and the rest. According to the diagnosis of the Ministry of Education and Research, the lack of a sufficient number of teachers meeting Estonian language requirements has slowed down quality improvements in Ida-Viru.

On the other hand, with the exception of Hiiu, counties with lower pupil-to-teacher ratios and lower population density display higher than average shares of repeaters and dropouts in general education. Lääne and Saare, two counties with low population density, had higher shares of repeaters and discontinuers compared to the national average in 2018, although they had higher than average PISA scores in the same year. These results suggest a correlation between indicators of student motivation and a larger share of small/remote schools.

Despite the large volume of teachers, many municipalities face new teacher shortages. A much higher proportion of principals in Estonian schools reported facing teacher shortages compared to the OECD average (44% versus 27%) (OECD, 2020[6]). National data also shows that more rural counties have a smaller percentage of teachers aged 30 or younger in basic education: young teachers in counties with a population density of 12 inhabitants per km^2 represented only 5.7% of teaching staff, almost 10 percentage points less than in the more urbanised counties of Tartu (15.1) and Harju (13.8). The problem of teaching shortages is linked to ageing staff, as currently, over 50% of teachers are 50 years or older (Figure 4.3).

Figure 4.3. Age and gender distribution of teachers in Estonia, 2005 and 2020



Source: Author's elaboration based on Statistics Estonia (2021[7]) (2021), *General Education*, https://www.stat.ee/en/find-statistics/statistics-theme/education/general-education (accessed on 20 August 2021).

Geographical differences and trends in education expenditure

In Estonia, total school spending per pupil in general education, which includes running costs such as school staff salaries and information and communication technology (ICT) equipment, steadily increased in the last decades to reach USD PPP 7 462 in 2017. Available internationally comparable data for 2016 shows Estonia spends less on average than OECD countries at all levels of education (OECD, 2021[1]).

Data for 2011 showed Estonia spent more on capital and less on wages as a share of total expenditure than OECD countries, as a result of high pupil-to-teacher ratios, low wages and high levels of investment on modernising the upper secondary school network (Santiago et al., 2016[3]). In 2018, 66% of total expenditure in basic education accrued to staff compensation.

More recent data for 2014-19 at the municipal level shows that nominal expenditure per capita grew in all municipalities, linked to an increase in wages across all areas and work categories (Table 4.5). Nominal expenditure per capita and wages grew by 9.1% and 8.3% in cities, faster than in towns and suburbs (8.2%) and rural areas (8.6% and 8.7%). Small geographical differences in wages may be linked to similar levels of satisfaction with wages between teachers in rural and urban schools. Internationally comparable data for 2018 showed that the level of satisfaction with wages among teachers in rural schools was not significantly different to the level of satisfaction of teachers in cities (OECD, 2021[1]).

Table 4.5. Municipal expenditure in education per capita and average wages of teachers, support staff and school heads by degree of urbanisation, 2014-19

Degree of urbanisation (LAU2)	Expenditure per capita 2019	Standard deviation	Change 2014-19 (%)	Wages teachers 2019	Standard deviation	Change 2014-19 (%)	Wages support staff 2019	Standard deviation	Change 2014-19 (%)	Wages school principals 2019	Standard deviation	Change 2014-19 (%)
Cities	384	95	9.1	1 647	51	8.3	1 472	98	11.9	2031	265	6.9
Towns and suburbs	465	78	8.2	1 508	118	8.2	1 313	566	9.8	1 851	226	6.4
Rural areas	537	125	8.6	1 513	132	8.7	1 173	542	8.6	1 699	306	7.2

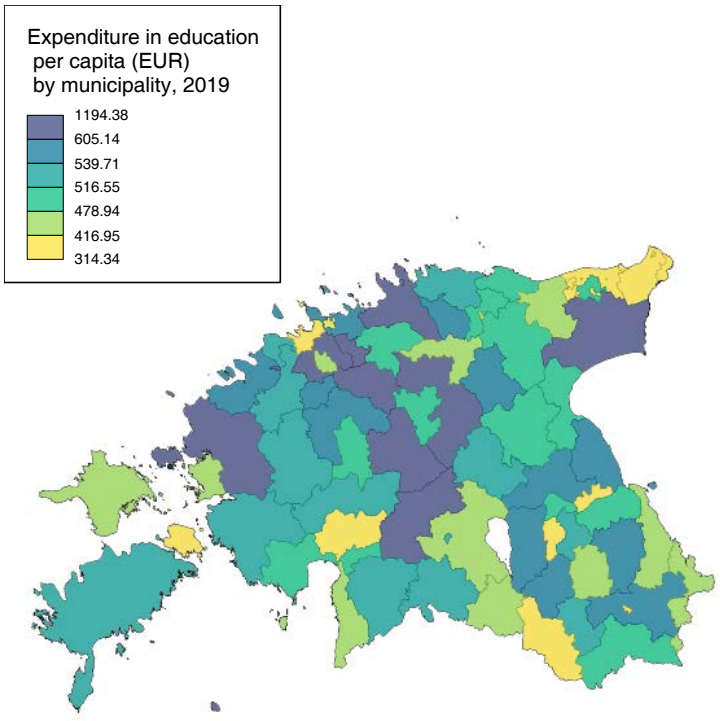
Note: Teachers include all class teachers and teacher and support specialists (special educator, social pedagogue, speech therapists, school psychologist) and school management staff (school principal, head of studies) who are involved in teaching. The degree of urbanisation classification at the municipality level relies on 2011 population grid and 2016 local administrative unit (LAU) boundaries.
Source: Author's elaboration based on Estonian Ministry of Education and Research (2021[8]), *Estonian Education Information System (EHIS) (database)* and Eurostat (2021[11]), *Degree of Urbanisation (DEGURBA)*, https://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/population-distribution-demography/degurba (accessed on 1 February 2021).

While the wage gap between rural and city municipalities is small, wage levels vary more widely across rural municipalities than in other municipality types. Nominal wages in cities – that do not take into account geographical differences in the cost of living – are on average only EUR 134 higher in cities compared to rural areas. Current transfer policies may be behind this alignment. On the other hand, rural municipalities have a much higher variation in average wages, especially for support staff that can have wages as low as EUR 700 below and as high as EUR 145 above compared to support staff in cities.

Across municipalities, expenditure per capita in 2019 varied from EUR 314 in Tallinn to over EUR 1 000 in central and border rural municipalities with sparse populations (Figure 4.4). Nevertheless, the rate of increase of per capita expenditure between 2014 and 2019 has a regional component, with a large proportion of municipalities in Northern and Central Estonia experiencing the largest average increases and municipalities in Northern, West and Southern Estonia experiencing the lowest increases (Figure 4.5).

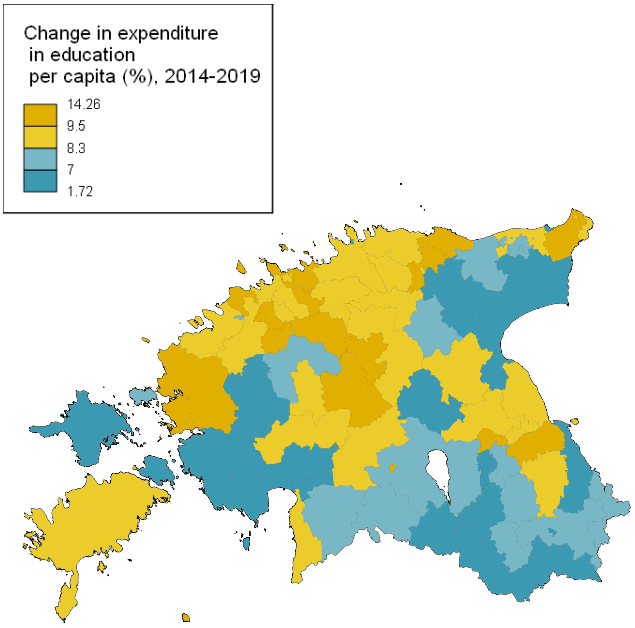
In summary, the education system in Estonia has achieved high quality and equity in provision combined with efforts to increase efficiency. The biggest challenge in maintaining this balance in the future is the strong generational inertia on teaching staff that has at the same time prevented downsizing teaching staff and created shortages of new teachers, especially in rural areas. The redistribution mechanisms in place seem to accomplish the goal of ensuring wages in rural areas remain aligned with national averages, although the incentives for school consolidation through funding for teaching staff may have led to over-dispersion in compensation across municipalities.

Figure 4.4. Expenditure in education per capita by municipality, 2019



Note: Expenditure in nominal values. Values binned by quantiles.
Source: Author's elaboration based on Estonian Ministry of Education and Research (2021[8]), *Estonian Education Information System (EHIS) (database)*.

Figure 4.5. Change in expenditure in education per capita by municipality, 2014-19



Note: Change calculated as compound annual growth rate.
Source: Author's elaboration based on Estonian Ministry of Education and Research (2021[8]), *Estonian Education Information System (EHIS) (database)*.

Benchmarking school sizes, resources and expenditure

Are actual differences in school sizes, resources and expenditure across municipalities aligned with what can be expected based on geographic and demographic differences? This section benchmarks 2011 actual school sizes, school resources (teachers) and expenditure to estimates based on the allocation model used in (OECD/EC-JRC, 2021[4]). For comparative purposes, the analysis in this section focuses on basic schools for the school sizes and resources parts and all general schools (primary and secondary in the estimations) for the expenditure part. Annex 4.B describes the data processing and estimation approach in more detail.

For the purpose of the comparative analysis in this section, schools are grouped into two categories: primary encompassing ISCED level 1 schools (Stages I and II/Grades 1-12) and secondary schools encompassing schools offering ISCED levels 2 and 3 (Grades 7-12).

Benchmarking school sizes and resources

The comparison of actual versus estimated resources (teachers per 100 students) and school sizes (students per school) across municipalities reveals that most municipalities classified as towns and suburbs have schools that are larger and less staffed than expected. On average, towns and suburbs municipalities have 0.7 fewer teachers per 100 students and 30 students per school more than what the estimations suggest (Table **4.6**).

Table 4.6. Differences between actual and simulated values on teachers per student, students per school and share of students coming from another municipality

Degree of urbanisation (LAU2)	Actual minus estimated difference in teachers per 100 students	Actual minus estimated difference in students per school, 2011	Actual minus estimated % of students coming from outside the municipality
Cities	1.9	-5.6	0.8
Towns and suburbs	-0.7	30.2	-17.0
Rural areas	5.5	3.7	-3.5

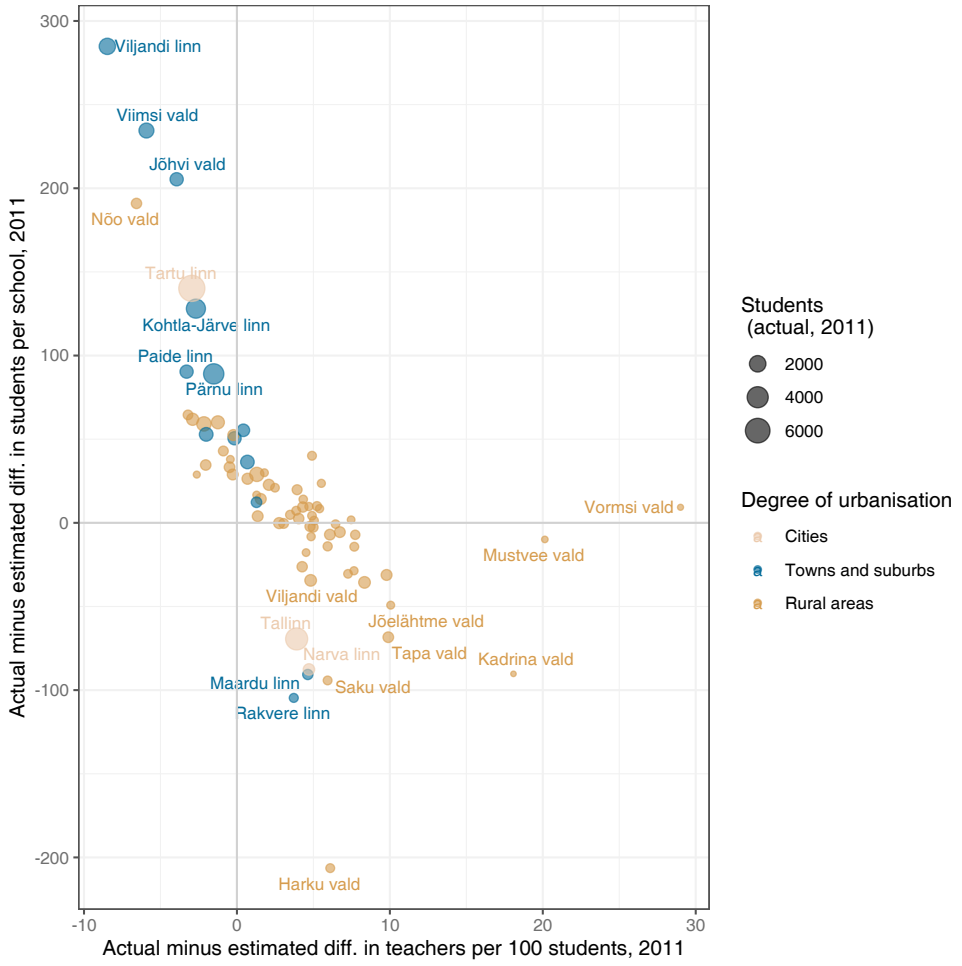
Note: Based on 2011 data. Basic schools only. Degree of urbanisation classification based on 2011 data. Degree of urbanisation based on classification at the municipality level.
Source: Author's elaboration based on Estonian Ministry of Education and Research (2021[8]), *Estonian Education Information System (EHIS) (database)*, OECD/EC-JRC (2021[4]), *Access and Cost of Education and Health Services: Preparing Regions for Demographic Change*, https://dx.doi.org/10.1787/4ab69cf3-en, Goujon, A. et al. (eds.) (2021[12]), *The Demographic Landscape of EU Territories: Challenges and Opportunities in Diversely Ageing Regions*, EUR 30498 EN, Publications Office of the European Union, Luxembourg, Jacobs-Crisioni, C. et al. (n.d.[13]), *Development of the LUISA Reference Scenario 2020 and Production of Fine-Resolution Population Projections by 5 Year Age Group*, and Eurostat (2021[11]), *Degree of Urbanisation (DEGURBA)*, https://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/population-distribution-demography/degurba (accessed on 1 February 2021).

Within the group of towns and suburbs municipalities, some seem to have shortages of both schools and teachers, while others seem to be operating under a smaller scale compared to their potential. Towns and suburbs municipalities serving a relatively large number of students including Nõo, Pärnu and Viimsi show more rationing in terms of teachers per student and larger scale in terms of students per school compared to the estimation. On the contrary, a number of non-urban municipalities close to cities – especially those in North Estonia close to Tallinn (Harku, Keila and to a lower extent Saku) have a smaller size compared to the estimations.

