

**EXECUTIVE
BOARD
MEETING**

SM/15/67

March 13, 2015

To: Members of the Executive Board

From: The Secretary

Subject: **Hungary—Selected Issues**

Board Action: Provides background to SM/15/66—Staff Report on the 2015 Article IV Consultation

Tentative Board Date: **Friday, March 27, 2015**

Publication: Yes*

Questions: Mr. Klein, EUR (ext. 36706)
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Document Transmittal in the Absence of an Objection and in accordance with Board policy: Monday, March 23, 2015—European Central Bank and WTO
After Board Consideration—European Bank for Reconstruction and Development, European Commission, European Investment Bank, Food and Agriculture Organisation, Organisation for Economic Cooperation and Development, United Nations Development Programme, World Food Programme

***Unless an objection from the authorities is received prior to the conclusion of the Board's consideration, the document will be published.**



HUNGARY

SELECTED ISSUES

March 12, 2015

Approved By
**The European
Department**

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CONTENTS

THE EFFICIENCY OF PUBLIC SPENDING ON HEALTH AND EDUCATION IN HUNGARY 4

A. INTRODUCTION	4
B. Stylized Facts: Performance of the Health and Education Sectors	5
C. Assessing the Efficiency of Public Spending on Health and Education	7
D. Conclusions and Some Policy Implications	12

FIGURES

1. Selected OECD Countries Spending on Health and Education	21
2. Selected OECD Countries: Health Outcomes	22
3. Selected OECD Countries: Education Outcomes	23
4. Selected OECD Countries: Selected Indicators of the Health Sector	24
5. Selected OECD Countries: Selected Indicators of the Education Sector	25

APPENDICES

I. Data Envelopment Analysis	15
II. Overview of Recent Reforms in the Health and Education Sectors	17
III. Robustness Analysis	19
IV. Overview of Resource Allocation in the Health Sector	20

REFERENCES	13
-------------------	-----------

INTERNATIONALIZATION OF SMALL AND MEDIUM SIZED ENTERPRISES IN HUNGARY: DETERMINANTS AND THE LINK TO GROWTH _____ **26**

A. Introduction	26
B. Some Stylized Facts	28
C. The Link between Internationalization and Growth	29
D. The Determinants of Firms' Internationalization	33
E. Conclusions and Some Policy Implications	36

TABLES

1. Selected Indicators by Firm Size, 2006–2013	30
2. SMEs: Selected Indicators by Export-to-Revenue Ratio	30
3. Correlation Matrix, SMEs and Large Firms	31
4. Estimation Results, Internationalization and Growth, Full Sample	32
5. Summary Statistics, Firm Level Variables	34
6. Correlation Matrix	34
7. Estimation Results, Determinates of the SMEs' Internationalization	35

APPENDIX

I. Supplementary Figures and Tables	39
-------------------------------------	----

REFERENCES _____ **37**

MONETARY POLICY SURPRISES AND MARKET REACTION IN HUNGARY—AN EVENT

STUDY APPROACH _____ **41**

A. Introduction	41
B. Methodology	42
C. The Effect of Monetary Policy Surprises	46
D. Conclusions	49

TABLES

1. Monetary Policy Council Meetings, July 2004–December 2014	43
2. Policy Change and Market Expectations, July 2004–December 2014	44
3. The Unexpected Change in the Policy Rate (in percentage points)	45
4. The Effect of Monetary Policy Surprises on Selected Financial Market Indicators	47

APPENDIX

I. Supplementary Figures and Tables	51
-------------------------------------	----

REFERENCES _____ **50**

CREATING A LEVEL PLAYING FIELD: GENDER INEQUITIES AND GROWTH IN**HUNGARY** _____ **54**

A. Introduction _____ 54

B. Women and the Labor Market: Explained and “Unexplained” Factors _____ 56

C. Implications for Growth _____ 61

D. Conclusion: Towards a More Level Playing Field _____ 63

FIGURES

1. Hungary: Gender Gaps in Education, Business and Politics _____ 55

2. Gender Gap in Earnings _____ 56

3. Maternal Employment Rates by Age of Youngest Child, 2007 _____ 56

4. Hungary: Trends in Female Labor Force Participation, 2000–13 _____ 57

5. Decomposition of the Change in PLFPR between 2008 and 2013 by Education Level _____ 57

6. Hungary: What is Holding Women Back? _____ 59

7. The Unexpected Component of the Pay Gap in Hungary is Large _____ 60

8. Parent's Expectations for their Children's Careers _____ 61

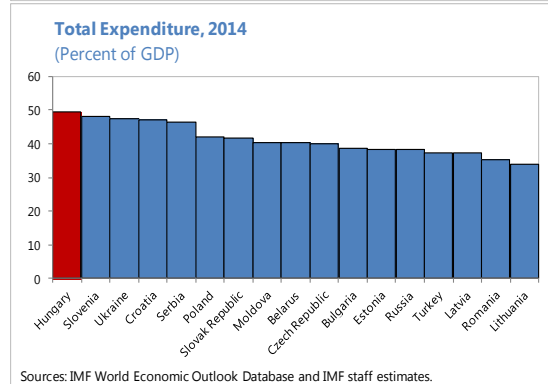
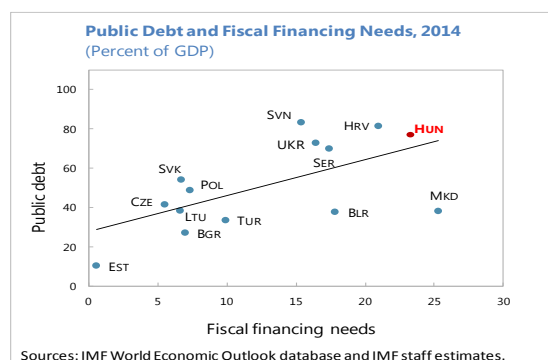
9. The Effect if Converging Participation Rates between Men and Women on the Size of
the Labour Force _____ 62**REFERENCES** _____ **64**

THE EFFICIENCY OF PUBLIC SPENDING ON HEALTH AND EDUCATION IN HUNGARY¹

A. Introduction

1. Putting Hungary's public debt ratio firmly on a downward path is a key policy

objective. At just below 77 percent of GDP at end-2014, Hungary's public debt ratio is among the highest in the region, and along with the associated high financing needs, it represents a key vulnerability to the Hungarian economy. This, together with the relatively high level of public expenditures—about 50 percent of GDP in 2014—suggests that the needed consolidation strategy should be expenditure-based. In this context and beyond identifying potential areas for expenditure rationalization,² the question on how to enhance the efficiency of spending becomes an important one as it can offer opportunities for improving outcomes within existing resources.



2. A successful consolidation strategy should entail protecting spending in priority sectors, such as health and education not only because of their potential positive effect on social welfare and long-term growth, but also given that spending levels in these sectors are not high in Hungary, while health and educational outcomes are lagging behind. As such, and given the limited fiscal space in Hungary, further improving health and educational outcomes should primarily be achieved by exploiting efficiency gains within the existing resource envelope. This would be all the more important, particularly in the health sector, in light of the potential upward pressure on health care costs from population aging over the medium term.

3. Against this background, this paper assesses the efficiency of public spending on health and education in Hungary, with a view to identifying potential efficiency gains and areas for reforms so as to lock in such gains. The paper finds potentially large room for efficiency

¹ Prepared by Asmaa El-Ganainy.

² Staff's main recommendations for expenditure rationalization focus on: improving the targeting of social benefits, scaling down costly and inefficient programs, reducing public employment and untar geted subsidies, and containing spending on non-EU related goods and services.

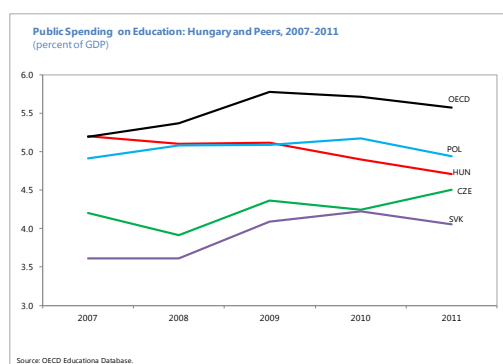
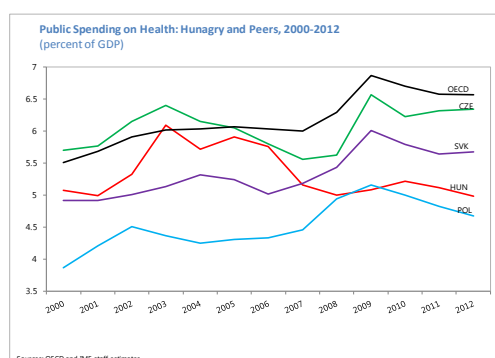
gains over the medium-term, particularly in the health sector. A frontier analysis using data envelopment methodology, suggests that savings from efficiency gains in the health and education sectors could amount up to about 3 percentage points of GDP over the medium-term, of which 90 percent could be achieved from efficiency gains in the health sector.

4. The rest of the paper is organized as follows: Section B presents some stylized facts about the performance of the Hungarian health and education sectors. Section C presents results of the efficiency analysis and identifies areas for reforms to enhance the performance of these sectors. Finally, section D concludes with some policy recommendations.

B. Stylized Facts: Performance of the Health and Education Sectors

5. Public expenditure on health and education in Hungary is not high by international standards and has declined over the past decade (Figure 1). More specifically:

- In the *health sector*, public spending as a share of GDP declined from about 6 percent in the early 2000s to 5 percent by 2008 (and remained broadly stable since then)—below the OECD and peers averages of 6½ and 5½ percent in 2012, respectively. In per capita terms, public spending was US\$1128 (PPP) in 2012, comprising about 45 percent of the average per capita spending in the OECD, and 80 percent of that in peers. The share of public health spending to total health spending declined from around 90 percent in the early 1990s to around 70 percent in the early 2000s, reaching 63 percent in 2012—below the OECD average of 72 percent, and that of peers (74 percent). As a share of total public expenditures, spending on health amounted to about 10 percent of total public expenditures in 2012—below the OECD and peers averages of about 14½ percent.
- In the *education sector*, public spending as a share of GDP declined from about 5½ percent in the mid-2000s to about 4½ percent in 2011—below the OECD average of about 5½ percent of GDP in 2011, but broadly on par with that of peers.³ In per student terms, annual public spending on primary and secondary educational institutions amounted to US\$4270 (PPP) in 2011, comprising about 53



³ Out of total public spending on all levels of education, Hungary spends about 60 percent (2¾ percent of GDP in 2011) on primary and secondary education—broadly on par with OECD and peers averages.

percent of the average per student spending in OECD, and 83 percent of that in peers. As a share of total public expenditures, spending on education declined from about 11 percent in the mid-2000s to 9½ percent in 2011—below the OECD and peers averages of about 13 and 11 percent, respectively.

