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From labour reserve to effective labour supply: Skills, accessibility and institutional coordination in Northern Hungary

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Abstract

This article develops a policy-oriented framework for interpreting labour supply in peripheral regional labour markets. The central argument is that a measurable labour reserve and an effective labour supply are not the same. People who are statistically available for work may remain outside a viable match because of qualification gaps, commuting constraints, incompatible schedules, caring responsibilities, wage-cost imbalances or fragmented institutional support. Northern Hungary is used as a regional case because its labour market combines long-term demographic pressure, uneven settlement structures, persistent territorial differences and employer recruitment difficulties. The study applies a structured synthesis of official Hungarian and European statistics together with peer-reviewed research on skills mismatch, commuting, human capital and regional labour-market adjustment. Rather than estimating a new causal model, it separates the conversion of labour reserve into effective labour supply into four filters: skill and occupational fit; spatial and temporal accessibility; economic viability of taking and keeping a job; and institutional coordination. The framework shows why training alone, vacancy creation alone or mobility support alone can produce weak results when another filter remains binding. The policy implication is a shift from counting available people and vacancies toward diagnosing the specific barriers that prevent viable matches. For peripheral regions, labour-market governance should connect vocational and adult education, employer workforce planning, transport, local services and targeted mobility support within the same territorial diagnostic process.

Keywords:
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Regional labour market Northern Hungary
Skills mismatch
Spatial mismatch.

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1. Introduction

Regional labour-market debates often begin with two headline quantities: how many people are available for work and how many jobs are available. In a peripheral region, this is an incomplete starting point. A registered jobseeker, an inactive person who could potentially work and an unfilled vacancy are statistical categories; they do not automatically form a viable employment relationship. The distance between statistical availability and real recruitability is where a large part of the regional matching problem is located.

Northern Hungary provides a useful setting for examining this distinction. Borsod-Abaúj-Zemplén, Heves and Nógrád counties contain industrial centres, smaller towns, rural settlements and commuting zones with markedly different access to jobs and services. The region has also experienced long-term demographic

pressure and uneven labour-market recovery. Research on Hungary has shown that regional averages can conceal strong internal differences in human capital, commuting possibilities and adjustment after economic shocks (Alpek, Tésits, & Bokor, 2016; Berkes, 2021; Molnár, Dániel, Molnárné Barna, & Kozma, 2024).

The practical problem is therefore not only whether labour exists, but whether people can be converted into a sustainable labour supply for actual jobs. A person may possess a qualification but not the qualification required locally. A vacancy may exist within the same county but be unreachable at the beginning or end of a shift. A wage may appear acceptable in gross terms but become unattractive after transport, childcare or housing costs. Training may raise formal competence but still fail to create employment if employers, schools and mobility systems are poorly coordinated. These are not separate anomalies. They are different points at which a potential match can fail.

This article introduces the concept of effective labour supply as an analytical bridge between formal labour reserve and actual recruitment capacity. The research question is: what conditions must be satisfied before a statistical labour reserve becomes an effective labour supply in a peripheral regional labour market? The purpose is not to produce another demographic description of Northern Hungary, nor to estimate the effect of population decline on employment. The contribution is a diagnostic framework that identifies four filters through which potential workers must pass before a stable employment match becomes realistic.

The article has a policy orientation. It treats skills, mobility, work conditions and institutional coordination as connected dimensions of labour-market governance. The argument is deliberately practical: if the binding constraint is incorrectly diagnosed, a technically reasonable intervention may still have little effect. More training does not solve a transport problem; a new bus route does not solve an occupation-specific skill gap; and a vacancy subsidy does not solve an employment proposition that remains economically unviable for the worker.

2. Conceptual Framework: From Labour Reserve to Effective Labour Supply

Labour economics distinguishes between population, labour force, employment and unemployment, but regional practice often uses these categories as if they also measured recruitability. They do not. Human-capital theory emphasises that education, skills and work experience affect productivity and labour-market opportunities (Becker, 1993). Skills-mismatch research further shows that available qualifications may not correspond to the level, field or practical requirements of available jobs (McGuinness, Pouliakas, & Redmond, 2018). Migration and mobility research adds that the ability to move or commute is unequally distributed across people and places (Harris & Todaro, 1970; World Bank, 2023).

For regional workforce planning, it is useful to distinguish three levels. The first is the potential labour reserve: people who are unemployed, inactive but potentially mobilisable, or otherwise available for entry or re-entry into employment. The second is the matched labour reserve: people whose skills and occupational profile are sufficiently close to a concrete job opportunity. The third is effective labour supply: people for whom the match is not only technically possible but also spatially accessible, temporally feasible and economically sustainable.