On the other hand, rural municipalities have on average 5.5 more teachers per every 100 students and around 4 students more per school than expected. The picture for municipalities is split between rural municipalities operating schools at a larger size and with a smaller teaching staff than expected (top left corner) and small rural municipalities with a smaller scale and an excess of teachers for the size of their

student population. This includes municipalities such as the island of Vormsi and Mustvee in Jõgeva County that have at least 20 more teachers per every 100 students compared to the estimations.

Figure 4.6. Comparison of actual versus estimated students per school and teacher per students in basic schools, 2011

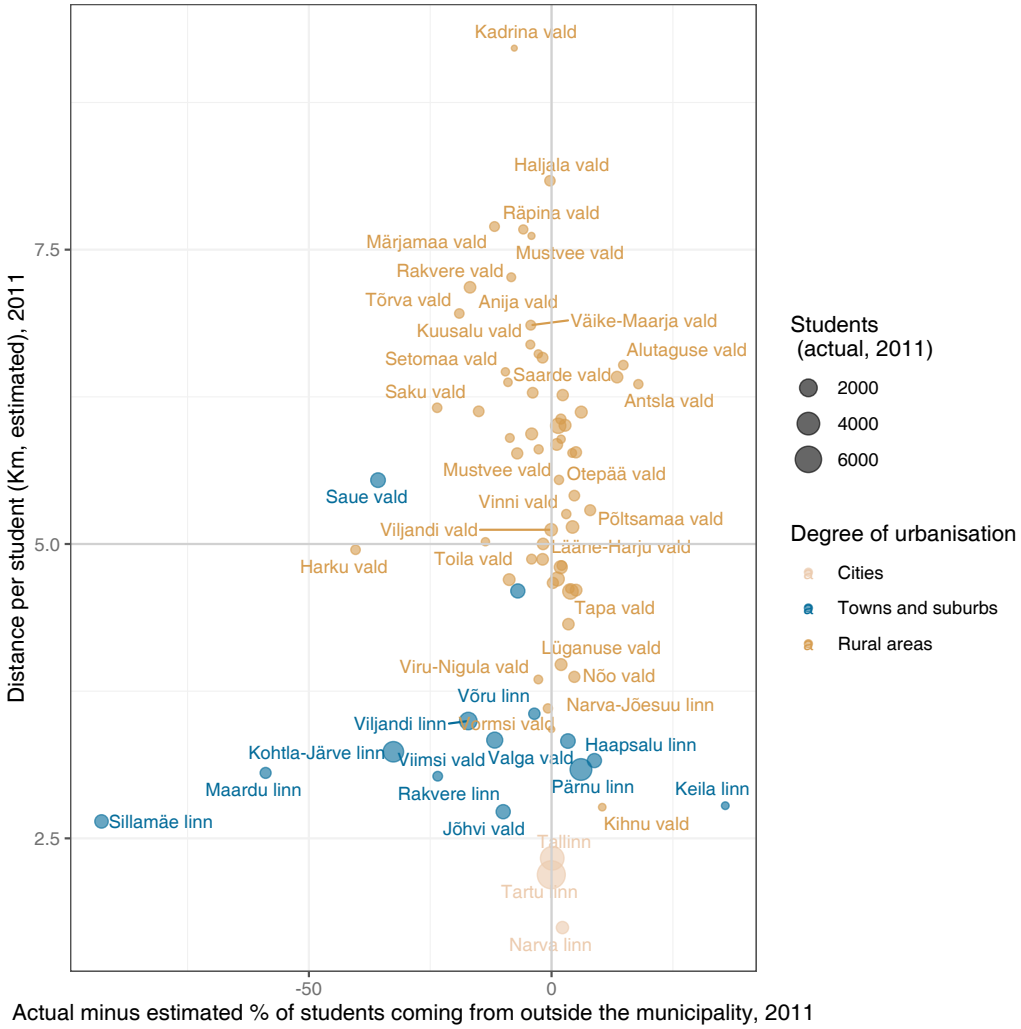


Note: Degree of urbanisation classification based on 2011 data. Basic schools are schools offering ISCED levels 1 and 2. See Annex 4.B for details. Excludes two observations for visual purposes (Ruhnu island, values -20 and 66 and Keila linn, values -621 and 8).
Source: Author's elaboration based on Estonian Ministry of Education and Research (2021[8]), *Estonian Education Information System (EHIS) (database)*, OECD/EC-JRC (2021[4]), *Access and Cost of Education and Health Services: Preparing Regions for Demographic Change*, https://dx.doi.org/10.1787/4ab69cf3-en, Goujon, A. et al. (eds.) (2021[12]), *The Demographic Landscape of EU Territories: Challenges and Opportunities in Diversely Ageing Regions*, EUR 30498 EN, Publications Office of the European Union, Luxembourg, Jacobs-Crisioni, C. et al. (n.d.[13]), *Development of the LUISA Reference Scenario 2020 and Production of Fine-Resolution Population Projections by 5 Year Age Group*, and Eurostat (2021[11]), *Degree of Urbanisation (DEGURBA)*, https://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/population-distribution-demography/degurba (accessed on 1 February 2021).

Part of the issues with smaller than expected school sizes may have to do with a low level of mobility across municipalities. It may be possible that students who could cross a municipal border to attend a school closer to them than in their municipality are not doing so. As the simulations do not impose any geographical restrictions on school choice and also do not consider quality differences across schools, both issues may be behind the observed differences.

The comparison shows that a number of towns and suburbs municipalities have a much smaller share of students coming from another municipality than expected, even when the distances that students travel to get to schools in those places from other municipalities is relatively small (i.e. below 5 km) (Figure 4.7). The most extreme cases are the urban municipalities of Sillamäe in Ida-Viru and Maardu in Harju, where the difference between the actual and estimated share of students coming from another municipality is 50 percentage points or more. What is more, growing municipalities such as Harku and Saku – that were shown before to have fewer students than expected – may also have the potential to have more students from other municipalities.

Figure 4.7. Actual and estimated share of students coming from another municipality versus distance per student, 2011



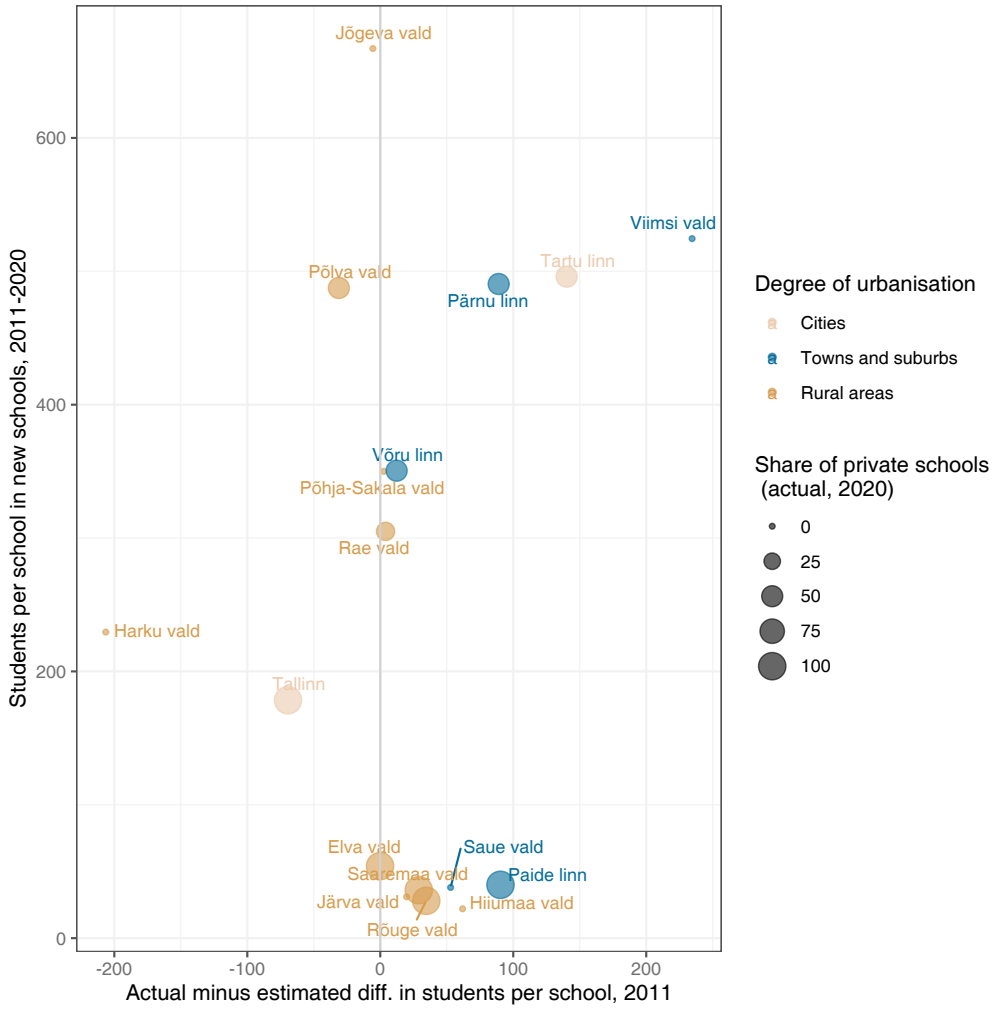
Note: Degree of urbanisation classification based on 2011 data. Basic schools are schools offering ISCED levels 1 and 2. See Annex 4.B for details. Excludes one observation for visual purposes (Ruhnu island, values -100 and 9.8).

Source: Author's elaboration based on Estonian Ministry of Education and Research (2021[8]), *Estonian Education Information System (EHIS) (database)*, OECD/EC-JRC (2021[4]), *Access and Cost of Education and Health Services: Preparing Regions for Demographic Change*, https://dx.doi.org/10.1787/4ab69cf3-en, Goujon, A. et al. (eds.) (2021[12]), *The Demographic Landscape of EU Territories: Challenges and Opportunities in Diversely Ageing Regions*, EUR 30498 EN, Publications Office of the European Union, Luxembourg, Jacobs-Crisioni, C. et al. (n.d.[13]), *Development of the LUISA Reference Scenario 2020 and Production of Fine-Resolution Population Projections by 5 Year Age Group*, and Eurostat (2021[11]), *Degree of Urbanisation (DEGURBA)*, https://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/population-distribution-demography/degurba (accessed on 1 February 2021).

Benchmarking new schools

A relevant question at this point is whether additional schools have been built in areas with school deficits and/or where demand grew in the last decade. This is the case for Viimsi (two new public schools), Pärnu and Tartu (each with one new public school and one new private school), where new schools came to supply increased demand in the last decade (Figure 4.8). Additional schools appeared in other suburban municipalities including Rae (two new public schools and one new private school) and Harku (two new public schools) that did not show excess capacity in the 2011 benchmark but experienced sharp increases in demand in the last decade.

Figure 4.8. Actual minus estimated students per school versus students in additional schools, 2011-20

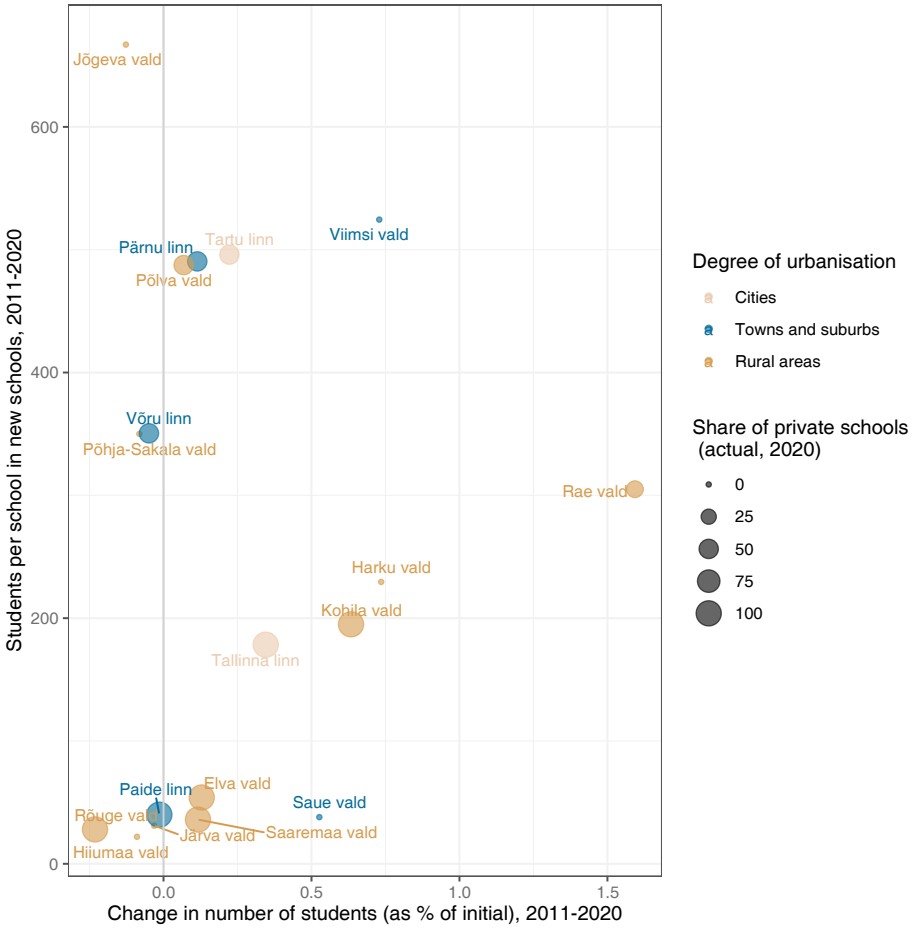


Note: Based on 35 additional schools in 2011-20. Students in basic schools only. Degree of urbanisation classification based on 2015 data. Basic schools are schools offering ISCED levels 1 and 2. See Annex 4.B for details.

Source: Author's elaboration based on Estonian Ministry of Education and Research (2021[8]), *Estonian Education Information System (EHIS) (database)*, OECD/EC-JRC (2021[4]), *Access and Cost of Education and Health Services: Preparing Regions for Demographic Change*, https://dx.doi.org/10.1787/4ab69cf3-en, Goujon, A. et al. (eds.) (2021[12]), *The Demographic Landscape of EU Territories: Challenges and Opportunities in Diversely Ageing Regions*, EUR 30498 EN, Publications Office of the European Union, Luxembourg, Jacobs-Crisioni, C. et al. (n.d.[13]), *Development of the LUISA Reference Scenario 2020 and Production of Fine-Resolution Population Projections by 5 Year Age Group*, and EC (2021[9]), *GHSL - Global Human Settlement Layer - GHS-SMOD*, https://ghsl.jrc.ec.europa.eu/download.php?ds=smod (accessed on 1 February 2021).