6. At the same time, and despite improvements over the past decades, health and educational outcomes are lagging behind (Figures 2 and 3):

- In the *health sector*, Hungary's longevity and mortality indicators are below OECD and peers averages. For instance, life expectancy increased by 5.5 years over the past four decades, compared to an average increase of 10 and 6.7 years in the OECD and in peers, respectively; thus, at 75.2 years in 2012, it remains below the OECD and peers averages of 80.2 and 77.1 years, respectively. Health-adjusted life expectancy is among the lowest in the OECD; whereas amenable mortality rate is the highest.⁴ Similarly, and despite the notable fall by more than 30 deaths per 100 live births over the past forty years, at about 5 deaths per 1000 live births in 2012, the infant mortality rate remains above the OECD and peers averages of 3.7 and 4.2 deaths, respectively.
- In the *education sector*, performance appears to be more mixed. For instance, performance in the Program for International Student Assessment (PISA)⁵ was low compared to OECD and peers' averages, and has deteriorated in recent years across all basic skills.⁶ Further, the share of students with low achievements has increased across all skills—suggesting that Hungary is moving further away from achieving its European benchmark under the strategic framework. However, other educational outcomes, suggest strong performance: for instance, enrollment rates are nearly universal, and graduation rates are high—with a first time graduation rate at upper secondary school of 94 percent in 2012 (up from 78 percent in 2008), surpassing the OECD and peers averages of 84 percent in 2012 (up from 81 and 83 percent in 2008, respectively).

⁴ Health-adjusted life expectancy (HALE) measures the number of healthy years an individual is expected to live at birth, thus it measures not just how long people live, but the quality of their health through their lives; whereas amenable mortality measures mortality amenable to health care—it is defined as “premature deaths that should not occur in the presence of timely and effective health care” (Nolte and McKee, 2008) or as “conditions for which effective clinical interventions exist [that should prevent premature deaths]” (Tobias and Yeh, 2009).

⁵ The PISA is a triennial international survey that aims to evaluate education systems worldwide by testing 15-year-olds in three key subjects: reading, math, and science. The assessment at the age of 15 is designed to capture student abilities to apply their knowledge to real-life situations and be equipped for full participation in society at the end of their compulsory schooling.

⁶ The average overall PISA score for peers excluding Slovakia whose score was lower than that of Hungary was 510 in 2012—significantly above Hungary's average overall score of 487.

C. Assessing the Efficiency of Public Spending on Health and Education

7. A frontier analysis is employed to assess the efficiency of public spending on health and education. It is based on Data Envelopment Analysis (DEA) developed by Farrell (1957) and popularized by Charnes, Cooper, and Rhodes (1978) (see Appendix I). It involves constructing a ‘best practice’ frontier populated by countries that provide the optimal combination of inputs and outcomes. The country’s distance from the efficiency frontier provides a measure of its efficiency—summarized by an efficiency score, which is used to estimate potential gains by improving efficiency to the levels of best-performers. The DEA is sensitive to sample selection and measurement error, thus outliers can greatly influence the efficiency scores.⁷ Thus, proper sample selection is critical to ensure that cross-country input-outcome bundles are comparable. The use of an OECD sample in this paper may help alleviate some of these constraints as most of these countries share similar institutional and economic features (i.e., broadly homogeneous in terms of technology and generally follow good practices in terms of data collection—and hence small measurement error).⁸

8. The analysis focuses on outcomes rather than outputs of health and education to assess the efficiency of these sectors. Performance can be measured by output (quantity) indicators, such as the number of medical treatments and enrollment (and graduation) rates; or outcome (quality) indicators, such as life expectancy and learning achievement (for instance, as measured by performance on standardized tests). The use of outcomes is generally preferable to the use of outputs (Joumard, 2010 and Grigoli, 2012), as they measure the overall efficiency of the system in transforming resources to final outcomes, and take into account elements of quality. As such, outcome indicators are generally considered a better measure for the overall effectiveness of the health care system in improving the health status of the population and that of the education system in the effective transfer of knowledge and skills and hence the quality of teaching and learning, and thus are more directly linked to welfare objectives, human capital accumulation, and growth (Grigoli, (2012); and Sutherland et. al. (2007)).⁹ To assess the evolution of expenditure efficiency over time, the analysis is separated into two time periods, 2000–06 and 2007–12 in the case of the health sector, and 2000–06 and 2007–11 in the case of the education sector. Given the lags between spending and its impact on outcomes, outcomes at the end of each period were used as the outcome indicator associated with the average spending in the corresponding period.

Efficiency of Health Spending

9. The efficiency of public spending on health in Hungary has improved over the past

⁷ Alternative techniques, such as the Stochastic Frontier Analysis, impose more structure on the data, but require a large panel of data which is often unavailable, and can be computationally challenging as the estimation is amenable to non-convergence.

⁸ Nevertheless, results should be interpreted with caution, given the heterogeneity among the OECD countries.

⁹ It is important to keep in mind though that outcomes are affected by other factors (beyond efficiency), such as life-style risks, which may bias the results.

decade, but there is still large scope for further gains reaching up to 2¾ percentage points of GDP over the medium-term. Using real public health expenditure per capita (\$US PPP) as the input variable, and life expectancy at birth as the outcome variables¹⁰ (Grigoli (2012) and IMF (2013)), the results suggest that Hungary's efficiency score has improved from 0.34 during 2000–06 to 0.45 during 2007–12 (compared to a score of 1 for an 'efficient/frontier' country).¹¹ Based on the second period's efficiency score, this implies potential gains of up to 55 percent of average public spending on health during 2007–12—that is the equivalent of 2¾ percentage points of GDP, if Hungary were operating with the same efficiency as that of frontier OECD countries. If Hungary were as efficient as the average OECD country (with an estimated efficiency score of 0.57), or as the average OECD country with relatively low level of per capita public spending on health (with an estimated efficiency score of 0.68),¹² potential gains would range between 15–25 percent—or the equivalent of 2/3–1¼ percentage points of GDP, while still achieving the same health outcome. The results are broadly robust when using infant mortality rate as the outcome indicator (see appendix III),¹³ and are in line with the findings of previous studies.¹⁴

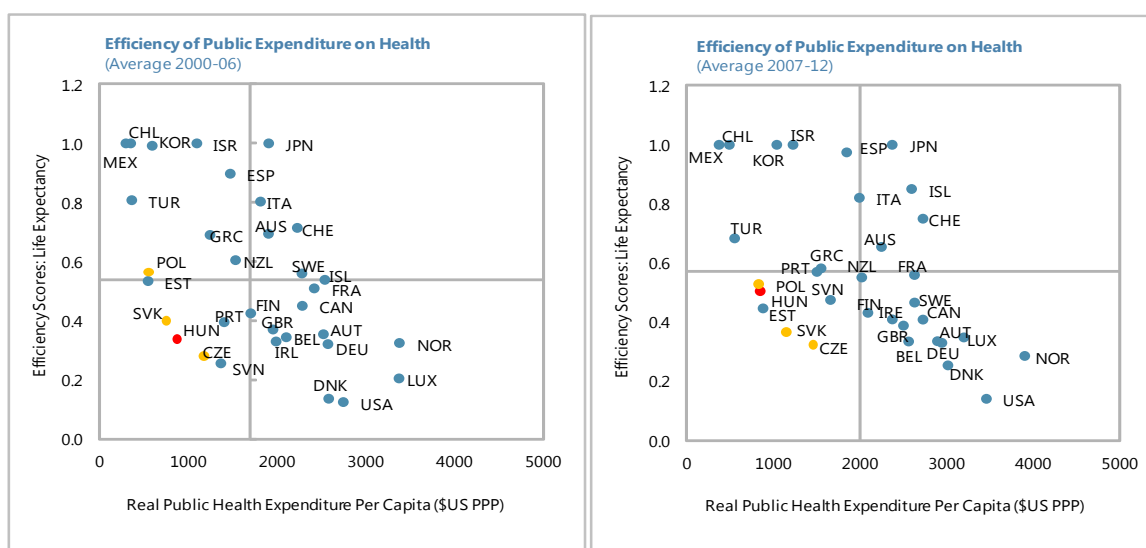
¹⁰ The use of life expectancy as an outcome variable is generally preferable to other measures, such as infant mortality rate, as it is a broader measure of health outcomes. Although, as mentioned earlier, the HALE is better indicator of health status, comprehensive time series on the HALE are lacking. However, Joumard et al. (2010) show that the correlation between life expectancy and the HALE is both very high and significant.

¹¹ See appendix II for a brief overview of recent reforms in the health sector, which may have contributed to the improvement in efficiency over the past decade.

¹² OECD countries with relatively low level of per capita public spending on health refer to countries in which such spending is at or below the median of the OECD sample during 2007–12.

¹³ Additional robustness checks further confirm the results, including when comparing Hungary's relative efficiency to countries with similar shares of public spending on health; similar levels of public spending per capita; and to regional peers.

¹⁴ For instance, Joumard et al. (2010) find, based on panel regressions, that the gap between the average health status of Hungarians and the OECD average is largely explained by the limited effectiveness of the system and the low level of health care resources. Their results are further supported by employing DEA using alternative measures of health outcomes, and by comparing Hungary to countries with similar health policies and institutions. Further, in their results, Hungary was singled out amongst the five countries where margins for improving health outcomes without increasing spending are the largest.



Sources: OECD Health Statistics Database and Author's calculations.

10. To improve health outcomes and enhance the performance of the sector, focus should be on closing the efficiency gap through a comprehensive reform strategy. As suggested by OECD (2008); Forthun and Hagemann (2010); Gaál et al. (2011); IMF (2012); and Eris (2012), such a strategy should largely focus on (i) improving the provider payment system by setting appropriate incentives to provide cost-effective medical care and address the inefficient use of health care resources and the imbalances in health services professionals (Figure 4);¹⁵ (ii) devising an appropriate regime for co-payments to rationalize demand and the high utilization of health care resources (Figure 4), while ensuring that access to medical services by low-income families is not undermined by such measures; (iii) improving resource allocation in the sector,¹⁶ including through strengthening the balance between existing capacities and the health care needs of the population—e.g., enhancing capacity for long-term care in light of rising pressures from population aging; (iv) discouraging the wide-spread use of ‘informal’ out-of pocket payments, which could limit access to medical services by the poor (Figure 4), including through improving the remuneration of the health care professionals; (v) containing the high level of pharmaceutical spending (Figure 4); and (vi) formulating a comprehensive plan for the management and strategic planning of health workforce, with a view to increasing the share (and training) of lower-skilled health care workers, and addressing physicians’ low wages and high concentration across certain specialties including

¹⁵ Such inefficiencies and imbalances are reflected in (i) the excess use of hospital-based care and specialty care and a corresponding lack of emphasis on primary care, as well as preventive and long-term care, and (ii) the disproportionately high share of specialists in the health workforce, and a corresponding shortage of certain specialists such as primary care, public health and diagnostic specialist, as well as of nurses, which resulted in doctors performing duties that can be performed by nurses.

¹⁶ See appendix IV for more details about resource allocation in the health sector.

through a mix of financial and other incentives, such as enhancing working-time flexibility, and offering options for continued education and training.