This distinction matters because policy instruments act on different transitions. Education and reskilling mainly affect the movement from potential reserve to matched reserve. Transport and schedule coordination affect accessibility. Wage structures, childcare, housing and working conditions affect the economic and practical viability of employment. Institutional coordination determines whether these elements are assembled around the same person, occupation and local labour-market area.

The proposed framework therefore treats effective labour supply not as a fixed stock but as a conditional outcome. It emerges when several filters are passed simultaneously. This interpretation does not require every barrier to be removed for every person. It requires policy and employers to identify which barrier is binding for which group and location.

2.1. Skill and Occupational Fit

The first filter is whether the knowledge, qualification and recent experience of a potential worker are sufficiently aligned with employer demand. Qualification level alone is not enough. Mismatch can be vertical, horizontal or task-specific, and it may concern practical competence, digital literacy, certification or recent work experience rather than formal schooling alone (McGuinness et al., 2018).

In peripheral labour markets the problem can be intensified by a thin occupational structure. A person may be employable in general but not for the vacancies that are locally available. Conversely, an employer may define a vacancy so narrowly that the available labour reserve is excluded even where adjacent skills could be developed through short-cycle training or supervised entry. The relevant question is therefore not simply whether the worker is qualified, but how large the distance is between existing competence and job requirements, and whether that distance can be closed at reasonable cost.

2.2. Spatial and Temporal Accessibility

The second filter is access. showed that commuting in disadvantaged Hungarian areas is group-specific and cannot be reduced to geographical distance alone. Travel time, frequency of public transport, the

availability of a private vehicle and the timing of connections influence whether employment is practically reachable.

Temporal accessibility deserves the same attention as spatial accessibility. A workplace may be thirty kilometres away and still be unreachable if the first bus arrives after the shift begins. A parent may live close to an industrial zone but be unable to accept rotating shifts because childcare does not cover the required hours. These cases are frequently recorded statistically as labour shortage on the employer side and non-employment on the worker side, although the underlying problem is the architecture of daily mobility.

Treating transport as labour-market infrastructure changes the policy question. The relevant unit is not the county border but the functional commuting area around actual workplaces. Timetable coordination, employer transport, travel subsidies and shift design can therefore alter the size of effective labour supply without changing the number of residents or the formal qualification structure.

2.3. Economic Viability and Job Sustainability

The third filter concerns whether taking a job produces a credible net improvement for the worker or household. Classical migration and labour-allocation models emphasise expected returns rather than nominal opportunities (Harris & Todaro, 1970; Todaro & Smith, 2020). At regional level the same logic applies to commuting and job acceptance. Gross wages are evaluated together with transport costs, childcare, housing, work schedules, employment security and career prospects.

This point is especially important when employers describe a shortage in occupations that remain difficult to fill despite a measurable labour reserve. The shortage may be partly a price and conditions problem rather than a pure absence of people. This does not mean that every vacancy can or should be solved through wage increases. It means that recruitment difficulty should be decomposed before being labelled a skills shortage. Otherwise, training policy may be used to respond to a problem whose main source lies in work organisation or the total cost of participation.

Sustainability also matters after recruitment. Effective labour supply is not fully realised when a worker enters a job but leaves quickly because the employment arrangement is unstable. Retention therefore belongs to labour-supply analysis, but here it is treated narrowly: not as a general demographic strategy, but as evidence that a match has remained viable beyond entry.

2.4. Institutional Coordination

The fourth filter is institutional. Education providers, employers, local authorities, transport operators and employment services often hold different pieces of the same problem. Fragmented responsibility can produce interventions that are individually reasonable but collectively ineffective. A training programme may prepare workers for occupations for which local employers are not recruiting. Employers may report shortages without providing schools with sufficiently precise information about tasks and entry requirements. Transport decisions may be taken without reference to shift patterns.

The European Commission's work on regional talent and the OECD's analysis of territorial inequalities both point toward the importance of coordinated regional capacity rather than isolated programmes (European Commission, 2023; OECD, 2023). For Northern Hungary, institutional coordination should therefore be understood as a labour-market production factor. It determines how quickly information about demand is translated into training, mobility and employment arrangements.

3. Materials and Method

The article applies a structured policy-synthesis design. It does not estimate a new causal model and does not use individual-level survey responses. The evidence base consists of three source groups: official Hungarian and European statistical material describing regional labour-market conditions; peer-reviewed research on skills mismatch, human capital and commuting; and policy literature on territorial retention and regional labour-market governance.

The geographical frame is the Northern Hungary NUTS 2 region and its three counties: Borsod-Abaúj-Zemplén, Heves and Nógrád. National and European evidence is used as context and is not mechanically transferred to the regional level. The analysis focuses on mechanisms that can explain why a measurable labour reserve does not automatically translate into recruitable labour.