On the other hand, the supply of additional schools in some rural municipalities does not seem to align with increased demand in the past decade or differences identified in the benchmark to estimated values. This is the case of Jõgeva and Viljandi that had fewer students per school in 2011 than expected and also experienced a decline in student numbers in 2011-20. In both cases, the additional school was a public school (Figure 4.9). In some cases, however, the construction of a new school was accompanied by the closure of one or more schools, so the total number of schools did not grow.

Figure 4.9. Change in number of students versus students in additional schools, 2011-20



Note: Degree of urbanisation classification based on 2015 data. Basic schools are schools offering ISCED levels1 and 2. See Annex 4.B for details.

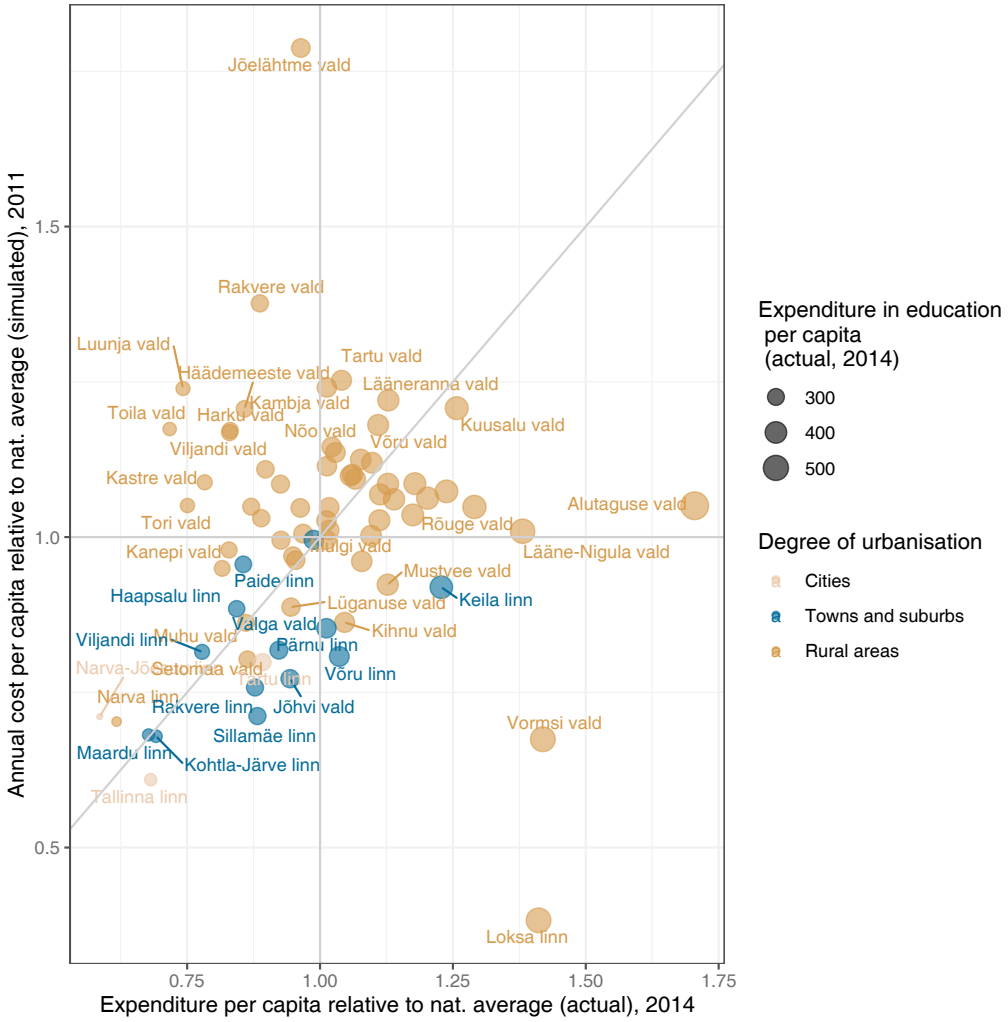
Source: Author's elaboration based on Estonian Ministry of Education and Research (2021[8]), *Estonian Education Information System (EHIS) (database)*, OECD/EC-JRC (2021[4]), *Access and Cost of Education and Health Services: Preparing Regions for Demographic Change*, https://dx.doi.org/10.1787/4ab69cf3-en, Goujon, A. et al. (eds.) (2021[12]), *The Demographic Landscape of EU Territories: Challenges and Opportunities in Diversely Ageing Regions*, EUR 30498 EN, Publications Office of the European Union, Luxembourg, Jacobs-Crisioni, C. et al. (n.d.[13]), *Development of the LUISA Reference Scenario 2020 and Production of Fine-Resolution Population Projections by 5 Year Age Group*, and EC (2021[9]), *GHSL - Global Human Settlement Layer - GHS-SMOD*, https://ghsl.jrc.ec.europa.eu/download.php?ds=smod (accessed on 1 February 2021).

Benchmarking expenditure

A final question that could be explored with the simulated data is whether the funding per municipality correspond to what could be expected if the allocation was guided by unavoidable costs arising from geographic and demographic factors.

Figure 4.10 compares differences with respect to the national average in expenditure per capita (X-axis) versus estimated annual cost per capita based on simulated school placements (Y-axis). Compared to the benchmark of being aligned with the national average, a number of municipalities mostly classified as cities, towns and suburbs (left bottom quadrant and close to the 45 degree line) have lower than average expenditure per capita according to both the actual data and the simulated data. Similarly, a number of rural municipalities such as Kuuslu (top right quadrant and close to the 45 degree line) have levels above the national average according to both the simulated and actual data.

Figure 4.10. Expenditure per capita (actual) versus annual costs per capita (estimated) relative to national average by municipality, 2011 and 2014



Note: Degree of urbanisation classification based on 2015 data. Annual cost includes the sum of estimated expenditure in all simulated schools (primary and secondary) based on 2011 population information. Expenditure in education includes expenditure for all educational levels in 2014.
Source: Author's elaboration based on Statistics Estonia (2021[10]), *Main Demographic Indicators*, http://andmebaas.stat.ee/ (accessed on 8 February 2021), Estonian Ministry of Education and Research (2021[8]), *Estonian Education Information System (EHIS) (database)*, OECD/EC-JRC (2021[4]), *Access and Cost of Education and Health Services: Preparing Regions for Demographic Change*, https://dx.doi.org/10.1787/4ab69cf3-en, Goujon, A. et al. (eds.) (2021[12]), *The Demographic Landscape of EU Territories: Challenges and Opportunities in Diversely Ageing Regions*, EUR 30498 EN, Publications Office of the European Union, Luxembourg, Jacobs-Crisioni, C. et al. (n.d.[13]), *Development of the LUISA Reference Scenario 2020 and Production of Fine-Resolution Population Projections by 5 Year Age Group*, and EC (2021[9]), *GHSL - Global Human Settlement Layer - GHS-SMOD*, https://ghsl.jrc.ec.europa.eu/download.php?ds=smod (accessed on 1 February 2021).

Nevertheless, the majority of municipalities (42 out of 79) (left top quadrant) have higher than average annual costs per capita according to the simulated data but lower than average expenditure per capita according to the actual data. The most extreme case is Jõelähtme in Harju County, which has annual costs per capita 78% above the national average but actual expenditure per capita 4% below the national average. Opposite to these cases are 32 municipalities that have larger expenditure per capita than what would be predicted based only on unavoidable costs of smallness and remoteness, with significant deviations (more than 10 percentage points) in only 18 cases. These include some small and remote rural municipalities (including some small islands) to which funding may have been allocated based on remoteness criteria.

The analysis in terms of total expenditure shares shows that expenditure allocation across municipalities largely corresponds to what could be expected from an allocation based on unavoidable costs driven by geography and demography. As Figure 4.11 shows, the shares of total expenditure in towns and suburbs and rural municipalities largely correspond to the shares of total costs (i.e. most observations lie close to the 45 degree line). By this measure, most rural municipalities seem to have a smaller share of total expenditure than what would be predicted by their unavoidable costs of smallness and remoteness, while a small group of municipalities including Rae and Viimsi seem to have higher shares than expected.

In summary, current spatial differences in demand patterns in Estonia may require three different strategies: i) focus on improving efficacy and efficiency in the use of school resources in remote areas with low access; ii) increasing the scale of provision of schools in suburban municipalities with underutilised potential to alleviate congestion in areas with fast-growing demand; and iii) increase provision in growing urban and suburban municipalities with a strategic and common planning vision. At the same time, current expenditure in education shares generally reflects the needs of municipalities facing unavoidable costs of smallness and remoteness. The next section discusses how this assessment holds when considering future population projections.

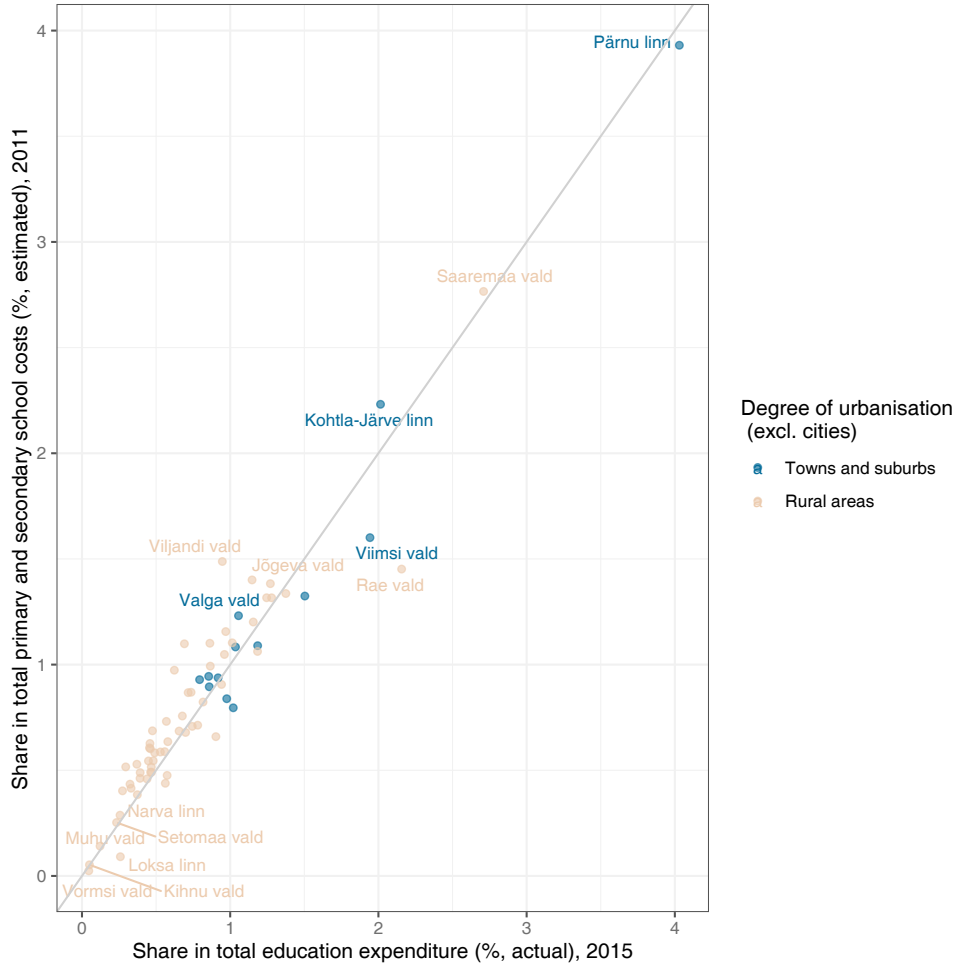
Future policy scenarios

Available population projections for Estonia show that, by 2035, the number of primary and secondary students is projected to decrease by 13% (-0.6% annually) and 2% (-0.07% annually). These changes will happen unevenly across degrees of urbanisation. Student numbers will increase in cities and decrease in sparse rural areas and villages and to a lesser extent in towns and suburbs. This section reviews how the number of schools, school resources (teachers), costs and distance would change following these trends under three policy scenarios:

1. What if the school network in 2035 responded efficiently to new demand levels? (i.e. the school network to 2035 is set up according to 2035 student numbers or the “2035 students/2035 schools” scenario).
2. What if the present school network is kept intact in the future? (i.e. keeping the same 2011 school network in 2035 or the “2035 students/2011 schools” scenario).
3. What if the 2011 school network remains the same in 2035 but student-to-teacher ratios increase by three more students everywhere (the “larger pupil-to-teacher ratio” scenario)?

The results of this section are based on simulated school placements for 2011 and 2035 following the method outlined in the OECD/EC-JRC report (2021[4]). While the 2021 network would have been much preferred as a baseline, the available simulated data only includes data for 2011 and 2035. Unlike the previous sections, results are aggregated by primary (ISCED level 1, ages 5-11) and secondary education (ISCED levels 2 and 3, ages 12-18).

Figure 4.11. Share in annual costs (estimated) versus share in total education expenditure (actual) by municipality, 2011 and 2014



Note: Degree of urbanisation classification based on 2015 data. Excludes municipalities classified as cities for visual purposes. Annual cost includes the sum of estimated expenditure in all simulated schools (primary and secondary) based on 2011 population information. Expenditure in education includes expenditure for all educational levels in 2014.

Source: Author's elaboration based on Estonian Ministry of Education and Research (2021[8]), *Estonian Education Information System (EHIS) (database)*, , Goujon, A. et al. (eds.) (2021[12]), *The Demographic Landscape of EU Territories: Challenges and Opportunities in Diversely Ageing Regions*, EUR 30498 EN, Publications Office of the European Union, Luxembourg, Jacobs-Crisioni, C. et al. (n.d.[13]), *Development of the LUISA Reference Scenario 2020 and Production of Fine-Resolution Population Projections by 5 Year Age Group*, and EC (2021[9]), *GHSL - Global Human Settlement Layer - GHS-SMOD*, https://ghsl.jrc.ec.europa.eu/download.php?ds=smod (accessed on 1 February 2021).

By degree of urbanisation and schools

By 2035, Estonia is projected to have a lower absolute number of students and also a different distribution of the remaining students. Compared to a policy that adapts the 2035 school network to serve the new demand, a policy that preserves the 2011 school network leads to higher increases in annual costs outside cities and smaller increases in distances in sparse rural areas. The effect of decreased demand is nevertheless felt even if the school network adapts, especially in sparse rural areas where small schools will have to remain open to ensure adequate access. This is also reflected in smaller annual changes in schools compared to annual changes in students. On the other hand, the spatial changes in future demand imply the need for a simultaneous fall in the number of teachers outside cities and an increase in the number of teachers in cities to match the pace of changes in the number of students.

An alternative to adapting the school network is to increase school efficiency. The results show that increasing student-to-teacher ratios by three more students per teacher reduces annual costs per student in all types of areas but more strongly in more urbanised areas. In this way, annual costs in sparse rural areas would increase by 0.49% annually until 2035 if the 2011 school network remains the same but they would decrease by 0.03% annually if the number of students per teacher increases everywhere.