Efficiency of Education Spending

11. The efficiency of public spending on education has improved over time, but there is scope for further efficiency gains. Using real public primary and secondary expenditure on educational institutions per student (\$US PPP) as the input variable, and the PISA scores as the outcome variable¹⁷ (Grigoli (2012) and IMF (2013)), the results suggest that Hungary's efficiency score has improved considerably between the two periods under consideration, and at 0.9 during 2007–11 (up from 0.70 during 2000–06),¹⁸ it is above the overall OECD average score (estimated at 0.61), and that of OECD countries with relatively low level of per student public spending on primary and secondary education (estimated at 0.79).¹⁹ Based on the second period's efficiency scores, this implies potential gains of up 10 percent of average public spending on primary and secondary education during 2007–11—that is the equivalent of 1/3 percentage points of GDP, if Hungary were operating with the same efficiency as that of frontier OECD countries, while still achieving the same educational outcomes. The results are robust when using cumulative spending per student (\$US PPP) in primary and secondary education as the input variable (see appendix III),²⁰ and are consistent with previous findings.²¹

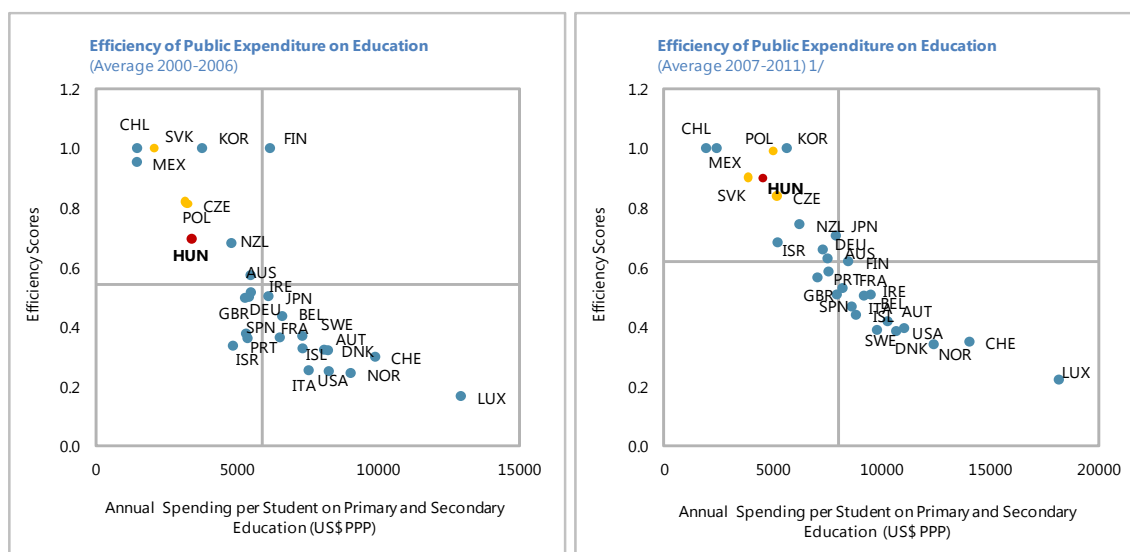
¹⁷ Similar to the case of the health sector analysis, the use of PISA as an outcome indicator takes into account the quality of teaching (and learning), and hence measures the effective transfer of knowledge and skills (Grigoli, (2012); and Sutherland et al. (2007)). PISA scores employed in this study are the average overall scores across the three key sub-components of the test: reading, math, and science.

¹⁸ See appendix II for a brief overview of recent reforms in the education sector, which may have contributed to the improvement in efficiency over the past decade.

¹⁹ OECD countries with relatively low level of per student public spending on primary and secondary education refer to countries in which such spending is at or below the median of the OECD sample during 2007–11.

²⁰ Additional robustness checks further confirm the results, including when comparing Hungary's relative efficiency to countries with similar shares of public spending on primary and secondary education; similar levels of public spending per student on primary and secondary education; and to regional peers.

²¹ For instance, based on DEA using multiple input model, Sutherland et al. (2009) find that in Hungary potential improvements in output from efficiency gains using the same level of inputs could reach up to 7 percent. Also, IMF (2015), based on DEA and an alternative input indicator, finds that Hungary is quite close the frontier.

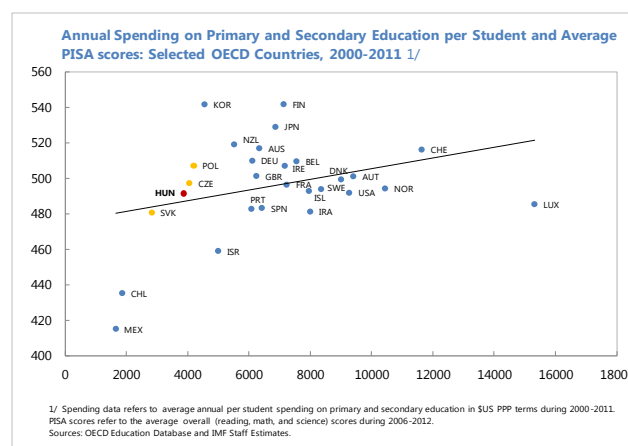


1/ Spending data is up to 2011, while the PISA scores refer to 2012.
Sources: OECD Education Database and Author's calculations.

12. While there is room for further exploiting efficiency gains in the education sector, focus should be on improving educational outcomes and access to quality education.

Further efficiency gains could be achieved, for instance, by increasing instruction time, which is low in Hungary (Figure 5). At the same time, the introduction of the new teacher career model—that emphasizes teachers' remuneration (which is low in Hungary, Figure 5), career path, qualifications, training, and skill-development—could help improve educational outcomes, so as the introduction of mandatory early childhood education

starting in 2015, and the on-going efforts to strengthen quality evaluation. Once efficiency gaps are closed and fiscal buffers are re-built, consideration could be given to increasing spending on public education, with a view to further enhancing educational outcomes, given the positive correlation between spending and educational outcomes, and the fact that both public spending on education and educational outcomes in Hungary are not high by international standards. Further, as equal access to mainstream quality education still remains a major problem for disadvantaged children in Hungary,²² there is a need to put in place a systematic approach to promote inclusive mainstream



1/ Spending data refers to average annual per student spending on primary and secondary education in US\$ PPP terms during 2000-2011. PISA scores refer to the average overall (reading, math, and science) scores during 2006-2012. Sources: OECD Education Database and IMF Staff Estimates.

²² For more details, see the European Council's final recommendations on the National Reform Program of Hungary (http://ec.europa.eu/europe2020/europe-2020-in-your-country/magyarorszag/country-specific-recommendations/index_en.htm; http://ec.europa.eu/europe2020/pdf/csr2014/csr2014_council_hungary_en.pdf; and http://ec.europa.eu/europe2020/pdf/csr2014/swd2014_hungary_en.pdf).

education for such groups, in line with the EC's recommendations. Such an approach would not only enhance equality of access to education, but would also help improve outcomes, given the very strong correlation between socio-economic status and academic performance in Hungary (OECD, (2014)).

D. Conclusions and Some Policy Implications

- 13. Policy makers in Hungary face a difficult balance:** building fiscal buffers and reducing vulnerabilities require a sustained reduction in public spending to put the high public debt ratio on a declining path, but at the same time, the relatively low levels of public spending on health and education, along with the lagging health and educational outcomes, and the continued need for improving the overall performance of these sectors may justify more resources. This conjuncture calls for improving efficiency, particularly in the health sector, given the expected increase in costs over the medium-term in the face of population aging. An additional factor that is likely to contribute to the upward pressure for health and education spending is the current low remuneration of health workforce and teachers.
- 14. Frontier analysis, using data envelopment methods, suggests that there is large scope for improving the efficiency of public spending on health, and to a lesser extent, on education in Hungary.** More specifically, and although estimates of spending efficiency are subject to uncertainty, efficiency gains could reach up 3 percentage points of GDP, of which 90 percent could be secured from the health sector, without sacrificing current outcomes, if Hungary were operating with the same efficiency as that of 'frontier' OECD countries.
- 15. The inefficiencies of the Hungarian healthcare system are manifest in low responsiveness to patients' demands, and supply-side constraints that are exacerbated by inefficiencies in the utilization of available resources.** A comprehensive reform strategy that focuses on addressing the perverse incentive structure in the system, increasing the system's responsiveness to the needs of the population, and improving the management and strategic planning of health workforce would be essential to improving the performance of the sector. Efficiency gains could be channeled to increasing the remuneration of health care professionals and thus help address the challenges that Hungary faces in retaining and attracting highly-skilled doctors—an important precondition for high-quality health care. Tackling the widespread use of informal payments is particularly important from an access point of view for vulnerable groups.
- 16. In the education sector, there seem to be room for further efficiency gains, but priority should be given to improving outcomes, which may require higher spending.** Given Hungary's medium-term consolidation needs such higher levels of spending should (ideally) be achieved by redirecting resources from less productive areas rather than increasing the overall spending envelope. Equally important would be to put in place a systematic approach to improve effective and equal access to quality, inclusive, mainstream education and to foster continued education for disadvantaged students.

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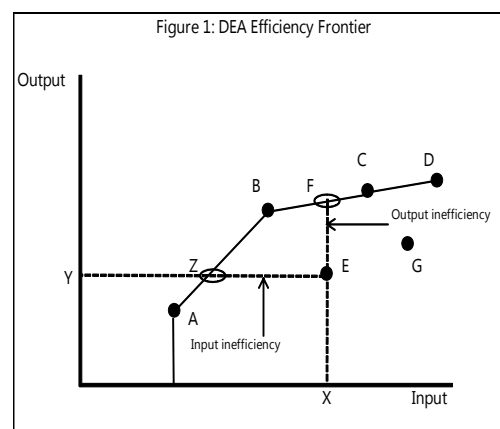
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Appendix I. Data Envelopment Analysis

Data envelopment analysis (DEA) is a non-parametric approach, popularized by Charnes, Cooper and Rhodes (1978) that assesses the relative efficiency of decision making units (DMUs).²³ Based on the assumption of a convex production possibilities set, an efficiency frontier is constructed as the linear combination of efficient or optimal input and outcome combinations in the cross-country sample using linear programming techniques, where a parametric transformation is not assumed (i.e., without imposing specific functional restrictions). The most efficient countries that lie on the frontier then ‘envelop’ the less efficient ones (Sutherland et al. (2007)). In essence, the frontier provides a benchmark by which ‘enveloped’ observations can be judged based on their position relative to the frontier. By construction, countries on the frontier will have an efficiency score of one, whereas the ‘enveloped’ ones will have efficiency scores bound between zero and one. Efficiency gains can be defined as the amount by which input could be reduced while holding the level of output constant (input inefficiency), or as the amount by which output could be increased while holding the level of input constant (output inefficiency).²⁴

Figure 1 illustrates an efficiency frontier that connects points A to D as these countries dominate other input-output pairs, such as countries E and G in the interior. The convexity assumption allows an inefficient input-output pair, such as point E to be assessed relative to a hypothetical position on the efficiency frontier, such as point Z by taking a linear combination of efficient country pairs, such as points A and B. In this manner, an input-based efficiency score that is bound between zero and one can be calculated as the ratio of YZ to YE.

The score corresponds to the proportional reduction in spending consistent with relatively efficient production of a given outcome. Similarly, an output-based efficiency score for point E can be calculated as the ratio of XF to XE, consistent with the proportional increase in the outcome indicator given current spending if production is relatively efficient. This would correspond to the



²³ The definition of DMUs is flexible, as it could refer to countries, counties, schools, firms, etc.

²⁴ See Zhu (2003) and Afonso and St. Aubyn (2005) for a detailed technical treatment of the DEA approach and its application to the health and education sectors.

hypothetical point F that is calculated as a linear combination of the actual countries B and C.