The analytical procedure had four stages. First, evidence was classified according to the type of barrier it described: skill and occupational fit, accessibility, economic viability or institutional coordination. Second, each barrier was linked to the labour-market transition it can block. Third, interventions were assigned only where there was a plausible operational connection between the barrier and the policy instrument. Fourth, the resulting framework was checked for substitution errors: cases in which a commonly used intervention would not address the identified constraint.

This design is interpretive rather than causal. Its purpose is diagnostic clarity. The framework should therefore be read as a tool for structuring regional labour-market decisions, not as an estimate of the numerical contribution of each barrier.

4. Analytical Findings: Four Points Where Labour Supply is Lost

The synthesis suggests that labour supply can be lost at four different points before a stable employment relationship is formed. These losses are analytically distinct, even when they appear in statistics as the same outcome: an unfilled vacancy, unemployment, inactivity or rapid turnover.

The first loss occurs before matching, when qualifications and occupational profiles do not correspond. The second occurs after a plausible skill match has been identified but the job is not spatially or temporally accessible. The third occurs when access is possible but the employment proposition is not economically or practically sustainable. The fourth occurs when institutions fail to connect information and interventions quickly enough to resolve the preceding barriers.

These stages help explain why the same region can simultaneously report unemployment and recruitment difficulty. The two indicators are not necessarily contradictory because they measure different sides of the matching process. A regional labour reserve can be numerically visible while a much smaller effective labour supply is available to specific employers at specific times and locations.

Regional averages can further obscure where the loss occurs. Urban centres and industrial zones may have stronger job demand and better transport links than smaller settlements. Human capital is also spatially concentrated in Hungarian regional centres (Berkes, 2021). As a result, a county-level unemployment rate may combine several local labour markets whose practical recruitment conditions are very different.

The framework also changes how shortage should be diagnosed. If a vacancy remains open, the first question should not automatically be 'where can more workers be found?' It should be 'at which filter is the potential match failing?' The answer determines the intervention.

5. A Diagnostic Matrix for Regional Labour-Market Policy

Table 1 translates the framework into a diagnostic sequence. The purpose is to prevent policy substitution: applying a familiar instrument simply because it is available, rather than because it addresses the actual constraint.

Table 1. Diagnostic matrix for converting labour reserve into effective labour supply.

Filter	Typical failure	Diagnostic question	Primary intervention	Main actors
Skill / occupation	Worker and vacancy are not technically matched	What exact competence or occupational gap prevents entry?	Targeted training; supervised entry; modular reskilling	Employers; VET/adult education; employment services
Spatial / temporal access	The job exists but cannot be reached reliably	Can the worker reach actual shift times at acceptable cost?	Timetable coordination; employer transport; commuting support; shift redesign	Employers; transport operators; municipalities
Economic viability	The match is possible but unattractive or unsustainable	Does employment produce a credible net gain after costs and constraints?	Pay and benefit review; predictable schedules; childcare/housing partnerships	Employers; municipalities; social services
Institutional coordination	Resources exist but are disconnected	Who assembles training, access and recruitment around the same need?	Shared diagnostics; local labour-market coordination; outcome monitoring	Employers; chambers; education; local/regional authorities

5.1. When Training is the Right Intervention

Training is appropriate when the dominant gap is a specific and remediable competence difference. In this case, the programme should begin with a defined occupational demand and end with a credible entry route. General training without an employment connection can raise formal qualifications while leaving the effective labour supply unchanged.

Employer participation is important because job requirements often contain tacit or practical elements that are not visible in occupational classifications. Short modular programmes, supervised workplace learning and recognition of adjacent skills can reduce the distance between existing competence and job requirements. The objective is not training volume but conversion into viable matches.

5.2. When Mobility is the Right Intervention

Mobility support is appropriate when workers and jobs are reasonably matched in skills but separated by time, cost or transport. Here the relevant intervention may be timetable coordination, employer buses,

targeted commuting subsidies or adjustment of shift start and end times. The effect can be immediate because no new qualification has to be created.

This is also the area where local government and employer decisions can interact most directly. A small change in a transport connection can alter the feasible recruitment area of several workplaces, while an employer's shift redesign can make an existing public route usable. These interventions are often cheaper than repeated recruitment campaigns directed at an inaccessible labour pool.

5.3. When the Employment Proposition is the Constraint

When workers are qualified and the workplace is reachable, persistent recruitment difficulty should trigger examination of the total employment proposition. Wage level is part of this assessment, but not the only component. Predictability of schedules, contract stability, use of qualifications, development opportunities and household costs can determine whether a formally available job is attractive enough to enter and remain in.

This diagnosis requires care because employer capacity varies. Smaller organisations may not be able to solve housing or childcare constraints alone. The appropriate response may therefore involve shared instruments rather than firm-level benefits: local housing initiatives, childcare coordination, transport support or partnerships with training providers.