Table 4.7. Changes in students, schools, teachers, distance and annual costs per student by degree of urbanisation and educational level, 2011-35

	Change in students (%)	Change in schools (%, annual)	Change in teachers (annual, %)		Change in distance per student (km)		Change in annual costs per student (%, annual)		
Scenario		2035 schools/ 2035 students	2035 schools/ 2035 students	2011 schools/ 2035 students	2035 schools/ 2035 students	2011 schools/ 2035 students	2035 schools/ 2035 students	2011 schools/ 2035 students	Larger pupil-to-teacher ratio
	Primary education (ISCED 1)								
Sparse rural areas	-1.7	-0.9	-1.7	-1.5	0.20	0.39	7.3	12.6	-0.7
Villages	-1.0	-0.2	-0.9	-1.3	-0.07	0.23	3.3	5.3	-10.2
Towns and suburbs	-1.0	-0.7	-1.0	-0.9	-0.03	-0.04	1.2	2.1	-14.2
Cities	0.5	0.4	0.5	0.4	-0.04	-0.06	-0.1	-0.6	-16.6
	Secondary education (ISCED 2 and 3)								
Sparse rural areas	-2.0	-1.2	-2.0	-1.8	0.26	0.57	2.1	4.8	-14.1
Villages	-1.8	-0.8	-1.7	-1.4	-0.17	0.48	2.7	2.4	-16.3
Towns and suburbs	-0.3	0.3	-0.2	-0.7	-0.31	0.10	2.6	1.8	-16.9
Cities	1.3	0.9	1.3	1.3	-0.23	-0.44	-0.1	-1.8	-19.3

Note: Degree of urbanisation classification based on 2015 data. Change measured by compound annual growth rates.
Source: Author's elaboration based on OECD/EC-JRC (2021[4]), *Access and Cost of Education and Health Services: Preparing Regions for Demographic Change*, https://dx.doi.org/10.1787/4ab69cf3-en, Goujon, A. et al. (eds.) (2021[12]), *The Demographic Landscape of EU Territories: Challenges and Opportunities in Diversely Ageing Regions*, EUR 30498 EN, Publications Office of the European Union, Luxembourg, Jacobs-Crisioni, C. et al. (n.d.[13]), *Development of the LUISA Reference Scenario 2020 and Production of Fine-Resolution Population Projections by 5 Year Age Group*, and EC (2021[9]), *GHSL - Global Human Settlement Layer - GHS-SMOD*, https://ghsl.jrc.ec.europa.eu/download.php?ds=smod (accessed on 1 February 2021).

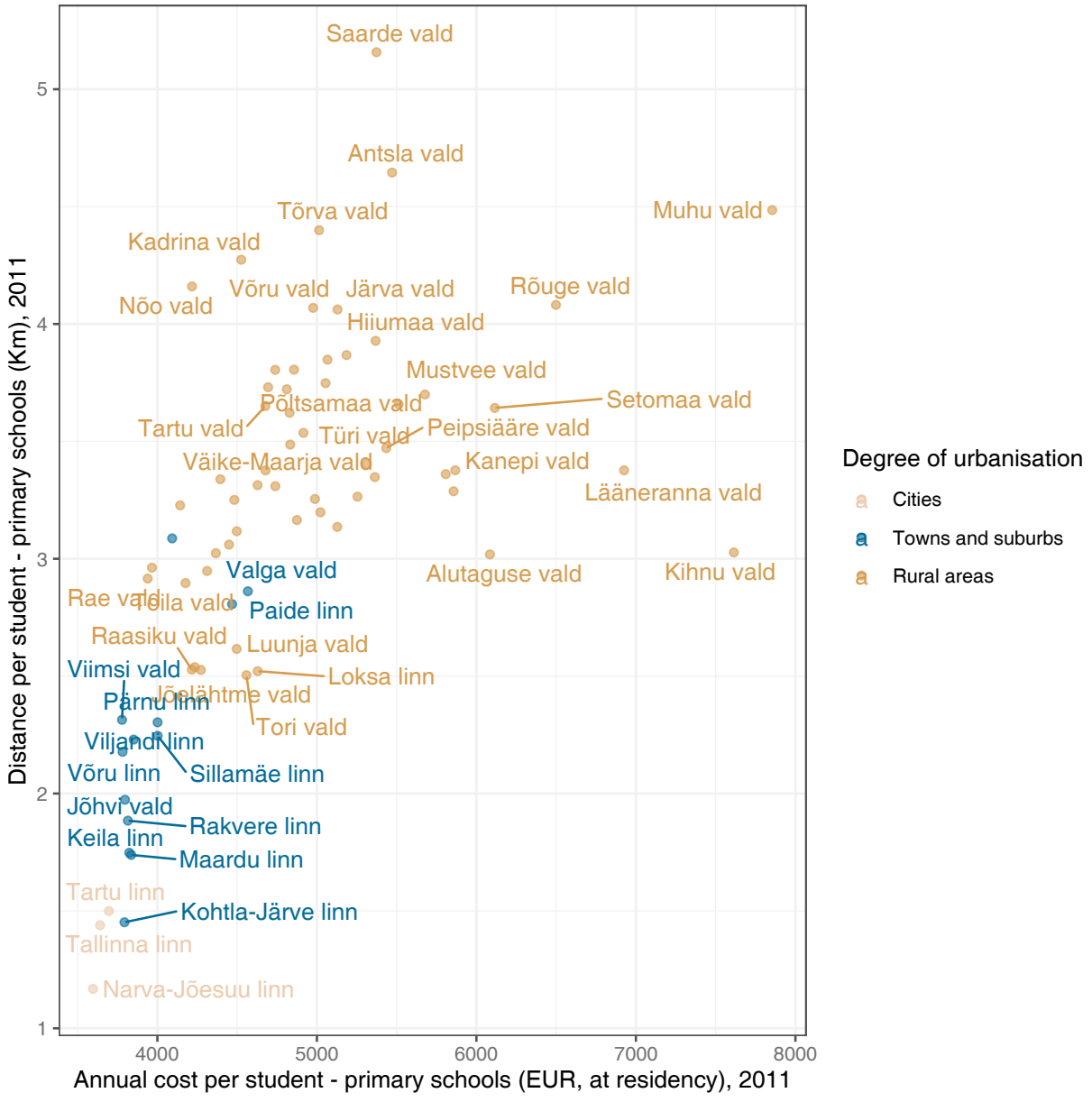
Importantly, not adapting the school network does not necessarily mean distances to schools remain the same in the future. In fact, under the no consolidation scenario, the most remote primary and secondary schools are further away compared to the present (2011) and school network adaptation scenarios (see Annex 4.C). This is because present schools do not necessarily have the best location in terms of access for future students, given the expected changes in the spatial distribution of students. Generally, when seen from the perspective of schools, the scenario of no school network adaptation leads to more dispersion in costs, with some schools reaching annual costs more than four times higher than the average.

By municipalities and counties

The present values of annual costs and distances per student illustrate how the trade-off between efficiency and access is faced by municipalities and counties to different degrees. While municipalities classified as towns, suburbs and cities have both the lowest annual costs and distances per primary school student, most rural municipalities have simultaneously larger values in both dimensions (Figure 4.12). At the county level, Lääne and Tartu have both lower annual costs and distances per secondary school students, while

a county such as Hiiu faces distances per student around 9 km larger and annual costs almost EUR 1 000 above Tartu (Figure 4.13).

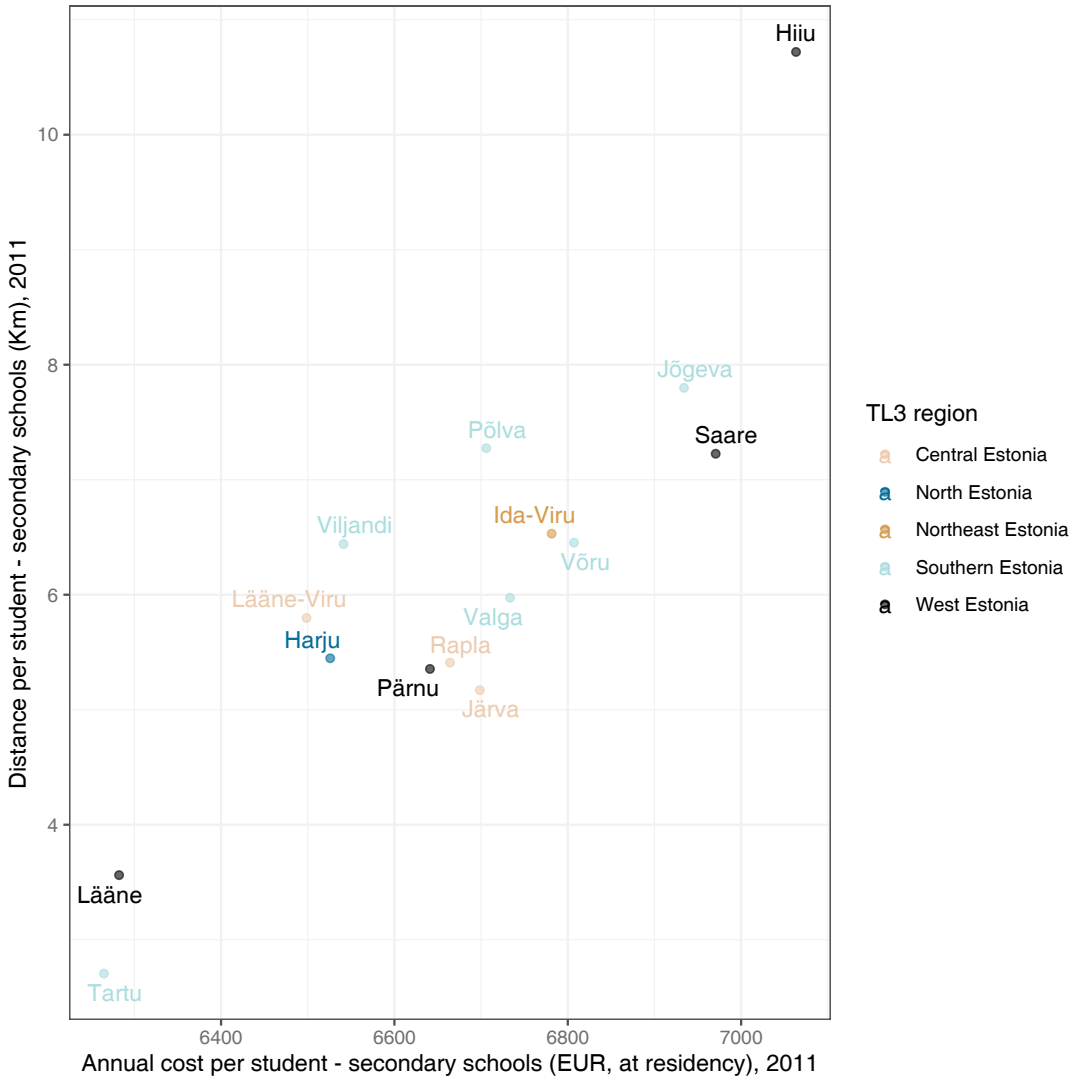
Figure 4.12. Annual costs and distances per primary school student by municipality, 2011



Note: Degree of urbanisation classification based on 2011 data. Primary school level excludes one municipality with higher values for visual purposes (Vormsi, EUR 11 989 and 2.03 Km).

Source: Author's elaboration based on OECD/EC-JRC (2021[4]), *Access and Cost of Education and Health Services: Preparing Regions for Demographic Change*, https://dx.doi.org/10.1787/4ab69cf3-en, Goujon, A. et al. (eds.) (2021[12]), *The Demographic Landscape of EU Territories: Challenges and Opportunities in Diversely Ageing Regions*, EUR 30498 EN, Publications Office of the European Union, Luxembourg, Jacobs-Crisioni, C. et al. (n.d.[13]), *Development of the LUISA Reference Scenario 2020 and Production of Fine-Resolution Population Projections by 5 Year Age Group*, and EC (2021[9]), *GHSL - Global Human Settlement Layer - GHS-SMOD*, https://ghsl.jrc.ec.europa.eu/download.php?ds=smod (accessed on 1 February 2021).

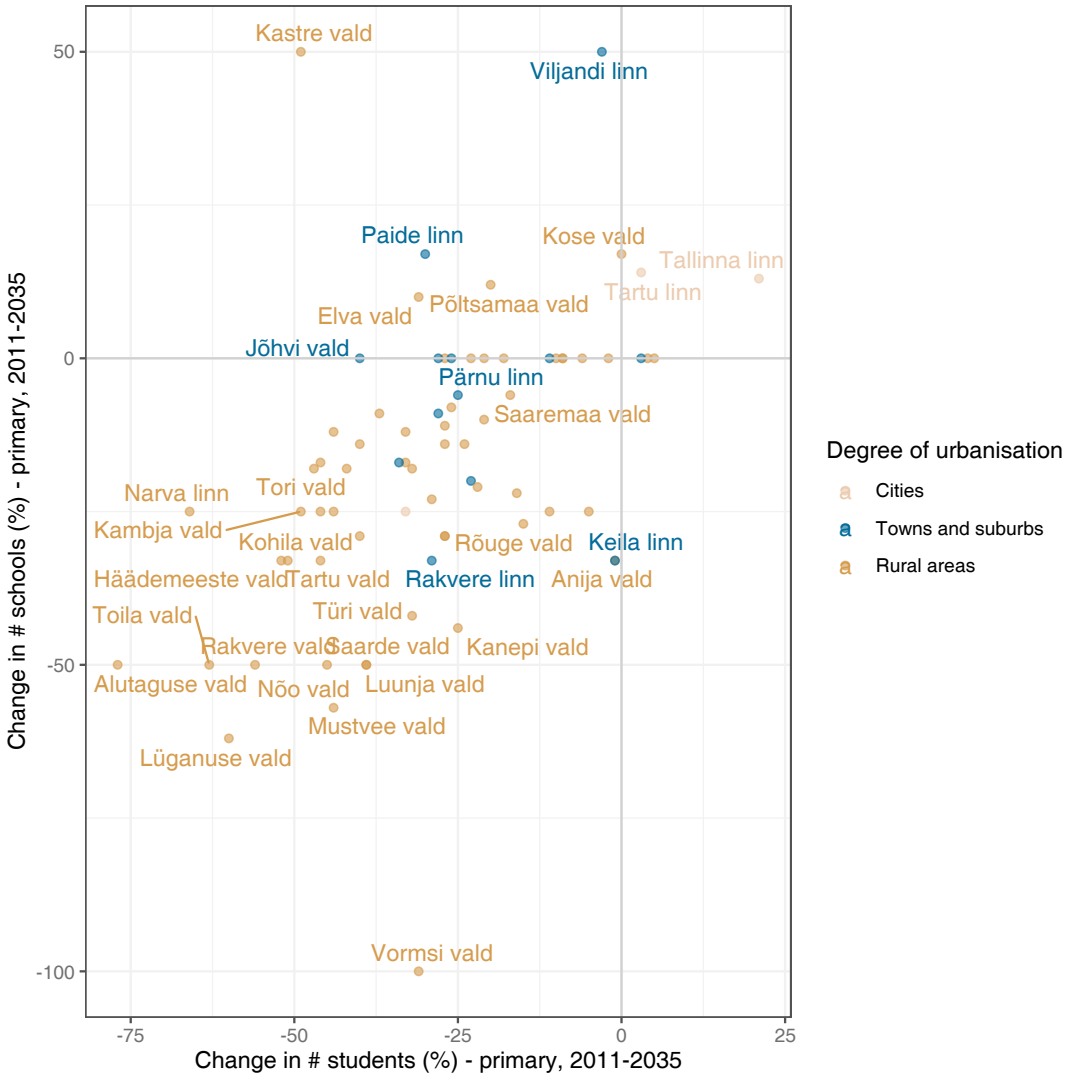
Figure 4.13. Annual costs and distances per secondary school student by county, 2011



Source: Author's elaboration based on OECD/EC-JRC (2021[4]), *Access and Cost of Education and Health Services: Preparing Regions for Demographic Change*, https://dx.doi.org/10.1787/4ab69cf3-en, Goujon, A. et al. (eds.) (2021[12]), *The Demographic Landscape of EU Territories: Challenges and Opportunities in Diversely Ageing Regions*, EUR 30498 EN, Publications Office of the European Union, Luxembourg, and Jacobs-Crisioni, C. et al. (n.d.[13]), *Development of the LUISA Reference Scenario 2020 and Production of Fine-Resolution Population Projections by 5 Year Age Group*.