As a non-parametric approach, the DEA is considered a powerful tool to assess spending efficiency as it does not require assumptions about unknown functional forms or complex distributional properties, which can help avoid some of the econometrics pitfalls. In addition, it is a simple, easy to explain, and allows to benchmark performance between countries. However, the methodology focuses on inputs and outcomes that can be quantified, and thus, it may overlook important factors that are harder to measure and affect outcomes²⁵—as such, it considers all deviations from the frontier explained by inefficiency rather than the result of omitted or uncontrollable variables. Further, it assumes that different combinations of the observed input-output bundles are feasible, such that any country could move to the frontier by freely accessing the technology of production and by being unhampered by the country's own idiosyncratic conditions. Moreover, many public policy targets are impacted by private spending, as a result, large differences across countries in public health and education spending could bias the efficiency scores.

²⁵ For instance, life style-related risks in the case of health sector and the stronger initial conditions in educational outcomes.

Appendix II. Overview of Recent Reforms in the Health and Education Sectors

- A. Health sector.** OECD (2008); Forthun and Hagemann (2010); Gaál et al. (2011); IMF (2012); and Eris (2012) review recent reforms in the health sector, which included, among others, strengthening individual incentives through the introduction of co-payments for pharmaceuticals and long term chronic care;²⁶ strengthening the efficiency of health care delivery by adjusting the capacity of providers to meet the needs of patients;²⁷ containing pharmaceutical subsidies by requiring that prior authorization be obtained for overspending in the pharmaceutical sub-budget of the Health Insurance Fund;²⁸ and fostering competition in the pharmaceutical market—for example by moving to international reference pricing and to the generic program.²⁹ More recent measures included the introduction of the public health product tax in 2012 to encourage healthier life style; enhancing the management of health workforce, including by improving the remuneration of health care professionals in 2012; launching the health sector structural transformation in 2012, which included recentralization of hospitals from the local to the central government; and promoting IT and human resource development under the EU-financed development programmes of 2007–13.
- B. Education sector.** OECD (2004); OECD (2008); and Hungary's 2014 National Reform Program review reforms to the public education system, which included among others, the introduction of performance-based financing scheme in 2007—which replaced a financing system based on a fixed amount of funds per student—to encourage schools to improve performance;³⁰ and the expansion of development spending under the EU funds 2007–13 programming period to support both infrastructure (including IT) and content development. More recent reforms aimed at further strengthening accessibility to (and quality of) education,³¹ transferring the operations

²⁶ Co-payments in primary and outpatient care and a hospital daily fee for inpatient care were introduced during 2006–07, but the measures were subsequently repealed by a national referendum in 2008 (IMF, 2012).

²⁷ This led to some reduction in hospital beds, as well as closure and merger of some hospitals (Gaál et al. (2011)).

²⁸ To further contain pharmaceutical spending, the government also increased the license fees of pharmaceutical industry sales representatives to address the perceived problem of undue influence of pharmaceutical companies on physicians.

²⁹ The move towards generic program was facilitated in part by halving the time required for a generic product to become a reference product to three months after the expiration of the patent.

³⁰ The new financing system linked financing to a number of parameters, such as class size, lessons time, teachers compulsory number of training per week...etc.

³¹ For more details about the government priorities in the education sector and the EC's recommendations on education and training, see Hungary's 2014–17 convergence program, available at

(continued)

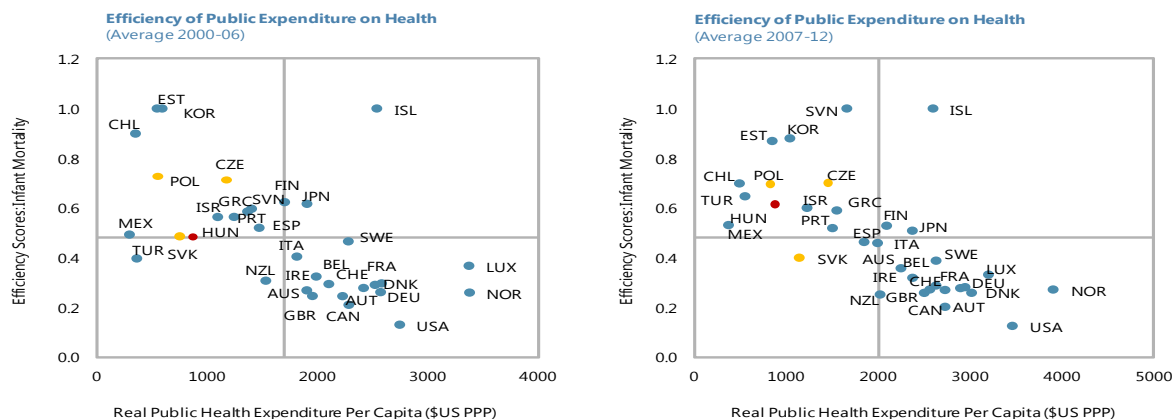
of public education institutions from municipalities to the central government with a view to harmonize the quality of education, and the initiation of a number of programs, largely financed by EU funds, with a view to facilitate equal access to quality, inclusive, mainstream education and to foster continued education for disadvantaged students.³²

(http://ec.europa.eu/europe2020/pdf/csr2014/cp2014_hungary_en.pdf); Hungary's 2014 national reform program, available at (http://ec.europa.eu/europe2020/pdf/csr2014/nrp2014_hungary_en.pdf), and the EC'S recommendations on Hungary's national program, available at (http://ec.europa.eu/europe2020/europe-2020-in-your-country/magyarorszag/country-specific-recommendations/index_en.htm).

³² For example: the Útravaló Scholarship Program promotes the access of disadvantaged students to secondary education, success in secondary education studies, and acquirement of vocational qualification; the Arany János Programs also promote secondary school advancement of disadvantaged students and students with multiple disadvantages in a comprehensive way with a view to support special groups advancement to institutes of higher education, or entering the labor market successfully; the "Tanoda" programs which aim at supporting the inclusion of students living in material deprivation or in adverse social conditions; and finally, the "Second Chance" type programs which support (re-) enrollment of youths with multiple disadvantages beyond mandatory school age who missed secondary school studies or dropped out, including Roma youths, back to secondary school (For more details, see Hungary's 2014 National Reform Program).

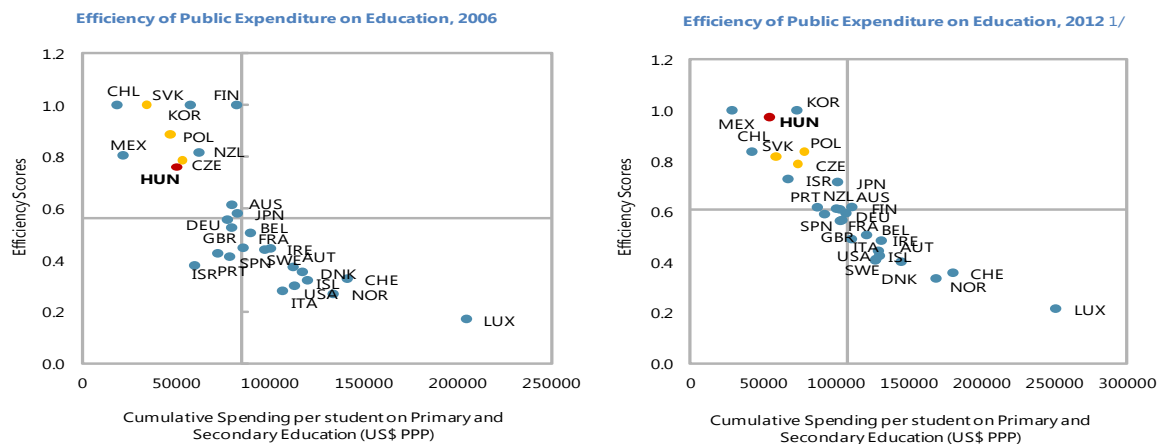
Appendix III. Robustness Analysis

A. Health sector - Efficiency scores when using *infant mortality* as the outcome variable.³³



Sources: OECD Health Statistics Database and Author's calculations.

Education sector - Efficiency scores when using *cumulative* spending per student (\$US PPP) in primary and secondary education as the input variable:



1/ Spending data refers to 2011, while the PISA scores refer to 2012.

Sources: OECD Education Database and Author's calculations.

³³ Since the analysis supposes that more output is better, infant mortality is a reverse outcome where a lower value is better, thus, the inverse of the original value is used in the analysis (Anton (2013)).

Appendix IV. Overview of Resource Allocation in the Health Sector

Resource allocation in the health sector is skewed towards some areas (Table 1). For example:

- Spending on out-patient care, including day-cases, accounted for 28 percent of total per capita spending on health in 2012, below the OECD average of 34 percent.
- Spending on long-term care in 2012 was only 4 percent of total per capita spending on health, significantly below the OECD average of 12 percent.
- Spending on medical goods, including pharmaceuticals, accounted for 34 percent of total per capita spending on health in 2012, double the OECD average of 17 percent.
- Spending on preventive care accounted for 3 percent of total per capita spending on health in 2012, broadly on par with the OECD average; however, the share of public spending on such preventive care (at 48 percent) was significantly below the OECD average (80 percent).
- Spending on investment in medical facilities in 2012 amounted to 3 percent of total per capita spending on health, below the OECD average of more than 4 percent.

Table 1. Health Care Expenditure for Selected Types of Care in Selected OECD Countries
Expenditure per capita in US dollars at current purchasing power parities, 2012 or latest year available 1/