5.4. When Coordination is the Binding Constraint

Some problems persist not because the required resources are absent, but because they are disconnected. A school may have training capacity, an employer may have vacancies and a transport operator may have an underused route, yet no institution is responsible for assembling them into one operational solution.

For this reason, regional labour-market governance requires a convening function. It does not necessarily require a new organisation. Existing county, municipal, chamber, education or employment-service structures can perform the role if responsibilities are clear, information is timely and outcomes are measured in terms of sustained employment rather than programme participation.

5.5. Operational Monitoring Indicators

A diagnostic framework becomes useful only when it changes what is monitored. Table 2 proposes indicators that distinguish programme activity from labour-market conversion. The emphasis is on whether a potential worker moves through the relevant filter and remains in a viable employment relationship.

Table 2. Suggested monitoring shift from programme activity to labour-market conversion.

Problem area	Activity measure	Conversion measure	Interpretation
Skills	Number completing training	Share entering a related job within a defined period	Tests whether training closes a real demand gap
Accessibility	Transport support or routes provided	Share able to reach target shifts reliably	Tests whether mobility intervention expands the usable recruitment area
Recruitment	Vacancies advertised or filled	Recruitment time and early retention	Separates entry from sustainable matching
Coordination	Partnership meetings or agreements	Time from identified shortage to joint intervention	Tests whether institutions convert information into action

6. Discussion

The effective-labour-supply framework offers a different interpretation of peripheral labour-market weakness. It moves the analytical focus away from population counts and vacancy counts toward the conversion process between them. Demographic decline remains important because it can narrow the potential labour reserve, but it does not identify which workers are recruitable for which jobs. Likewise, a falling unemployment rate does not demonstrate that recruitment problems have disappeared.

This distinction is relevant beyond Northern Hungary. Regions with ageing populations, selective migration and dispersed settlement structures may increasingly face simultaneous labour scarcity and labour-market exclusion. In such settings, the margin of adjustment becomes smaller: losing a technically qualified and mobile worker has greater consequences, while bringing an inactive person into employment may require several barriers to be addressed at once.

The framework also helps clarify institutional accountability. Skills policy should be judged by whether it closes identifiable competence gaps. Transport policy should be judged partly by whether it connects residential areas to real working-time patterns. Employer workforce planning should distinguish between skill shortages and unattractive or inaccessible jobs. Local social policy should recognise that childcare and housing

can influence labour-market participation even though they are not conventionally classified as employment instruments.

There is also a methodological implication. Regional labour-market dashboards should avoid treating the labour reserve as a single stock. Where data permit, it is more informative to distinguish qualification fit, commuting feasibility and other participation constraints. Even a qualitative diagnostic used consistently across employers and settlements would improve policy design by showing which barriers recur and which are location-specific.

The framework has limitations. It is not a causal model and does not estimate how many people are lost at each filter. It also does not capture every determinant of labour-force participation, including health, informal care, discrimination or individual preference in sufficient depth. Its purpose is narrower: to provide a transparent structure for deciding why an apparently available worker and an apparently available job may still fail to form a sustainable match.

7. Policy Implications for Northern Hungary

Three practical conclusions follow. First, workforce policy should be organised around functional labour-market areas rather than administrative averages wherever possible. The relevant geography is the area from which a workplace can realistically recruit under actual transport and shift conditions.

Second, interventions should be sequenced. A skills gap should be addressed before mobility support is designed around a candidate who cannot perform the job; mobility should be solved before recruitment incentives are increased for a workplace that remains unreachable; and retention measures should be considered once entry is viable. This sequencing does not imply rigid stages, but it prevents resources from being spent on the wrong constraint.

Third, monitoring should focus on conversion outcomes. Useful indicators include not only training completions and vacancies filled, but the share of trained participants entering relevant employment, retention after entry, commuting feasibility, recruitment time and the proportion of vacancies that remain open because of identifiable skill, access or conditions barriers. These measures would make the gap between labour reserve and effective labour supply visible.

8. Conclusion

A peripheral region can have a labour reserve and still lack effective labour supply. The difference lies in whether people, skills, jobs and everyday conditions can be connected in a viable way. For Northern Hungary, this distinction is particularly important because settlement structure, commuting constraints, uneven human-capital distribution and employer demand interact across a geographically diverse region.

The article proposes four filters between potential labour reserve and effective labour supply: skill and occupational fit, spatial and temporal accessibility, economic viability and institutional coordination. The framework is intentionally operational. It asks decision-makers to identify the point at which a potential match fails before choosing an intervention.

The broader implication is that labour shortage should not be treated as a single diagnosis. Sometimes the answer is training; sometimes transport; sometimes work organisation or compensation; sometimes coordination across institutions. Regional labour-market governance becomes more effective when these possibilities are separated analytically and recombined only where the evidence supports them.

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