The projections for primary schools show that while the number of students is expected to increase in only a handful of urban municipalities including Tallinn and Tartu, the number of schools can increase in some rural municipalities close to cities such as Kastre near Tartu and Viljandi (Figure 4.14). Nevertheless, the large majority of rural municipalities is expected to see a decrease in both students and schools if the school network adapts to future demand. These changes are substantial in some remote municipalities such as Alutaguse.

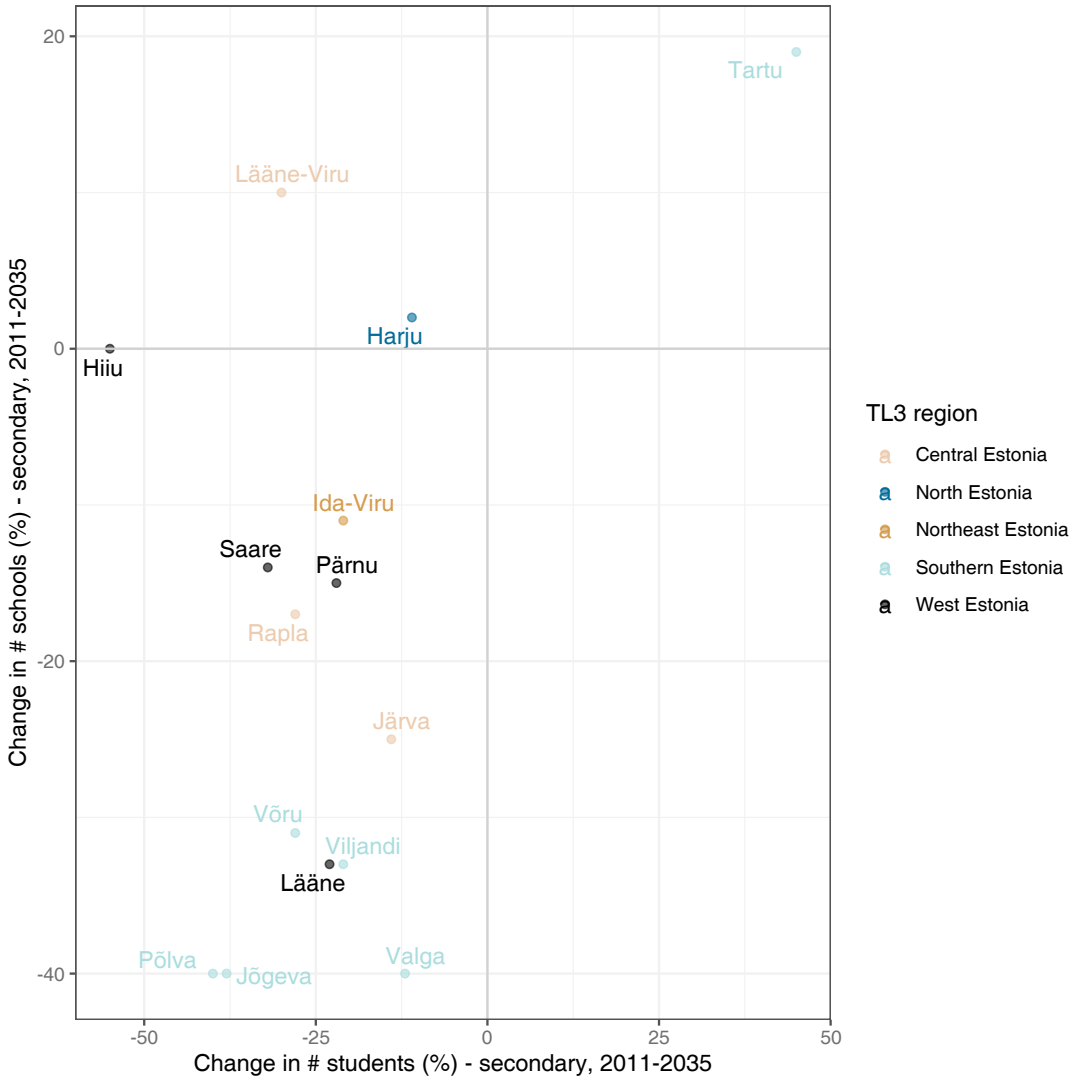
Figure 4.14. Change in number of primary students and schools by municipality, 2011-35



Note: Degree of urbanisation classification based on 2011 data. Annual costs calculated at schools.
Source: Author's elaboration based on OECD/EC-JRC (2021[4]), *Access and Cost of Education and Health Services: Preparing Regions for Demographic Change*, https://dx.doi.org/10.1787/4ab69cf3-en, Goujon, A. et al. (eds.) (2021[12]), *The Demographic Landscape of EU Territories: Challenges and Opportunities in Diversely Ageing Regions*, EUR 30498 EN, Publications Office of the European Union, Luxembourg, Jacobs-Crisioni, C. et al. (n.d.[13]), *Development of the LUISA Reference Scenario 2020 and Production of Fine-Resolution Population Projections by 5 Year Age Group*, and Eurostat (2021[11]), *Degree of Urbanisation (DEGURBA)*, https://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/population-distribution-demography/degurba (accessed on 1 February 2021).

Regarding secondary education, only Harju, Lääne-Viru and Tartu are expected to have more schools in 2035 compared to 2011 (Figure 4.15). Unlike Tartu, both Harju and Lääne-Viru will themselves experience a decrease in students but will at the same time have new schools to serve the needs of growing surrounding areas. On the other hand, all counties of Southern Estonia including Jõgeva, Põlva and Valga and Lääne on the west coast will face the largest decreases in the number of secondary schools following strong projected decreases in the number of students.

Figure 4.15. Change in number of secondary students and schools by county, 2011-35

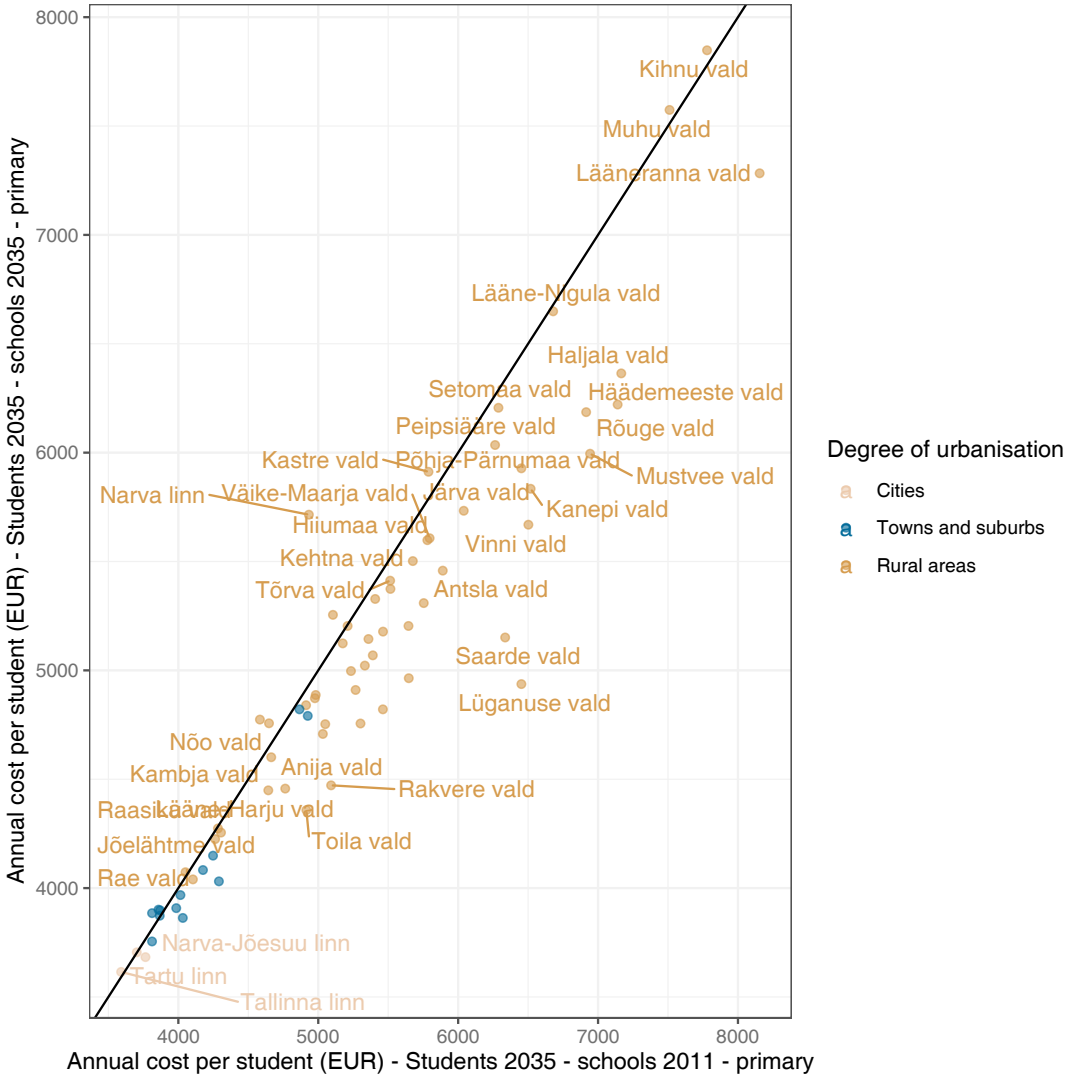


Note: Annual costs calculated at schools.

Source: Author's elaboration based on OECD/EC-JRC (2021[4]), *Access and Cost of Education and Health Services: Preparing Regions for Demographic Change*, https://dx.doi.org/10.1787/4ab69cf3-en, Goujon, A. et al. (eds.) (2021[12]), *The Demographic Landscape of EU Territories: Challenges and Opportunities in Diversely Ageing Regions*, EUR 30498 EN, Publications Office of the European Union, Luxembourg, and Jacobs-Crisioni, C. et al. (n.d.[13]), *Development of the LUISA Reference Scenario 2020 and Production of Fine-Resolution Population Projections by 5 Year Age Group*.

Finally, as Figure 4.16 shows, the future costs differential from keeping the present school network versus adapting it vary across municipalities and counties. Small rural municipalities such as Saarde in Pärnu and Lüganuse in Ida-Viru (furthest away from the 45 degree line) face annual costs of at least EUR 1 000 per student above the annual costs they would experience if the school network was adapted to the future demand. On the other hand, for a significant share of municipalities, primary school annual costs would remain at similar levels even without school network adaptation. At the county level, only Jõgeva faces the most significant differences in cost from policies that maintain present secondary schools into the future.

Figure 4.16. Annual costs per primary school student by municipality under two school network adaptation scenarios, 2011-35



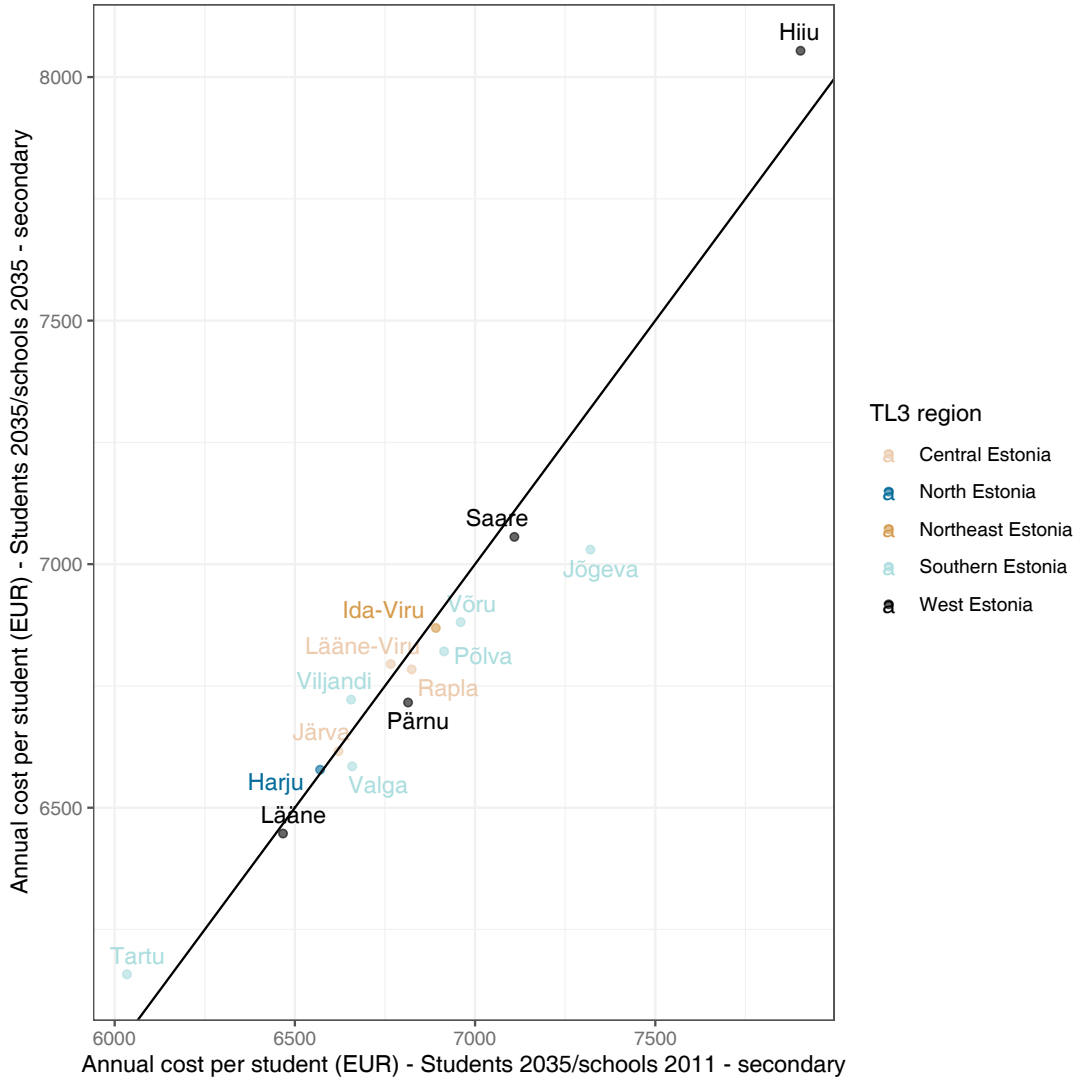
Note: Degree of urbanisation classification based on 2011 data. Excludes one observation for primary school level (Vormsi, EUR 13 425 and EUR 7 910) for visual purposes.