	Total expenditure on health	of which: Public	Inpatient care 2/	of which: Public	Out-patient care 3/	of which: Public	Long-term and home care 2/	of which: Public	Medical goods 4/	of which: Public	Prevention and public health	of which: Public	Administration and insurance	of which: Public	Investment on medical facilities	of which: Public
Australia	3996.9	2732.6	1229.4	885.3	1635.7	1206.5	46.2	43.8	700.9	318.3	33	72.6	77.4	44.7	232.7	161.4
Austria	4896.1	3716.0	1616.7	1441.4	1297.0	907.2	664.9	549.7	757.4	472.0	80.9	68.2	176.3	107.0	302.9	170.5
Czech Republic 6/	2077.4	1745.4	594.0	564.8	748.9	659.6	81.3	81.3	501.1	303.0	42.0	35.8	61.8	61.7	35.4	35.4
Denmark	4698.4	4029.3	1295.4	1189.1	1487.8	1253.2	1088.8	1009.1	459.2	219.4	101.8	98.1	98.0	93.1	167.3	167.3
Estonia	1446.6	1138.9	401.2	381.5	538.4	461.8	65.0	50.9	346.5	173.0	47.8	40.9	28.2	28.1	19.5	2.7
Finland	3558.7	2669.3	953.5	864.7	1265.1	957.5	336.7	271.7	567.8	265.3	210.4	125.8	58.4	51.1	166.8	133.2
France	4288.2	3317.0	1277.7	1170.4	1184.7	860.2	468.1	461.9	857.0	518.0	83.4	56.9	250.3	136.4	167.0	113.2
Germany	4811.2	3690.8	1318.6	1175.6	1345.9	954.8	679.8	517.1	904.0	625.9	153.6	128.9	249.0	188.1	160.4	100.5
Hungary 6/	1802.9	1128.1	455.2	399.6	511.4	305.6	71.3	59.6	618.5	259.7	59.3	28.5	29.5	25.9	54.3	45.7
Japan 6/	3428.3	2826.4	1059.2	978.8	1073.3	890.0	386.8	330.5	755.3	519.1	99.6	64.3	54.0	43.8	30.0	30.0
Korea	2290.9	1248.2	501.3	273.6	742.5	354.6	278.3	199.8	491.8	254.2	66.6	56.2	105.5	82.8	105.0	27.0
Luxembourg	4577.9	3846.4	1080.4	968.5	1613.9	1272.3	991.7	833.1	503.3	380.3	83.0	81.3	73.3	53.7	229.7	257.2
Norway	6140.2	5221.9	1651.5	1640.6	1721.4	1298.6	1698.1	1538.3	626.0	348.9	148.5	134.3	35.8	35.8	258.9	225.4
Poland	1540.1	1065.5	481.8	461.3	433.3	274.4	126.4	117.3	354.5	119.8	29.1	20.1	17.9	17.8	97.1	54.8
Slovak Republic	2104.9	1467.6	457.9	432.8	665.8	499.2	22.4	22.4	720.0	412.1	84.2	22.4	67.0	67.0	87.5	11.7
Slovenia	2667.4	1906.7	723.2	637.4	748.0	532.3	272.2	259.7	598.5	272.7	97.2	70.7	94.2	46.1	134.2	87.8
Spain	2998.1	2190.1	701.6	651.1	1140.2	778.9	336.9	228.5	603.8	376.7	64.5	63.5	91.2	44.1	59.9	47.3
Sweden 6/	4106.0	3336.4	1019.8	1003.6	1723.9	1355.8	310.8	298.4	592.0	314.3	152.5	117.4	60.0	60.0	220.0	180.2
United States	8745.3	4159.9	1561.3	862.9	4068.5	1815.9	730.6	490.2	1141.3	369.6	256.6	256.6	630.5	280.3	356.5	84.4
<i>Memo items:</i>																
Peers average 7/	1907.5	1426.2	511.2	486.3	616.0	477.7	76.7	73.7	525.2	278.3	51.8	26.1	48.9	48.8	73.3	34.0
Selected EU 8/																
Average	3255.3	2517.7	884.1	810.1	1050.3	790.9	394.0	340.0	598.8	336.6	92.1	68.5	96.8	70.0	135.8	100.5
High	4896.1	4029.3	1616.7	1441.4	1723.9	1355.8	1088.8	1009.1	904.0	625.9	210.4	128.9	250.3	188.1	302.9	257.2
(AUS)	(DNK)	(AUT)	(AUT)	(SWE)	(SWE)	(DNK)	(DNK)	(DEU)	(DEU)	(FIN)	(FIN)	(DEU)	(FRA)	(DEU)	(AUT)	(LUX)
Low	1446.6	1065.5	401.2	381.5	433.3	274.4	22.4	22.4	346.5	119.8	29.1	20.1	17.9	17.8	19.5	2.7
(EST)	(POL)	(EST)	(EST)	(POL)	(POL)	(SVK)	(SVK)	(EST)	(POL)	(POL)	(POL)	(POL)	(POL)	(POL)	(EST)	(EST)
Selected OECD 9/																
Average	3693.4	2707.2	967.4	841.2	1260.3	875.7	455.6	387.5	636.8	343.3	101.9	81.2	118.9	77.2	151.8	101.9
High	8745.3	5221.9	1651.5	1640.6	4068.5	1815.9	1698.1	1538.3	1141.3	625.9	256.6	256.6	630.5	280.3	356.5	257.2
(USA)	(NOR)	(CHE)	(NOR)	(USA)	(USA)	(NOR)	(NOR)	(USA)	(DEU)	(USA)	(USA)	(USA)	(USA)	(USA)	(USA)	(LUX)
Low	1446.6	1065.5	401.2	273.6	433.3	274.4	22.4	22.4	346.5	119.8	29.1	20.1	17.9	17.8	19.5	2.7
(EST)	(POL)	(EST)	(KOR)	(POL)	(POL)	(SVK)	(SVK)	(EST)	(POL)	(POL)	(POL)	(POL)	(POL)	(POL)	(EST)	(EST)

Source: OECD (2013), "OECD Health Data: Health Expenditure and Financing", OECD Health Statistics (database)

1/ The latest year varies from 2007 to 2012.

2/ Inpatient care covers only curative and rehabilitative inpatient care. Long-term nursing in patient care is included with home health care.

3/ Hospital and non-hospital outpatient care, same-day care and ancillary services.

4/ Durable and non-durable goods including pharmaceuticals and therapeutic appliances.

5/ The average is an unweighted average of the latest year of data available; see source database for detail of country coverage.

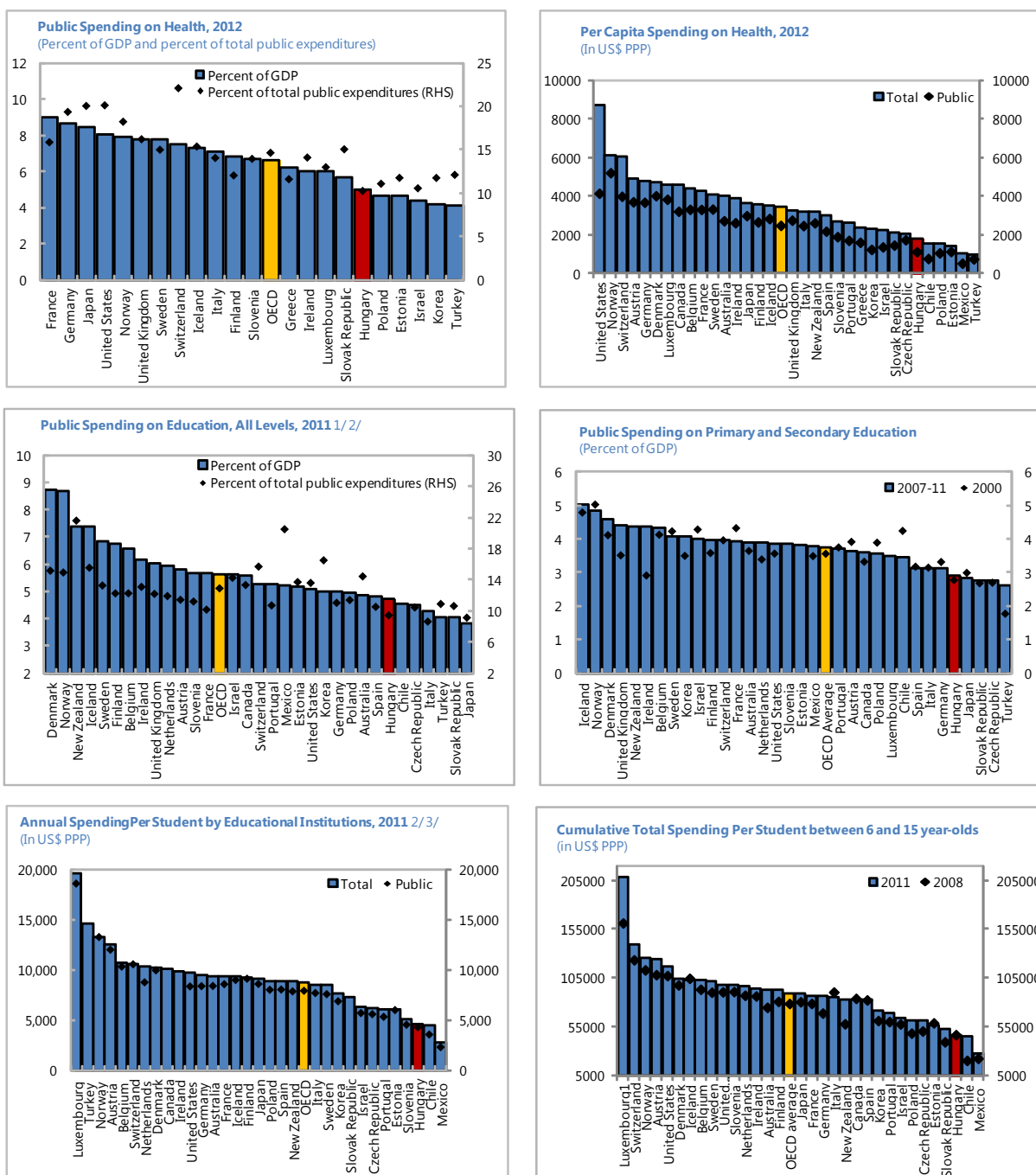
6/ The country has a small discrepancy in the data, thus the components do not add up to the total.

7/ Peers group includes Czech Republic, Poland and Slovak Republic

8/ Selected EU group includes Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Luxembourg, Poland, Slovak Republic, Slovenia, Spain and Sweden.

9/ Selected OECD includes Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Japan, Korea, Luxembourg, New Zealand, Norway, Poland, Slovak Republic, Slovenia, Spain, Sweden, Switzerland and United States.

Figure 1. Selected OECD Countries Spending on Health and Education



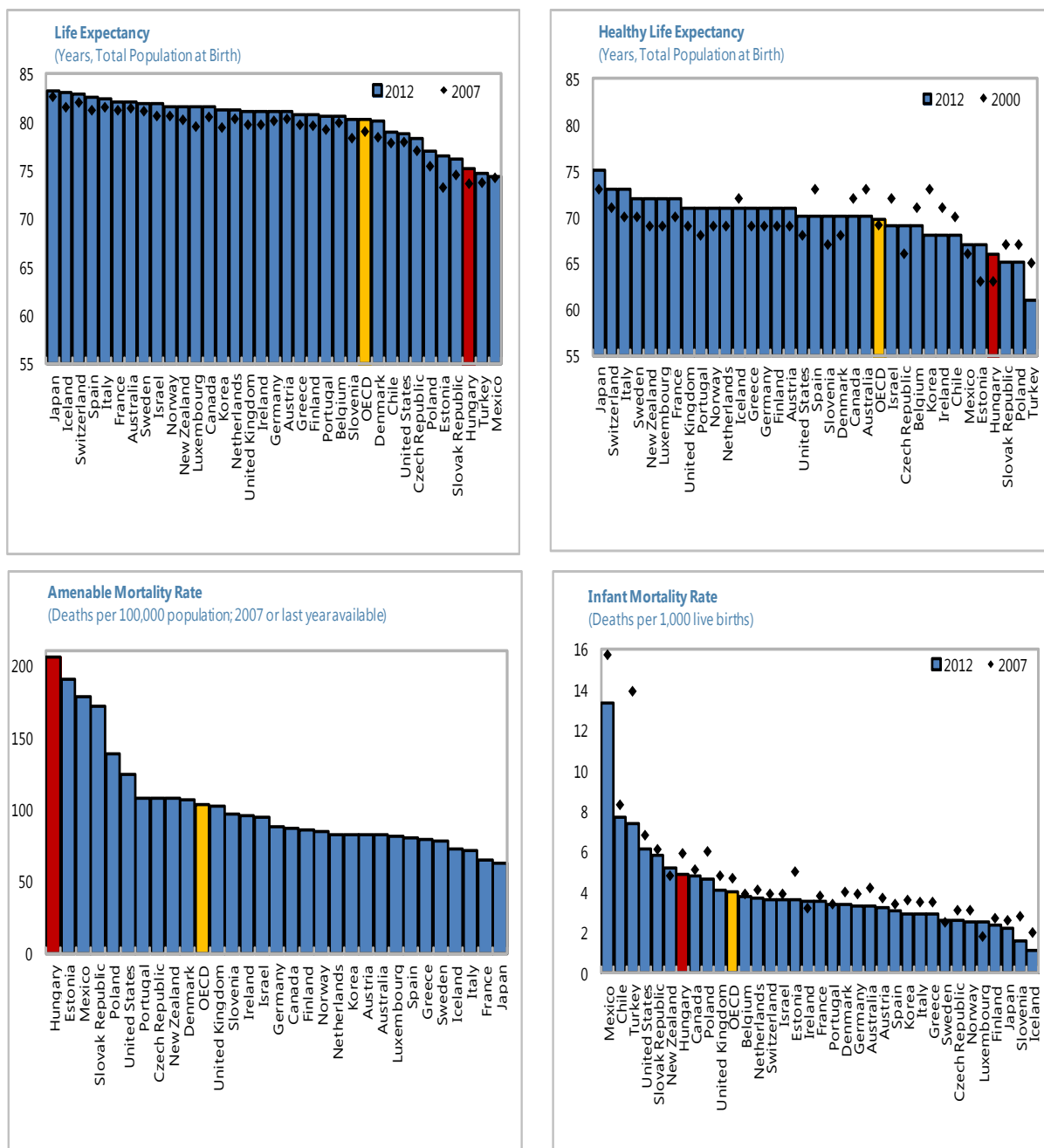
Sources: OECD Health and Education Database; PISA 2012.

