

The Differential Impact of the National Program for Increasing Skilled Workforce for the High-Tech Industry: A Case Study of Peripheral Regions in the Israeli Labor Market.

1. Introduction

Many studies assessing national educational reforms focus on the likelihood of acquiring advanced education and the associated labor market returns (Angrist & Pischke, 2008). In the context of the 21st-century global economy, fostering a skilled technological workforce is considered a primary driver of national economic resilience. Israel, frequently termed the "Start-Up Nation" (Senor & Singer, 2009), relies heavily on its high-tech sector, which accounts for a disproportionate share of its GDP and industrial exports.

However, the rapid expansion of this sector has led to a persistent shortage of skilled labor, particularly in engineering and computer science. To address this, the Israeli government and the Council for Higher Education (CHE) initiated the '**National Program for Increasing Skilled High-Tech Personnel**.' This strategic reform aimed at promoting higher education in STEM fields (science, technology, engineering, and mathematics) across all segments of the Israeli population, with a particular focus on reducing the representation gap of the geographical and socioeconomic periphery. This study investigates whether the increased accessibility provided by this reform has translated into equitable labor market outcomes for residents of the Israeli periphery.

2. Theoretical Framework and Literature Review

The theoretical foundation of this investigation lies in the divergence between **Human Capital Theory** and **Signaling/Screening Theory**.

2.1. Human Capital vs. Signaling

Human Capital Theory (Becker, 1964) suggests that education increases individual productivity by providing essential skills, which the labor market subsequently rewards with higher wages. Therefore, a policy that increases STEM enrollment should theoretically narrow the income gap between the Center and the Periphery. Conversely, Signaling Theory (Spence, 1973) posits that the labor market utilizes the "prestige" of the

academic institution as a proxy for a candidate's inherent ability. In a stratified higher education system like Israel's, where a clear hierarchy exists between research universities and regional colleges, the "return on education" may vary significantly based on the institution's brand, regardless of the student's actual technical proficiency (Shavit et al., 2007).

2.2. The "College Revolution" and Stratification

The Israeli "periphery" is characterized by geographical distance from the economic hub of Tel Aviv and lower socioeconomic rankings (Clusters 1–4 on the ICBS scale). While the "College Revolution" of the 1990s succeeded in democratizing access to degrees, research has indicated that it also led to "horizontal stratification," where periphery residents obtain degrees that yield lower market returns compared to those from elite universities (Feniger et al., 2016). This study examines if the STEM reform has overcome this structural barrier or merely replicated it within a technological framework.

3. Policy Context: The Reform Mechanisms

The 'National Program for Increasing Skilled High-Tech Personnel' (Government Decision 2292) utilized several institutional levers:

- **Performance-Based Budgeting:** Incentivizing institutions to increase STEM enrollment quotas, especially for underrepresented groups.
- **Infrastructure Grants:** Funding for upgraded laboratories and computing facilities in regional colleges (CHE, 2017).
- **Targeted Support:** Expanding pre-academic programs (Mechina) to bridge educational gaps for periphery students.

4. Methodology and Data Utilization

This ongoing study utilizes a comprehensive micro-dataset from the **Israel Central Bureau of Statistics (ICBS)**. By integrating administrative data from the Ministry of Education and the Israel Tax Authority, we track students longitudinally from high school graduation through their academic careers and into the labor market.

4.1. Data Sources

- **Academic Files:** Institutional type (University vs. College), specific STEM majors, and graduation status.
- **Labor Market Records:** Longitudinal data on monthly wages and industry classification (NAICS).
- **Demographic Data:** Residential history, parental education, and psychometric entrance scores.

4.2. Econometric Approach

To provide a robust assessment of the reform, the study employs several **econometric models** without pre-committing to specific functional forms:

- **Mincerian Wage Equations:** To estimate returns on STEM education while controlling for experience and socioeconomic background (Mincer, 1974).
- **Fixed-Effects (FE) Models:** To account for unobserved individual heterogeneity and institutional characteristics.
- **Propensity Score Matching (PSM):** To compare "similar" individuals from the periphery and the center who chose different educational paths (Rosenbaum & Rubin, 1983).
- **Selection Bias Correction (Heckman Models):** To address the non-random nature of the choice to pursue a STEM degree (Heckman, 1979).

5. Preliminary Observations and Expected Findings

As this research is a **work in progress** for the August conference, preliminary analysis of descriptive data offers critical insights.

5.1. The Success of Accessibility

The findings reveal that the reform contributed considerably more to making STEM higher education accessible to residents of the periphery than to the rest of the population. Enrollment in STEM programs at regional colleges has outpaced growth in the center since

2017. The policy has successfully lowered the "cost of entry" for residents of the Negev and Galilee.

5.2. The Earning Capacity Paradox

However, initial indicators suggest that this impact is not fully reflected in the earning capacity of these residents. A persistent "wage gap" appears to remain between periphery graduates and their peers from central research universities. We hypothesize that this is driven by:

1. **Institutional Quality Disparities:** Variations in the quality of education provided by different Israeli academic colleges compared to major research universities.
2. **Field Selection Heterogeneity:** Periphery residents may be more concentrated in STEM sub-fields with lower market demand (e.g., life sciences) rather than high-paying core fields like Software Engineering.

6. Conclusion and Expected Contribution

This study highlights the complexities and challenges of STEM education reforms. It underscores that while access has improved, disparities in institutional quality remain a significant barrier to achieving labor market equality.

By August, this study will provide a complete empirical mapping of these outcomes. The research will conclude with **policy recommendations**, suggesting that future reforms must move beyond "enrollment quotas" and focus on the **"Value-Added"** of the education provided, ensuring that the quality of STEM programs in regional colleges matches that of central universities.

7. Selected References

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