Source: Author's elaboration based on OECD/EC-JRC (2021[4]), *Access and Cost of Education and Health Services: Preparing Regions for Demographic Change*, https://dx.doi.org/10.1787/4ab69cf3-en, Goujon, A. et al. (eds.) (2021[12]), *The Demographic Landscape of EU Territories: Challenges and Opportunities in Diversely Ageing Regions*, EUR 30498 EN, Publications Office of the European Union, Luxembourg, Jacobs-Crisioni, C. et al. (n.d.[13]), *Development of the LUISA Reference Scenario 2020 and Production of Fine-Resolution Population Projections by 5 Year Age Group*, and EC (2021[9]), *GHSL - Global Human Settlement Layer - GHS-SMOD*, European Commission, https://ghsl.jrc.ec.europa.eu/download.php?ds=smod (accessed on 1 February 2021).

In summary, school consolidation will have to continue in the next decades in most municipalities. At the same time, a number of urban and suburban municipalities will have to deal with increasing capacity. The results show that school network adaptation to future demand can be achieved without increasing travelled distances. Still, a number of small schools in remote areas operating at high costs will have to remain open at relatively high costs for decades to ensure access. Comparatively, increasing within school efficiency can lead to major cost savings that can outpace the increase in costs associated with the decline in future

demand for educational services. Before turning to the conclusions and recommendations of this chapter, the next section discusses digital provision for education services.

Figure 4.17. Annual costs per secondary school student by municipality under two school network adaptation scenarios, 2011-35



Source: Author's elaboration based on OECD/EC-JRC (2021[4]), *Access and Cost of Education and Health Services: Preparing Regions for Demographic Change*, https://dx.doi.org/10.1787/4ab69cf3-en, Goujon, A. et al. (eds.) (2021[12]), *The Demographic Landscape of EU Territories: Challenges and Opportunities in Diversely Ageing Regions*, EUR 30498 EN, Publications Office of the European Union, Luxembourg, and Jacobs-Crisioni, C. et al. (n.d.[13]), *Development of the LUISA Reference Scenario 2020 and Production of Fine-Resolution Population Projections by 5 Year Age Group*.

Digital education provision in Estonia: Opportunities and challenges

Estonia has recently increased its efforts to digitalise its education system, including vocational education and training (VET). Despite the progress made in recent years, Estonia still faces significant challenges from digital skills to broadband connectivity.

This section first discusses recent efforts to digitalise education, especially in the access to and use of technological devices. It then describes how Estonia is preparing vocational education for the challenges of tomorrow despite persistent high dropout rates and low transition from VET to higher education. Finally, the section sheds light on the Estonian shortcomings in the area of digitalisation, in particular with regard to the digital skills of teachers and urban-rural connectivity gaps.

Recent government strategies to digitalise education show encouraging results

In the framework of the Lifelong Learning Strategy, the Estonian government's education reference document for 2014-20, Estonia implemented a digital transformation programme to improve the digital skills of teachers and students and to digitalise learning tools across all of the territory, including small towns and rural areas.

At the end of 2021, the Estonian Ministry of Education and Research has adopted the Education Strategy 2021-2035[4] in parallel to Estonia's long-term reform plan Estonia 2035, which serves as the basis for planning the use of incoming EU funds (Estonian Ministry of Education and Research, 2019[14]). This educational comprehensive strategy has several objectives in the field of digitalisation, including:

- Develop and use digital solutions in order to foster educational innovation as well as the diversification and personalisation of education (e.g. assessment for learning, raising awareness of the opportunities and risks of the information society).
- Increase the acquisition of vocational and professional skills, including digital skills.
- Promote more efficient use of digital resources and improved working conditions (including through digital tools and solutions) for teachers.

Other initiatives such as the EDULAB project have aimed at increasing the use of new technologies and digital tools in the school system. This project enables schools and researchers to develop innovative educational technologies and to promote co-creation methods for connecting educational innovation and practice. The EDULAB project also offers an online platform where teachers help and consult each other on using technological resources (Burns and Gottschalk, 2020[15]).

Today, all Estonian schools use e-school solutions, such as the web applications eKool and Stuudium to improve organisation and collaboration between teachers, parents and students, or the e-Schoolbag portal (*e-koolikot*) for digital learning materials, among many others. In addition, 95% of the schools have participated in the ProgeTiger technology programme to introduce subjects such as engineering sciences, design and technology and ICT in the school curricula.

According to the Programme for the International Assessment of Adult Competencies (PIAAC), which provides internationally comparable data on adults' proficiency in key information-processing skills, 99% of Estonian teachers use computers at work more frequently than teachers in 16 countries included in the sample,[5] and most are satisfied with their computer skills (Valk, 2013[16]). On the students' side, according to PISA 2018, 97% of Estonian students have access to Internet at home. Estonian rural areas are also better equipped than city schools in terms of available computers per student at modal grade (OECD, 2021[1]). In addition, 90% of Estonian children feel satisfied with digital studying from home, 80% of them report good access to needed devices – a larger proportion than in other countries – and 70% have started to use new study methods and tools of communication when studying from home (Telia Company, 2020[17]).

Estonia plans to make VET future-ready despite remaining challenges

Government efforts in the field of digitalisation of education also include VET. In addition to the Vocational Educational Institution Act (*Kutseõppeasutuse seadus*) of 2013 which had among its objectives to modernise the infrastructure of VET, national programmes support the development of digital skills via a

holistic approach and result-oriented use of learning technologies (Cedefop, 2017[18]). Vocational schools also use the above-mentioned e-Schoolbag portal as well as the Study Information System (*Õppeinfosüsteem*, ÕIS), a digital system containing information about study programmes and timetables, and allowing for examination registrations (OECD, 2020[19]).

On the matching of vocational students to labour market needs, since 2015, the OSKA labour market needs monitoring and forecasting system serves as a platform for employers, educational institutions and the public sector to discuss how to evaluate labour and skills needs of key sectors, including ICT. According to a 2016 sectoral report on ICT, Estonia needed a total of 37 000 ICT professionals by 2020 in order to ensure that the number of ICT professionals matches the development needs of the country in the ICT sector and other economic sectors. OSKA's forecasting results are used for career counselling, curriculum development and strategic planning at all education levels, including VET (Cedefop, 2017[18]).

Despite digitalisation efforts, vocational education in Estonia still faces significant challenges. In countries such as Austria, Sweden or the United States, more than 10% of post-secondary VET graduates entered higher education, while in Estonia this rate was 6.9% in 2019/20.[6] Recent data from 2020 suggests nevertheless that around a quarter (24%) of students who enter post-secondary VET in Estonia already have a higher education diploma. In 2020, 19.2% of all students who start vocational secondary education dropped out during their first year of studies and 9.4% did not continue studying either in VET or in general education the next year after they dropped out. In addition, few upper secondary VET graduates pursue the additional bridging year to access higher education as this means losing the public benefits and social guarantees they receive as students (Musset et al., 2019[20]).

The digital skills and urban-rural divides are still a challenge to overcome

While digital skills in Estonia are lower than those of its northern neighbours when looking at internationally comparable data (Nordic Co-operation, 2015[21]),[7] rural-urban gaps persist. In 2011/12, 29% of persons in Estonia did not have sufficient technical computer skills to undertake cognitive tests on the interviewer's computer, 5 percentage points above the international average and more than twice as high as countries such as Denmark, Norway or Sweden. In addition, in Estonia, 31% of individuals living in rural areas have basic digital skills, in contrast with 68% in cities. Regarding connectivity, in 2020, cable networks covered only 23.6% of rural households (76.7% of all households in Estonia) and fixed very high-capacity network (VHCN) only covered 20.5% of rural households (71% in Estonia) (EC, 2021[22]).

Furthermore, teachers' low digital skill levels have represented a major challenge for Estonia in the past, especially because of the high proportion of older staff among teachers. According to a PIAAC study published in 2013, only 27% of Estonian teachers had good skills in problem-solving in technology-rich environments (PS-TRE)[8] (scoring at the proficiency levels 2 or 3), significantly below the average of 16 countries (46%). Moreover, the proportion of high-skilled in PS-TRE (levels 2-3) was lower among teacher education graduates than among higher education graduates (Valk, 2013[16]). These gaps may be associated with a negative correlation between PS-TRE skills and age (Nordic Co-operation, 2015[21]) and may particularly affect rural areas where teaching staff is older (Echazarra and Radinger, 2019[23]).

According to a satisfaction survey conducted by the Estonian Ministry of Education and Research, 66% of teachers stated they have sufficient digital skills in 2018, with this share increasing to 70% in 2020. A 2018 teacher satisfaction survey conducted by the Estonian Ministry of Education and Research showed that teachers self-assess their own digital skills as insufficient and only 30% of teachers stated in the 2018 OECD Teaching And Learning International Survey (TALIS) that they felt sufficiently prepared to use ICT in teaching. Nevertheless, according to TALIS 2018, Estonia is one of the OECD countries where ICT skills for teaching were most included in teachers' professional development activities (EC, 2020[24]).

Policy recommendations

Based on the assessment developed in the previous sections, this section provides recommendations to help Estonia adapt its school network and achieve the goal of ensuring access to high-quality education for students, regardless of where they live. It also presents some common insights for policies across all service sectors that stem from the analyses of education networks conducted in this chapter.

Focus on training and career incentives to attract teachers to rural schools

The issue of shortages of newly qualified teachers that disproportionally affects rural areas could result in future rural-urban gaps in quality, even with the current mechanisms to ensure the alignment of wages in rural schools with national levels. Rural areas need to ensure clear incentives for new teachers, as well as mechanisms to compensate for the specificities of rural schools, including not only small and multi-grade classroom teaching but also possible feelings of isolation and long travel times. In this sense, the incentives to become a teacher in a small rural school need to go beyond lump-sum financial aid.

The current context requires a special emphasis on incentives to ensure a better assignment of human resource funds within rural schools, for instance by assuming more flexibility in roles and retirement plans for older staff and strong career and training incentives for newly qualified staff, including on digital skills. They could also evaluate the current attractiveness of part-time contracts as a significant share of teachers in rural areas work on a part-time basis. As the responsibility for the strategic planning of human resources in basic schools falls under the responsibilities of municipalities, the government should keep close track of performance indicators in small and shrinking municipalities and act to bridge capacity gaps, for instance by actively promoting managerial capacity sharing across neighbouring municipalities.

To bridge rural-urban gaps in teacher shortages, Estonia could consider additional benefits for new rural teachers – especially itinerant teachers – including flexible work hours, fewer contact hours per week and/or rotation systems. These policies should in any case be mindful of the needs of women in rural areas and their families, as the overwhelming majority of teachers in Estonia are women.

Use objective measures of unavoidable costs while allowing more flexibility in the use of funding

Small and sparsely populated municipalities will need to consolidate most of their schools while keeping some small schools open to ensure access to basic education. Because of the small scale of provision and already long travel distances to school, these municipalities will also have the largest unavoidable costs of providing primary education compared to cities, estimated to be on average over 30% in sparse rural areas. The additional cost of not adjusting the school network to future lower demand is largest in the smallest municipalities that also face the highest costs of maintaining old and under-utilised facilities. At the same time, these areas will need to downsize in the number of teachers while facing the most difficulties in attracting qualified, high-performing teachers.

While the inclusion of a fixed coefficient in the education grant system is a first step in the direction of ensuring small rural municipalities are appropriately funded, ideally, the criteria used in the transfer system should not include factors that are under the direct control of municipalities. The unavoidable cost estimates based purely on geographic and demographic factors presented in this chapter represent an example of such criteria. In the OECD context, Sweden uses a similar modelling approach to unavoidable additional costs in education in its territorial equalisation policies. Importantly, the cost and access estimates taken together can also help to signal the feasibility of further consolidation across municipalities.

Furthermore, while block grants have served the purpose of ensuring rural teachers in basic and upper secondary education are not paid significantly below national levels, they may lead to wage inflation in some municipalities and may not represent the best use of resources in the current context of teacher

shortages. Meanwhile, rural municipalities may have other funding needs including funding for teacher skill upgrading and relocation support for new teachers. With more flexibility in the use of funds, municipalities could be better placed to focus on quality objectives such as reducing gaps in the shares of teachers with qualifications and digital training. An option towards increasing flexibility is to phase out earmarked block basic education grants and redirect funds to increase other revenues of local governments, for instance through an equalisation fund. This approach should be accompanied by transparency in the way municipalities allocate funding.

Develop incentives to boost co-operation in education provision across municipalities

Promoting co-operation among municipalities undergoing shrinkage with the aim of increasing the quality of basic education through increased scale and resource sharing will be key in the next decades. Because of a history of lack of quality-oriented co-operation across rural municipalities in Estonia, this may require additional policy actions on top of existing financial incentives for school closures. These could focus for instance on effective incentives to ensure access to dormitories and transportation solutions in co-operation with neighbouring municipalities.

In general, the merger of some of the functions of groups of rural schools could help in achieving the goal of increasing resource sharing across rural schools, ensuring accountability for school principals and increasing the incentives for specialised teachers while maintaining access to school sites. A recent example is the municipality of Põltsamaa,[9] where seven small schools merged into two schools that operate in five locations. When extended to and formalised for groups of municipalities, these types of mergers can have the additional benefit of increasing managerial decision capacities and the connection between school and municipal level decisions which remains an outstanding problem that can worsen as small municipalities become even smaller. Strategic and flexible use of digital education provision use in combination with school clusters can further reduce the need for staff and student travelling.