1/ Public expenditure includes public subsidies to households for living costs (scholarships and grants to students/households and students loans), which are not spent on educational institutions.

2/ Or latest year available.

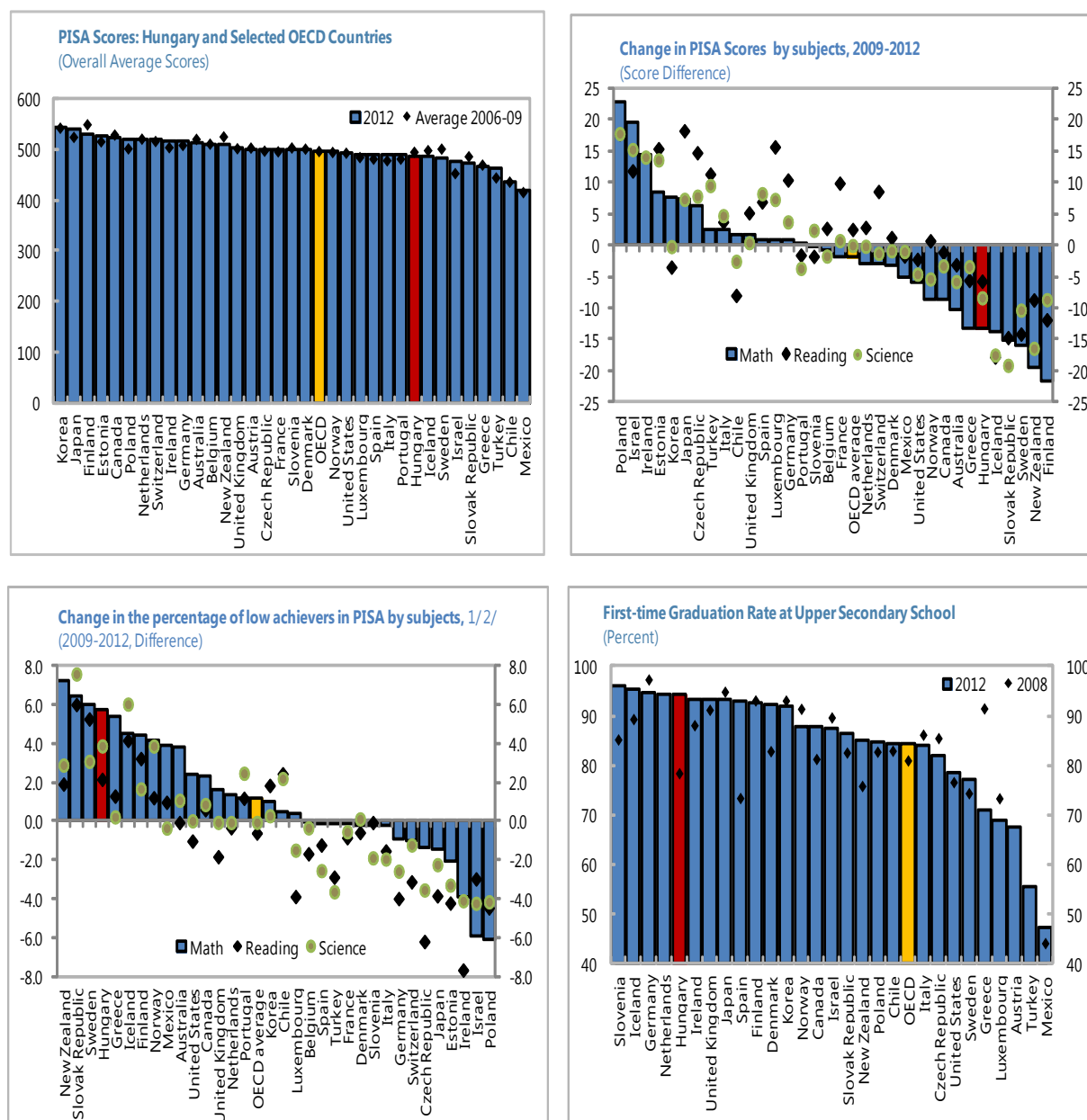
3/ Spending on primary, secondary, and postsecondary non-tertiary education.

Figure 2. Selected OECD Countries: Health Outcomes



Sources: OECD Health Statistics Database, WHO, and Gay et al. (2011).

Figure 3. Selected OECD Countries: Education Outcomes



Sources: OECD Education Database; PISA results, and IMF Staff Estimates.

1/ A Positive value implies a deterioration.

2/ Low achievers are defined as students with scores below level 2 (scores of less than 420.07 score points in math; less than 407.47 score points in reading, and less than 409.54 score points in science).

Figure 4. Selected OECD Countries: Selected Indicators of the Health Sector

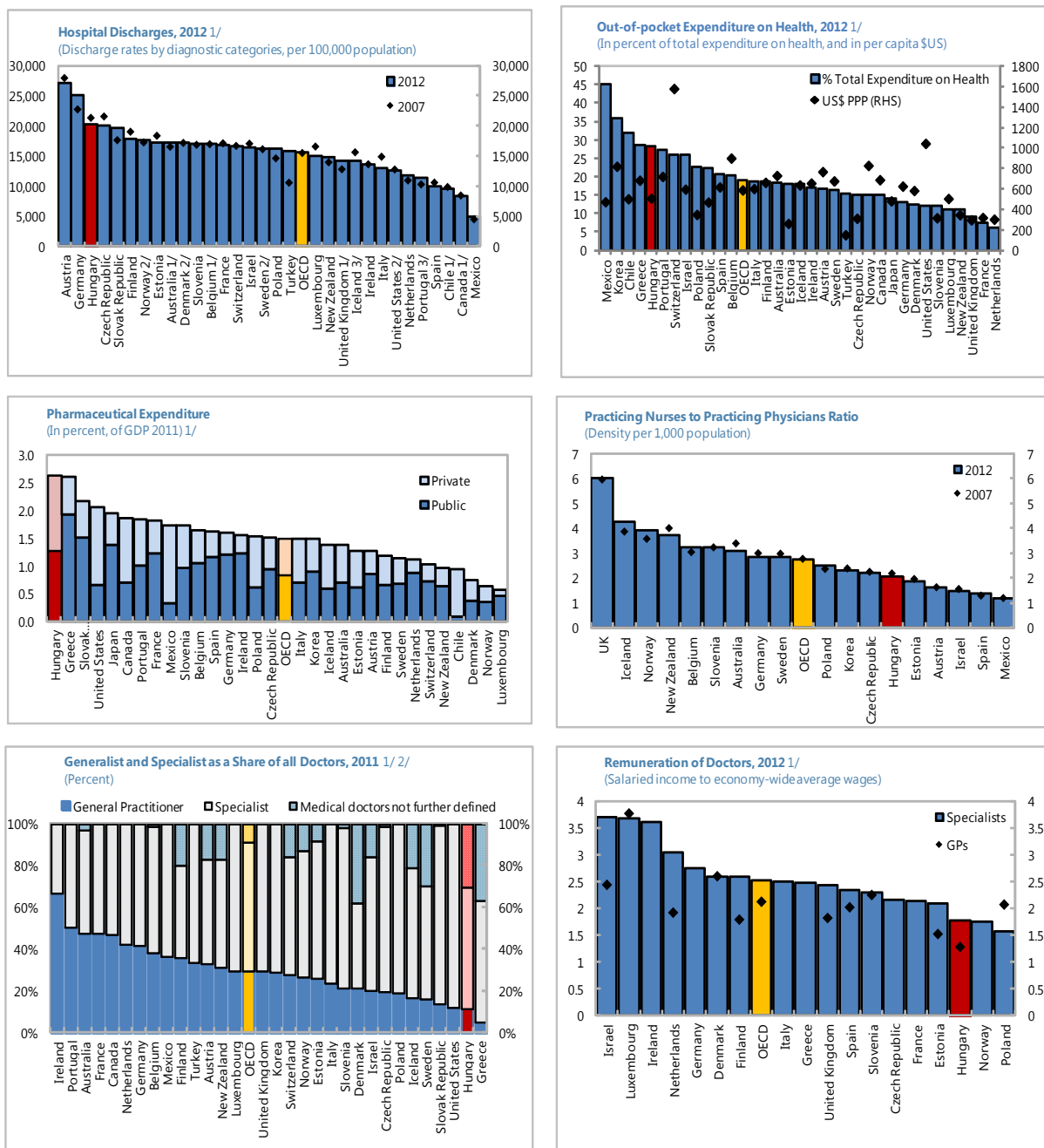
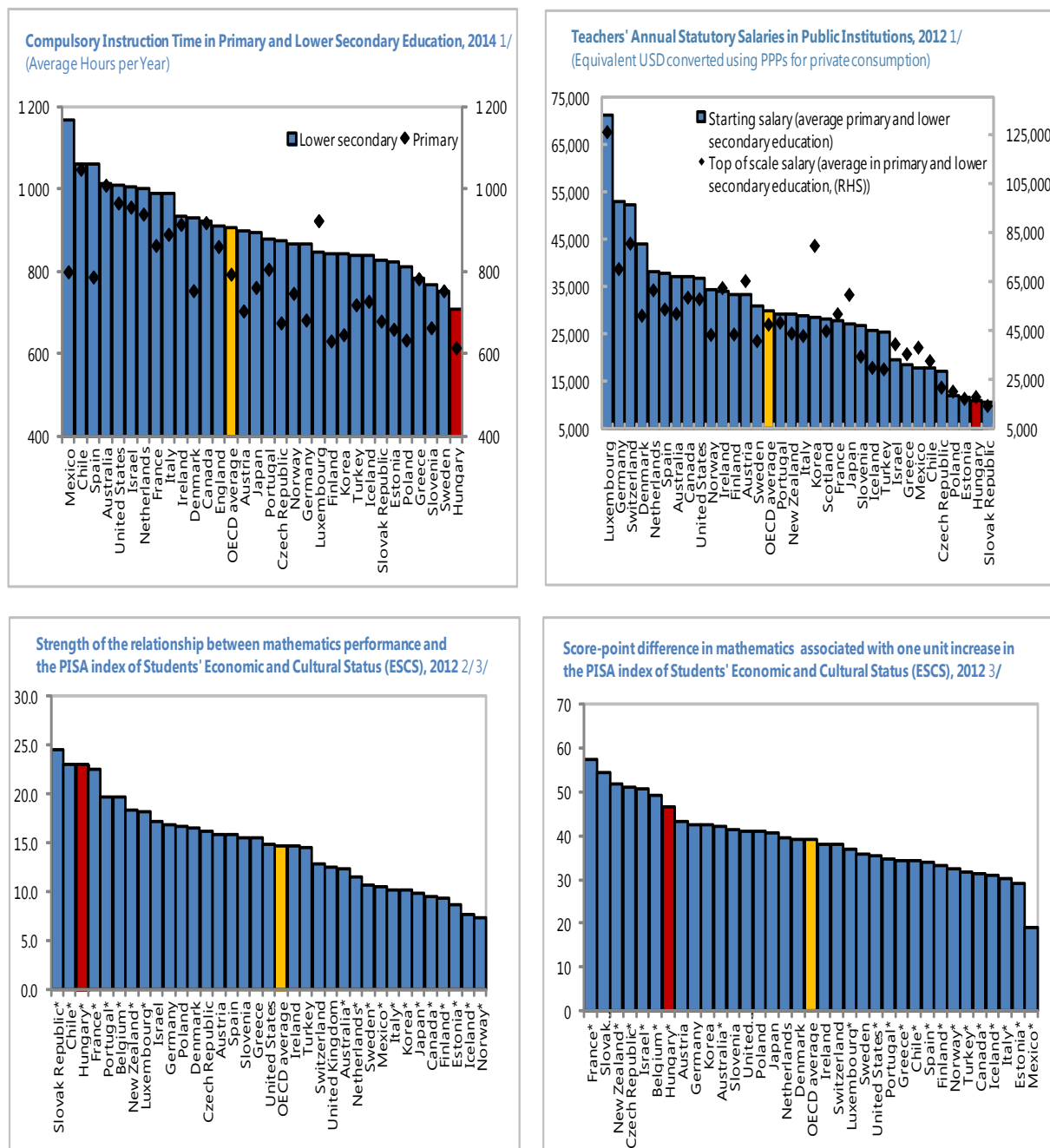


Figure 5. Selected OECD Countries: Selected Indicators of the Education Sector



Sources: OECD Education Database, and PISA 2012 Results.

1/ Or latest year available.

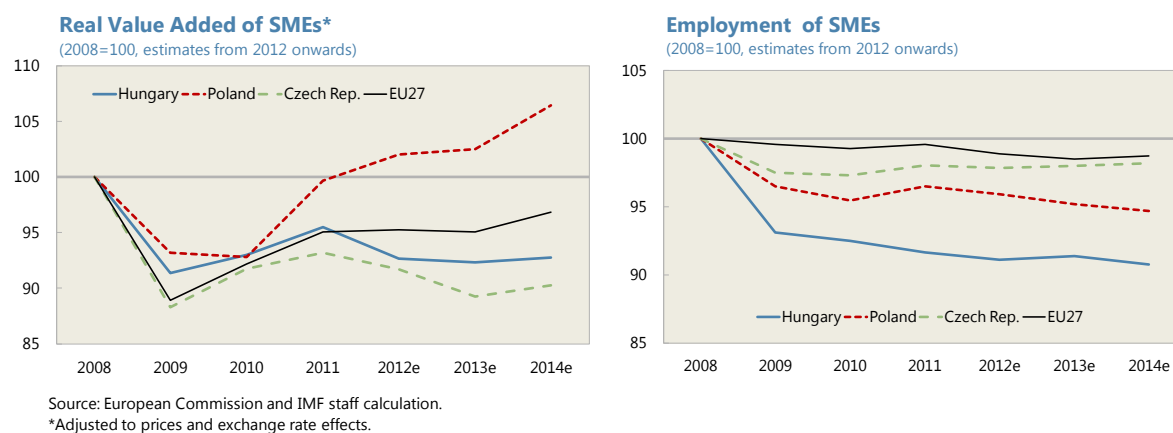
2/ Measured by the percentage of explained variance in math performance, based on a single-level bivariate regression of performance on the ESCS.

3/ All values are statistically significant. Values that are statistically significantly different from the OECD average are indicated with an asterisk.

INTERNATIONALIZATION OF SMALL AND MEDIUM SIZED ENTERPRISES IN HUNGARY: DETERMINANTS AND THE LINK TO GROWTH¹

A. Introduction

1. The small- and medium-sized enterprise (SME) sector in Hungary has yet to recover from the global financial crisis. This sector is relatively large, accounting for 71 percent of the business sector's employment.² However, employment and real value added are estimated to remain well below their pre-crisis level (about 9 percent and 7 percent, respectively), suggesting that the SMEs' weak activity continues to weigh on economic recovery (chart). While the poor SMEs' performance is in part a reflection of the ongoing corporate sector's deleveraging, and the tight credit conditions, which limited the access to finance for more risky SMEs, it also resulted from the sharp contraction of domestic demand—the SMEs' main market (Figure 1A in the Appendix).



2. Reducing the SMEs' heavy reliance on the domestic market can foster higher growth while increasing their resilience to shocks. The benefits of firms' internationalization are well recognized. By broadening the customer base through entering new markets, firms are able to expand their production, especially if such expansion is constrained in the domestic market due to saturation or well-entrenched competitors. Furthermore, the diversification of revenue sources can also reduce the firm's vulnerability to shocks, and as such support more stable growth over time, while some studies, including Robson and Bennet (2000), and Beccetti and Trovato (2002), suggest that firms are likely to become more productive and efficient by entering foreign markets ("learning-by-exporting" hypothesis).³ Relatedly, studies, including the OECD (2008), argue that firms that

¹ Prepared by Nir Klein.

increase their internationalization through increased integration into global supply chains are likely to benefit from access to new technologies, innovations, and advanced management techniques, and thus improve the production process and increase productivity.

3. Against this background, the purpose of this paper is twofold. First, it aims at assessing the link between the firm's internationalization (as proxied by the export-to-operating revenue ratio) and firm's growth in Hungary by applying a micro-level analysis. The second objective is to examine whether firm-level factors, including factor productivity, profitability, leverage, and capital structure play a role in the firm's degree of internationalization. Identifying these factors could help in shaping up policy priorities to facilitate higher SMEs' internationalization and growth.

4. The analysis finds a positive link between internationalization and growth among Hungarian SMEs. While the results should be treated with caution given the limited sample, the noisy period, and the narrow measure of internationalization, they show a positive and significant link between the change in the export-to-operating revenue ratio and SMEs' growth. Moreover, the analysis suggests that larger SMEs are more likely to access foreign markets, while factors such as higher fixed assets ratio, higher labor productivity, and more favorable liquidity position contributed to firms' internationalization. At moderate levels, higher leverage was also found to contribute to higher export-to-operating revenues ratio, though this effect diminishes at excessive leverage ratio.

5. The rest of the paper is structured as follows: Section B presents some stylized facts on the degree of internationalization and innovation among Hungarian SMEs compared to EU peers. Section C employs a dynamic panel model to assess the link between the SMEs' internationalization and growth, and examines whether the link varies by the firm's size. Section D identifies the firm-level determinants for the SMEs' internationalization; and section E concludes.

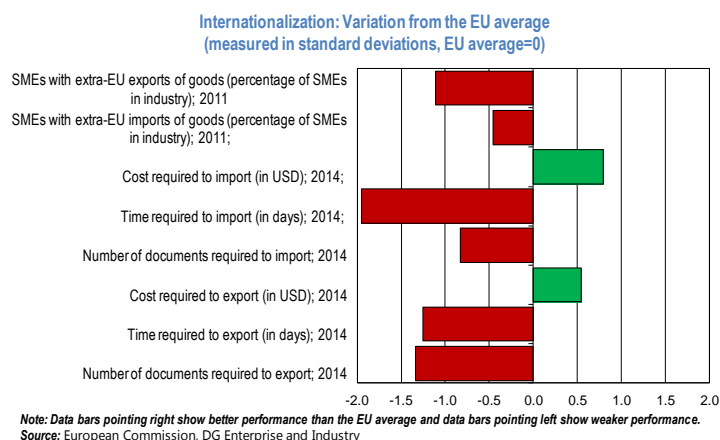
² The SME sector accounts for 53 percent of the business sector's value added, largely reflecting the presence of large multinational companies in the manufacturing sector.

³ While a common result is that exporting firms are generally more productive, larger, and technologically more sophisticated; the evidence on the direction of the causality is mixed. Some studies, including Bernard and Wagner (1997), Bernard and Jensen (1999), and Clerides et al. (1998), argue for a self selection of the more productive firms into the export markets given the high fixed costs associated with selling goods in foreign markets.

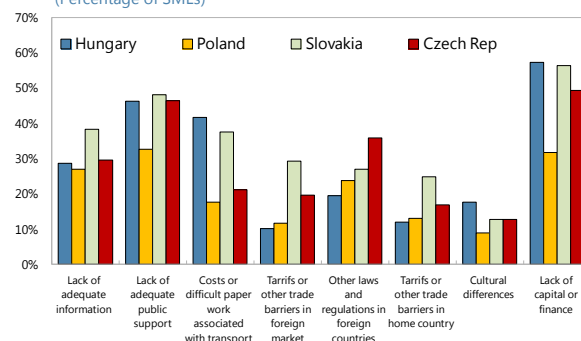
B. Some Stylized Facts

6. Cross country comparison suggests that the degree of internationalization among Hungarian SMEs falls behind that of its European peers (Figure 2A in the Appendix). The European Commission's 2014 *Small Business Act Fact Sheet*, indicates that, apart from the cost required to export/import, Hungary scores well below the EU's average in all of the internationalization criteria (chart).

Specifically, the share of SMEs trading outside the EU is significantly below the EU average, and the bureaucracy—the time and number of documents required to export/import—is poorer than the EU average. These indicators are consistent with the European Commission's survey on internationalization of European SMEs,⁴ which shows that the level of internationalization of Hungarian SMEs is relatively low, and in some indicators—particularly SMEs with direct exports and SMEs with cooperation with enterprises abroad—Hungarian SMEs fall behind their regional peers (Table 1A in Appendix).⁵ The survey also indicates that Hungarian SMEs face some critical impediments to expanding their activity beyond the local market. In this regard, the percentage of Hungarian SMEs that reported the “lack of capital or finance” and the “cost or difficult paper work associated with transport” is high and exceeded that in regional peers (chart).



Barriers Related to Business Environment /1
(Percentage of SMEs)



1/ The columns indicate the percentage of firms that reported these barriers as important.
Source: *Internationalisation of European SMEs*, European Commission, 2010.