Furthermore, a modular approach for the integration and combination of school services can aid a joint restructuring process in neighbouring small municipalities. This can work for instance to improve the integration of pre-primary and primary school levels and to separate lower education where there is room for consolidation at the level. Beyond using pre-existing structures such as municipal co-operation organisations at the county level, the central level could actively promote strategic partnerships among urban and suburban municipalities as well as among small rural municipalities, for instance through additional financial incentives for joint municipal projects with clear quality-enhancing goals for students.

Consolidate higher education provision with a functional and strategic view

Estonia has advanced in recent years towards the goal of creating a network of state-run upper secondary schools, in an effort to take control over the consolidation process at that level. While faster consolidation can bring benefits in terms of infrastructure quality and cost efficiency, the placement of schools that assigns each county capital with a facility does not follow a functional view. Placement based on functional service provision areas that also take into account the future demand for education would optimise access to schools and avoid resource duplication. This includes the design of the right incentives and regulations that apply to the same degree to both public and private schools. Furthermore, the placement of upper secondary schools should be more aligned with other spatial planning policies to potentiate the role of newly constructed schools in built environment improvement and service provision integration strategies.

The regional education centres that are part of the Estonian Education Strategy 2021-2035 can help aid the transfer of capacity from the central to the local levels and co-ordinate all stakeholders involved in the strategic provision of vocational education, including local economic actors. More than a political scale such as the county level, this co-operation needs to be done at a level that is fully recognised and supported by the municipalities involved, for instance through bottom-up approaches leading to strategic

partnerships. Moreover, regional education centres need to feed on early support systems in basic schools to support students in their transition from basic to higher education that in the case of many remote municipalities may also involve the physical relocation of students. To close persistent quality gaps, Ida-Viru may require additional investment in high-quality support systems to accompany students not only at the VET stage but throughout their school life.

Further develop demand-responsive transport (DRT) solutions to facilitate access to rural schools

The National Spatial Plan Estonia 2030+ aims to promote the combined use of passenger and public vehicles in low-density areas as well as to increase efficiency by adjusting public transport provision to demand (e.g. sizes of buses, routes, service schedules). In this context, the Ministry of Social Affairs is financing pilot projects for social transport, including DRT in rural areas. The first DRT service in Estonia, based on the passengers' behaviour and needs, has been launched in 2021 in Saaremaa Island, a private initiative part of the international project RESPONSE implemented in close co-operation with the municipality (RESPONSE-Project, 2021[25]). Other initiatives have emerged such as the MoNo bus for mobile youth work near Tartu, which is equipped with basic "tools" for work and serves as a transport vehicle for youth workers visiting villages without youth centres.

Despite the development of these initiatives and the availability of free public transport, school and vocational students in Estonia do not yet have access to transport-on-demand (DRT) services. The latter would allow Estonian rural areas to benefit from flexible transport services according to demand, prioritising flexible pre-bookable transport instead of scheduled services. The provision of DRT services will benefit the entire rural population, from dependent people needing access to basic services to teachers and upper secondary and vocational students – with more flexible schedules – living in remote areas. In Wales, for example, the Bwcabus service has reduced home visits by doctors and average journey times to the nearest employment centre from 52 to 27 minutes (Goodwin-Hawkins, 2020[26]). In France, Résa'Tao, the DRT service of Orléans metropolis and Icilà, the DRT service of the urban community of Sophia Antipolis, regularly cover school transport.

DRT services can incorporate sophisticated software that provides users and drivers with reliable and comprehensive real-time information and the possibility to make last-minute bookings from a mobile application or by phone. The routes, stops and timing of the service are flexibly adapted based on user demand. The software also has powerful algorithms that take into account itineraries, times and vehicle occupancy rates to optimise every trip, which has led to an increase in the rate of passenger grouping.

Finally, policies implementing DRT services can be complemented by other measures, such as the provision of an electrically assisted bicycle service, with the deployment of cycle connections, or the full or partial subsidy of driving licences for young people in rural communities.

Digitalise vocational education to broaden opportunities for rural youth

In general, to close rural-urban gaps in upper secondary outcomes and reduce the high VET dropout rates, Estonia can develop specific strategies to better integrate general and vocational upper secondary schools that serve rural students as well as to better connect VET with the skills needed for tomorrow's labour market. In this respect, the HEInnovate self-assessment tool is particularly interesting for VET schools wishing to explore their entrepreneurial and innovative potential. In addition, with consolidation, distances to upper secondary schools will increase for students in rural remote areas that already face the longest travel distances. In this context, the mechanisms employed should address not only the impact of consolidation on physical access but also the increased mismatch in the educational offer and local market demands, and the reduction in the variety of course offers.

A specific strategy for rural areas is to experiment with new digitally-based models of upper secondary provision that leverage curricula specialisation and high digital skills in Estonia. Vocational students in rural areas could be given the chance to complement their programmes by virtually attending courses offered outside their catchment area. The Estonian authorities should develop a strategy to support rural areas through VET and the OSKA forecasting system. This strategy would monitor not only leading sectors but also rural labour market needs in order to better connect VET with future rural jobs and, in particular, with the digital skills needs of rural employment.

Strengthening training on digital tools in all vocational schools would benefit key sectors for rural areas such as tourism, biotechnology, renewable energies, agri-food or the silver economy. This will require strengthened support for the development of VET teaching staff and student digital skills in using future technologies provided by ICT. The strategy should also encourage stronger collaboration between VET and businesses. This could include setting up talent meetings between final-year university students and small- and medium-sized enterprises (SMEs) in the above sectors as well as other highly demanded sectors such as science, technology, engineering and mathematics (STEM) or digital transformation services to rural areas.

Despite the extensive autonomy of vocational schools in Estonia, these efforts may need explicit government support as they are less likely to arise from private initiatives. They could also be used as a vehicle to ensure the integration of regional development objectives in decisions on VET curricula. This is especially relevant in regions with shrinking areas where a misalignment of VET offer and local needs could contribute to further brain drain.

Develop a common strategy of adaptation to shrinkage across all service sectors

It is imperative to align the adaptation of services in a coherent manner *across* sectors and not just in any one sector in particular. Such integration takes advantage of potential synergies and reduces inefficiencies in the use of fiscal resources. Estonia's existing network of service centres outlined in County-wide Spatial Plans (CSPs) should be better utilised to consolidate municipal services while still maintaining quality across all areas, including sparsely populated regions. This requires a coherent regional framework and strong inter-municipal co-operation, along with financial support from the central government. The integration of services through the service centre network should also bring cost savings based on economies of scale.

The recommendations outlined in this chapter are certainly not unique to the education sector. The need to bridge rural-urban gaps through financial incentives is important not only for teachers but also for other workers in healthcare, social protection and transportation. Digital service provision is also important to further bridge disparities in all services across regions, especially for remote areas that lack quick and convenient transport links to urban centres. Inter-municipal co-operation is critical to ensure a coherent response to shrinkage that maximises synergies across service sectors while preventing a destructive "race to the bottom" and central government incentives targeted toward joint municipal bodies can help in this regard. Developing DRT solutions linking service aggregation centres with residential areas will be much more effective than when implemented for schools alone. Overall, a common strategy of adaptation in Estonia is needed to best adapt service provision in a smart and sustainable manner.

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Notes

[1] Available at https://www.riigiteataja.ee/en/eli/513012014002/consolide/current.

[2] Before the teacher allowance was available to teachers outside Tallinn and Tartu.

[3] Urban areas include cities, cities without municipal status and towns.

[4] Available at https://www.hm.ee/sites/default/files/haridusvaldkonna_arengukava_2035_2810_0.pdf.

[5] Cyprus, the Czech Republic, Denmark, Estonia, Flanders (Belgium), France, Italy, Japan, Korea, the Netherlands, Norway, Poland, Russia, the Slovak Republic, Spain and the United Kingdom (England and Northern Ireland).

[6] Calculations based on OECD (2015[28]).

[7] Estonia is also one of Europe's leading countries for digital skills according to EC's DESI Index (available at https://digital-strategy.ec.europa.eu/en/library/digital-economy-and-society-index-desi-2021), ranking 5th on the human capital dimension in Europe with 62% of Estonians having at least basic digital skills.

[8] Problem-solving in technology-rich environments (PS-TRE) is the ability to use digital technology, communication tools and networks to acquire and evaluate information, communicate with others and perform practical tasks.

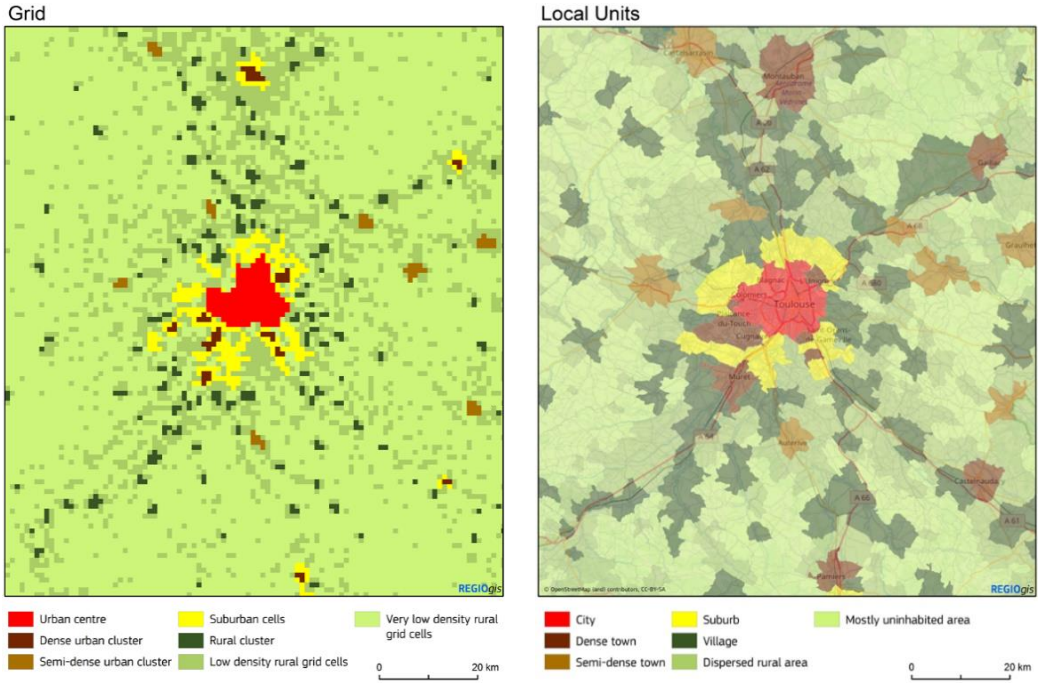
[9] See https://www.poltsamaa.ee/koolid.

Annex 4.A. Degree of urbanisation

The degree of urbanisation was designed to create a simple and neutral method that could be applied in every country in the world. It relies primarily on population size and density thresholds applied to a population grid with cells of 1 by 1 km. The different types of grid cells are subsequently used to classify small spatial units, such as municipalities or census enumeration areas (Annex Figure 4.A.1). The degree of urbanisation was endorsed by the United Nations (UN) Statistical Commission in March 2020 (https://unstats.un.org/unsd/statcom/51st-session/documents/BG-Item3j-Recommendation-E.pdf).

Degree of urbanisation level 1 classifies the entire territory into: i) cities; ii) towns and suburbs; and iii) rural areas. At level 2, towns and suburbs are split into: i) dense towns; ii) semi-dense towns; and iii) suburbs. Rural areas are split into: i) villages; ii) dispersed rural areas; and iii) mostly uninhabited areas. The settlement classification relies on 2015 GEOSTAT population data.

Annex Figure 4.A.1. Degree of urbanisation level 2 grid classification around Toulouse, France



Source: Ehrlich, D. et al. (2019[27]), *GHSL data package 2019: public release GHS P2019*, European Commission, Joint Research Centre, http://dx.doi.org/10.2760/729240.

- Cities have a population of at least 50 000 in contiguous grid cells with a density of at least 1 500 inhabitants per km^2.
- Dense towns have a population between 5 000 and 50 000 in contiguous grid cells with a density of at least 1 500 inhabitants per km^2.
- Semi-dense towns have a population of at least 5 000 in contiguous cells with a density of at least 300 inhabitants per km^2 and are at least 2 km away from the edge of a city or dense town.

- Suburbs have most of their population in contiguous cells with a density of at least 300 inhabitants per km^2 that are part of a cluster with at least 5 000 inhabitants but are not part of a town.
- Villages have between 500 and 5 000 inhabitants in contiguous cells with a density of at least 300 inhabitants per km^2.
- Dispersed rural areas have most of their population in grid cells with a density between 50 and 300 inhabitants per km^2.
- Mostly uninhabited areas have most of their population in grid cells with a density of fewer than 50 inhabitants per km^2.

In this chapter, these categories are collapsed into four categories: i) sparse rural areas (including mostly uninhabited areas and dispersed rural areas); ii) villages; iii) towns and suburbs (including dense and semi-dense towns and suburbs); and iv) cities.

Annex 4.B. Data processing

Basic schools

"Basic schools" include schools offering ISCED level 1 (both Stages I and II) and ISCED level 2 in 2011. It does not include general schools offering ISCED level 3 education, including those offering all prior educational levels. The resulting number of basic schools that fulfil this criterion is 315 schools located in 77 municipalities and serving 48 840 students at those educational levels (i.e. the sum of students only considers students in ISCED levels 1 and 2).

The simulated placement based on actual schools allocates 5-14 year-olds from a 2011 population grid to the same 315 actual schools based on the distance minimisation and balancing algorithm described in detail in the OECD/EC-JRC report (2021[4]). While the number of years is equivalent to ISCED levels 1 and 2 in Estonia (9 years), the age ranges differ, as in Estonia ISCED 1 starts at the age of 7. Nevertheless, the number of allocated students is roughly comparable (42 058). Across degrees of urbanisation, the simulated placement allocates: a larger share of students to sparse rural areas compared to the actual placement (42% versus 36%); a lower share in towns and suburbs (31% versus 37%); roughly the same share in cities and villages (20-21% and 7%).

In the estimations, "costs" include running costs such as salaries and ICT equipment and exclude capital or fixed investments such as school building construction or renovation. The excess of cost in an area is linked to the presence of small schools in areas with low local demand and can therefore be interpreted as a measure of the unavoidable costs of smallness and remoteness. Costs are measured at the place of residency of students so, when aggregated, they are meant to capture the situation experienced by students living in a municipality regardless of whether they attend school within the municipal borders or not.

Actual travelled distances to schools are not available. Travelled distances in the analysis correspond to the number of kilometres travelled by students according to the simulated placement of students to actual schools.

Annex Table 4.B.1. Comparisons on the share of students, teachers and students per teacher between actual and simulated school data, 2011

Degree of urbanisation	Share of students (actual, %)	Share of students (simulated, %)	Share of teachers (actual, %)	Share of teachers (simulated, %)	Students per teacher (actual)	Students per teacher (simulated)
Sparse rural areas	36	42	45	44	8.1	13.0
Villages	7	7	7	7	10.9	13.6
Towns and suburbs	37	31	30	30	12.6	14.2
Cities	21	20	18	19	11.9	14.3

Note: Degree of urbanisation classification based on 2015 data. Basic schools are schools offering ISCED levels 1 and 2.
Source: Author's elaboration based on (OECD/EC-JRC, 2021[4]), (Goujon et al., 2021[12]), (Jacobs-Crisioni et al., n.d.[13]) and (EC, 2021[9]).

Simulated placements

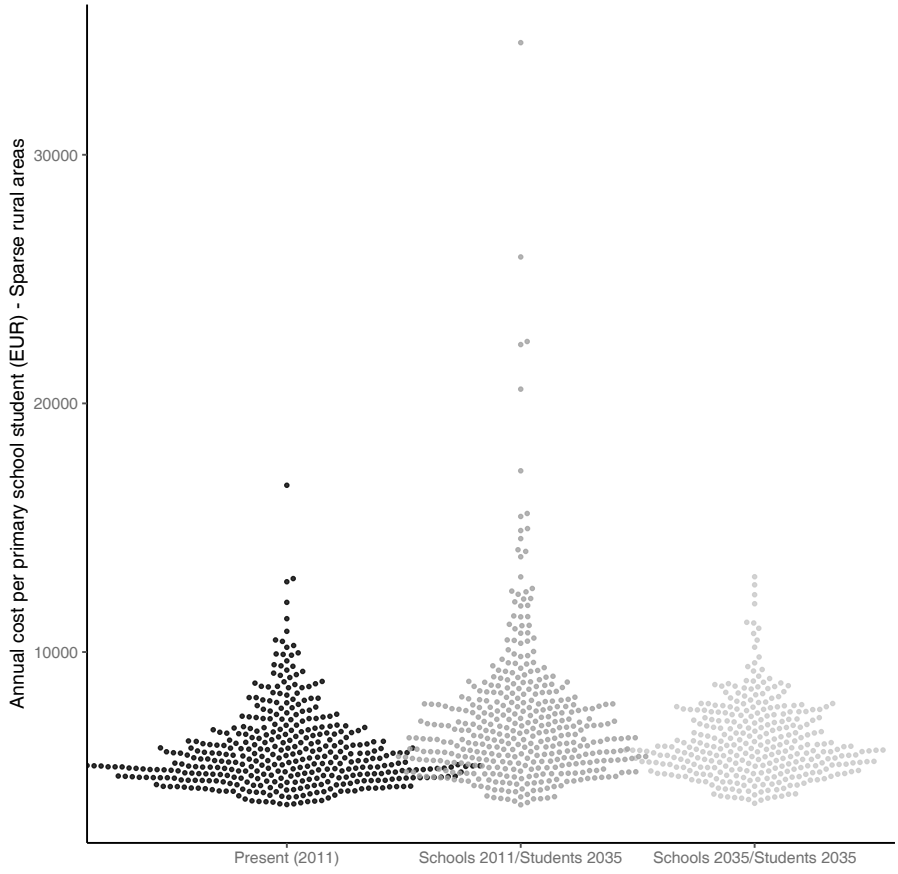
Annex Table 4.B.2. Simulated main education indicators for primary and secondary schools, 2011

Degree of urbanisation	Students	Share (%)	Schools	Share (%)	Teachers	Share (%)	Students per school	Annual cost per student (rel. to cities, %)
Primary schools (ISCED 1)								
Sparse rural areas	20 199	27	410	66	1 574	29	49.3	45
Villages	9 309	12	73	12	687	13	127.5	16
Towns and suburbs	18 842	25	75	12	1 344	25	251.2	6
Cities	26 982	36	65	10	1 831	34	415.1	
Total	**75 332**		**623**		**5 435**		**120.9**	
Secondary schools (ISCED 2 and 3)								
Sparse rural areas	13 498	18	74	35	1 209	20	182	20
Villages	14 758	20	51	24	1 243	21	289	11
Towns and suburbs	18 751	25	39	18	1 486	25	481	4
Cities	28 021	37	47	22	2 125	35	596	
Total	**75 028**		**211**		**6 063**		**355.6**	

Note: Degree of urbanisation classification based on 2015 data. “Estimated” refers to estimated cost based on actual school and student values.
Source: Author’s elaboration based on (OECD/EC-JRC, 2021[4]), (Goujon et al., 2021[12]), (Jacobs-Crisioni et al., n.d.[13]) and (EC, 2021[9]).

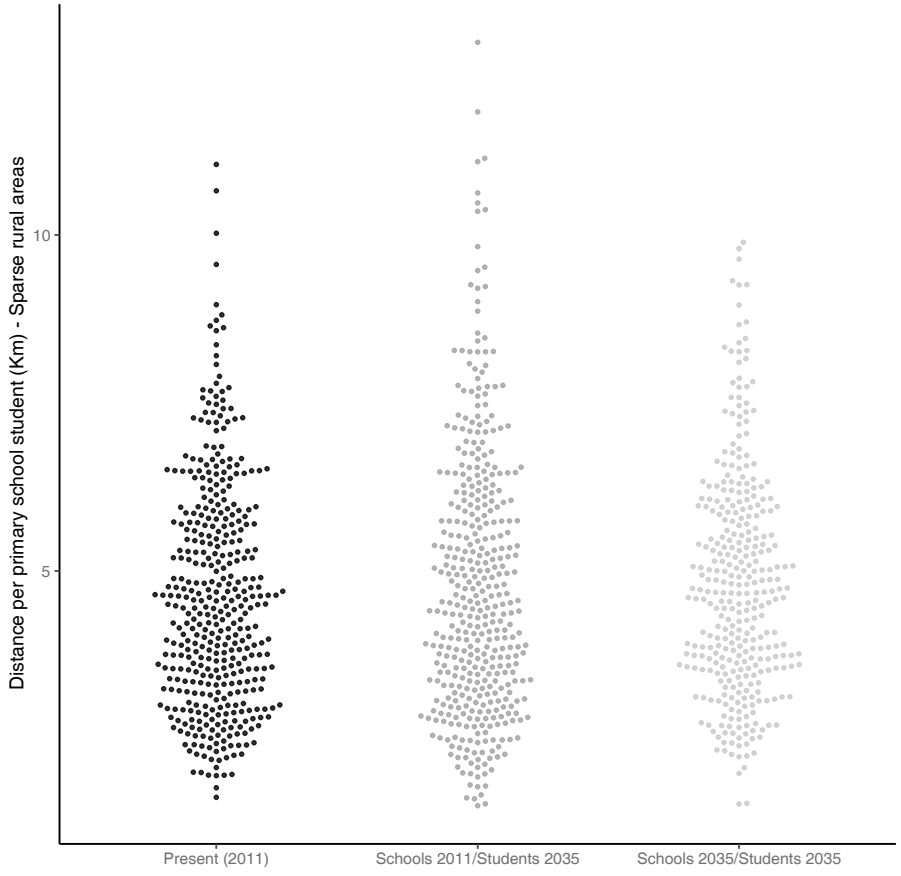
Annex 4.C. School-level results

Annex Figure 4.C.1. Simulated effect of school network policies on annual costs per primary school student in sparse rural areas, 2011-35



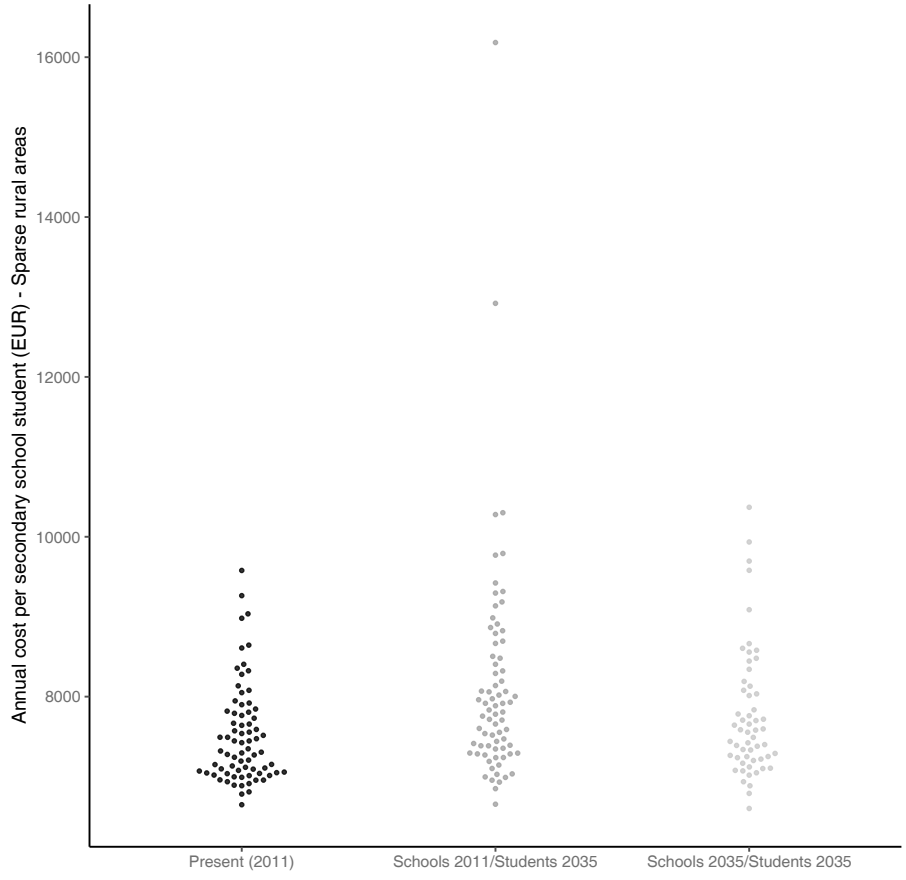
Note: Each dot represents a school. Costs measured at schools. Annual costs calculated at schools.
Source: Author's elaboration based on (OECD/EC-JRC, 2021[4]), (Goujon et al., 2021[12]), (Jacobs-Crisioni et al., n.d.[13]) and (EC, 2021[9]).

Annex Figure 4.C.2. Simulated effect of school network policies on distance to school per primary school student in sparse rural areas, 2011-35



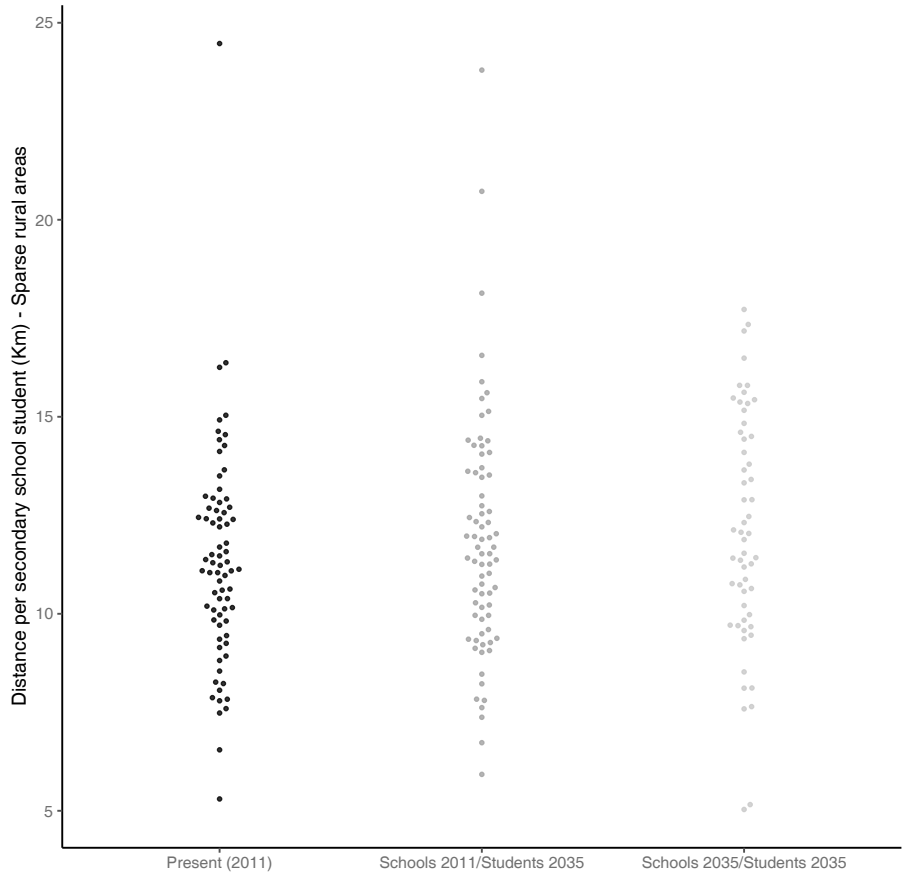
Note: Each dot represents a school. Costs measured at schools. Annual costs calculated at schools.
Source: Author's elaboration based on (OECD/EC-JRC, 2021[4]), (Goujon et al., 2021[12]), (Jacobs-Crisioni et al., n.d.[13]) and (EC, 2021[9]).

Annex Figure 4.C.3. Simulated effect of school network policies on annual costs per primary school student in villages, 2011-35



Note: Each dot represents a school. Costs measured at schools. Annual costs calculated at schools.
Source: Author's elaboration based on (OECD/EC-JRC, 2021[4]), (Goujon et al., 2021[12]), (Jacobs-Crisioni et al., n.d.[13]) and (EC, 2021[9]).

Annex Figure 4.C.4. Simulated effect of school network policies on distance to school per primary school student in villages, 2011-35



Note: Each dot represents a school. Costs measured at schools. Annual costs calculated at schools.
Source: Author's elaboration based on (OECD/EC-JRC, 2021[4]), (Goujon et al., 2021[12]), (Jacobs-Crisioni et al., n.d.[13]) and (EC, 2021[9]).

OECD Rural Studies

Shrinking Smartly in Estonia

PREPARING REGIONS FOR DEMOGRAPHIC CHANGE

Many lower density regions in the OECD face shrinkage, with projections suggesting that half of Europe will need to manage decline in remote regions by 2050. Half of Estonia's counties experienced population decline greater than 25% since 1991. Shrinkage leads to problems including lower municipal revenues, ageing, and greater per capita costs of service and infrastructure provision. Estonia is also the most carbon-intensive economy in the OECD, and heavily utilises its forests and land. To tackle these challenges, the report provides analyses in a number of policy areas to respond to demographic change in a smart and sustainable manner. A policy framework that emphasises a spatially oriented, coordinated approach for responding to shrinkage is developed. The report provides policy recommendations to make land use more efficient and spatial planning more coherent. It suggests ways to improve the transfer system and strengthen the municipal revenue base while encouraging inter-municipal cooperation. It also discusses education, the municipalities' largest spending responsibility, providing recommendations that adapt the school network to shrinkage while ensuring access to high-quality education for all students.

Co-funded by the **European Union** via the **Structural Reform Support Programme**

PRINT ISBN 978-92-64-85061-3
PDF ISBN 978-92-64-98729-6

9 789264 850613