7. There appears to be a strong link between internationalization and innovation.

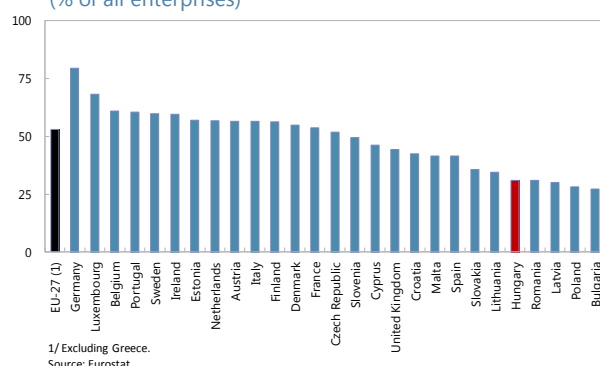
Although the causality between innovation and internationalization is likely to be bi-directional, it was found that internationally active firms tend to introduce product/service and process innovations more often than non-internationally active firms (European Commission, 2010). Some empirical studies, including Golovko and Valentini (2011), found that exports and innovation positively reinforce each other, as the positive effect of innovation on firms' growth rate is higher for

⁴ The survey was conducted in the context of the European Commission report on “Internationalisation of European SMEs” (European Commission, 2010).

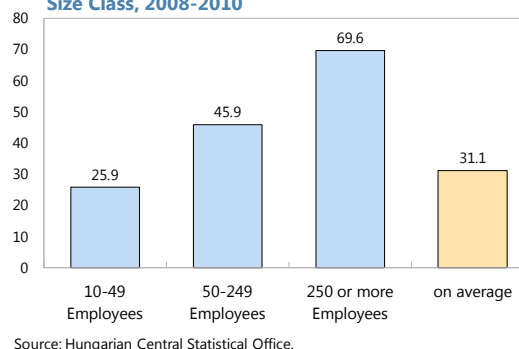
⁵ The report defines internationalization as one of the following activities: exporting, importing, investing abroad, cooperating internationally, or involvement in an international subcontracting.

firms that also engage in exports, and vice versa. This may suggest that the low level of Hungarian SMEs' internationalization is partly driven by their low level of innovation activities. The proportion of innovative enterprises (i.e., those that introduced a new product/service, process, new marketing or new management methods) during 2008–10 stood at about 31 percent, ranking fifth from the bottom in the EU (chart). Furthermore, the composition of enterprises shows that innovation activities are inversely related to the firm's size: while more than two thirds of the large firms were engaged in innovation activities in 2008–10, less than half of medium-sized firms and about a quarter of the small firms innovated during this period.

Proportion of innovative enterprises, 2008–10
(% of all enterprises)



Hungary. Proportion of Innovative Enterprises by Size Class, 2008-2010



C. The Link between Internationalization and Growth

Data

8. The analysis uses the ORBIS database of Bureau Van Dijck, which contains world-wide information on private and public firms. We include all Hungarian SMEs and large enterprises that have a complete record of the variables of interest, and that were “active” during the sample period (thus excluding firms that went bankrupt or were established during the period). Overall, the sample includes annual data for 2006–13 for 478 firms, 300 of them are SMEs that are privately-owned and unlisted in the stock market.⁶

9. Firms' characteristics are presented in Table 1. Although the comparison may not be representative of all Hungarian firms, it clearly shows that the exports-to-operating revenue ratio increases with the firm's size: the average export-to revenue ratio for the median large firm is ten-fold the ratio of the median small firm and about threefold the ratio of the median medium firm. The firms' cash flow-to-operating ratio also increases with the firm size, thus indicating a higher level of profitability. Interestingly, while the comparison indicates that large and medium firms

⁶ Consistent with the European Commission, we classify SMEs as firms with 10-249 employees (thus excluding micro firms), annual turnover of less than €50 million, and a balance sheet of no more than €43 million.

recorded higher growth than small firms (cumulative, 2006-13), there is no clear link between the firms' size and labor productivity growth.

Table 1. Selected Indicators by Firm Size, 2006–2013¹			
	Small firms (10-49)	Medium Firms (50-249)	Large Firms (>249)
Export-to-revenue ratio, percent	7.0	23.3	70.9
Labor productivity growth, cumulative 2006-2013	-7.62	-14.40	32.67
Assets (million EUR)	4	7	12
Cash flow-to- operating revenues, percent	5.0	6.0	9.0
Real Growth of operating revenues , Cumulative 2006-2013	-17.26	-0.05	0.07
Number of employees	32	96	363
Number of firms	88	212	178
¹ Figures refer to the median firm in each category.			

10. Table 2, which covers SMEs, highlights the differences between SMEs with high export-to-operating revenue ratio and the rest. The former are mostly from the manufacturing sector, and they are larger on average, both in terms of total assets and employees. Moreover, SMEs with a high export-to-revenue ratio were more profitable and recorded higher cumulative growth in their operating revenues compared to firms with low export share. The latter is also reflected in their higher labor productivity growth. The liquidity ratio shows that high-export firms maintained lower level of liquidity, suggesting that machinery, buildings and other tangible assets account for a larger part of their assets. Indeed their share of fixed assets to total assets is well above that of low-export firms. The gearing ratio (the ratio between non-current liabilities and shareholder funds) is significantly higher in firms with higher export ratio, thus suggesting that these firms have on average higher access to financing.

Table 2. SMEs: Selected Indicators by Export-to-Revenue Ratio^{1,2}		
	High Export ratio	Low Export ratio
Real Growth of operating revenues, Cumulative 2006-13	2.62	-12.03
Labor productivity growth, cumulative 2006-13	-1.5	-26.0
Cash flow (percent of operating revenue)	6.6	4.89
Gearing ratio	41.2	23.8
Assets (in mil EUR)	5.0	6.0
Fixed tangible assets-to-total assets	40.67	28.43
Liquidity ratio	0.84	1.02
# of employees	93	59
# of firms	156	144
of which manufacturing	110	6
Small firms	31	57
¹ Firms with high (low) export ratio are those that their export ratio is above (below) the sample's median.		
² Figures refer to the median firm in each category.		

Econometric Model

11. In the first stage, we examine whether higher internationalization matters for firms' growth. We apply a dynamic panel analysis with unobserved panel effects (Arellano and Bond, 1991), in which the firm-specific variables are treated as endogenous and instrumented with their lags.⁷ The sample includes both large firms and SMEs for which data is available over the period 2006–13. The model specification can be represented as follows:

$$(1) \text{ Growth}_{it} = \alpha_0 + \alpha_1(\text{Growth}_{it-1}) + \beta_1(\ln\text{Assets}_{it}) + \beta_2(d\text{Export}_{it}) \\ + \beta_3(d\text{Export}_{it} * \text{SME}) + \beta_4(\ln\text{Age}_{it}) + \beta_5(\text{Time}_t) + \varepsilon_{it}$$

12. Two alternative indicators are used to measure the firms' growth (Growth): the difference in the logarithms of the firm's operational revenues, *dlnOprev* (in HUF, deflated by the GDP prices) and the difference in the logarithms of the firm's employment, *dlnEmpl*. The change in the firm's internationalization is measured by the change in export-to-revenue ratio, *dExport*, and it is also interacted with *SME*—a dummy variable that obtains a value of one for SMEs and zero otherwise—to assess whether the impact of internationalization differ by the firm's size. In addition, we control for the "traditional" variables that are used in the literature to explain the firm's growth: (1) the firm's size, measured by the logarithms of the firm's total assets, *lnAssets* (in HUF, deflated by the GDP prices); and (2) the logarithms of the firm's age *lnAge*. The specification also includes a time variable, *Time*, to control for macroeconomic effects.

Table 3. Correlation Matrix, SMEs and Large Firms					
	<i>dlnEmpl</i>	<i>dlnOprev</i>	<i>lnAge</i>	<i>lnAssets</i>	<i>dExport</i>
<i>dlnEmpl</i>	1				
<i>dlnOprev</i>	0.277*	1			
<i>lnAge</i>	-0.084*	-0.017	1		
<i>lnAssets</i>	0.034	0.087*	0.021*	1	
<i>dExport</i>	0.028	0.038*	0.001*	0.015*	1
* indicates significance level of 5 percent.					

13. Table 3 presents the correlation matrix for the firm-specific variables. The table shows, as expected, a positive and significant correlation between the two measures for the firm's growth. Moreover, it indicates a positive correlation between the contemporaneous change in export-to-operating revenues and the two measures for growth and between the firms' size (*lnAssets*) and the firms' growth. The latter is negatively correlated with the firm's age, as also suggested by some previous studies.

⁷ Arellano's and Bond's (1991) estimator is designed for datasets with many panels and few periods and addresses the possible correlation between the lagged dependent variable and the unobserved panel effects.

Results

14. The estimation results are presented in Table 4. The Hansen test indicates that the instruments used are uncorrelated with the residual, and the Arellano-Bond tests for autocorrelation reject the hypothesis that the errors are not auto-correlated in the first order (AR(1)), but cannot reject this hypothesis for the second order (AR(2)).⁸ In addition, the results show that an increase in export-to-revenue ratio contributes to higher SMEs growth, suggesting that a one percentage point increase in export-to operating revenue ratio contributes to about 1½ percent to the firm's operating revenue growth (in real terms), and about ¼ percent growth in the firm's employment.⁹ Interestingly, the effect of higher export-to-operating revenue ratio is not significant for large firms, perhaps suggesting that the benefits of higher export ratios are significantly stronger at the initial stages and low levels of internationalization.

Table 4. Estimation Results, Internationalization and Growth, Full Sample¹						
Dependent variable	dlnOprev			dlnEmp		
<i>dlnOprev (lagged)</i>	-0.056**	-0.069**	-0.069**			
<i>dlnEmpl (lagged)</i>				0.024	0.022	0.019
<i>lnAssets</i>	0.380	0.376*	0.376*	0.153*	0.143*	0.139*
<i>dExport</i>	0.001	-0.003	-0.000	0.001	-0.000	-0.000
<i>dExport*SME</i>		0.016**	0.016**		0.003***	0.003***
<i>lnAge</i>			0.008			-0.069
<i>Time</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i># of observations</i>	2,240	2,240	2,240	2,267	2,267	2,267
<i>Arellano-Bond test (1) p-value</i>	0.000	0.000	0.000	0.000	0.000	0.000
<i>Arellano-Bond test (2) p-value</i>	0.875	0.225	0.206	0.539	0.687	0.659
<i>Sargan test</i>	0.028	0.115	0.115	0.302	0.280	0.267
¹ Significance level: * significant at 1 percent, ** significant at 5 percent, *** significant at 10 percent.						

15. In line with previous studies (e.g., Wiklund and Shepherd, 2005; Mateev and Anastasov, 2010) the results indicate that larger firms registered on average higher growth. This may reflect the notion that large firms are more likely to exploit economies of scale, have higher negotiating power over clients and suppliers (Serrasqueiro and Macas Nunes, 2008; Singh and Whittington, 1975), and that they generally face lower financing constraints. The impact of the firm's age was not found to have a significant effect, in contrast to the findings of some other studies such as Navertti et al. (2014).

⁸ The AR(1) process is expected in the differenced residuals; however, the test for AR(2) is more important because it detects autocorrelation in levels.

⁹ These results are broadly consistent with the European Commission's latest analysis for the EU (European Commission, 2014).

Robustness

16. The results are robust for alternative model specifications. For robustness, we estimate Eq. (1) under a two-stage least-squares generalization of fixed and random effect models.¹⁰ The estimation results (Table 2A in the Appendix) validate the positive effect of internationalization on growth among SMEs. More specifically, the coefficient size suggest that a one percentage point increase in export to operating ratio contribute to about 1-½ percent growth in the operating revenue, and about ½ percent increase in the firm’s employment. The impact of export-to-revenue on large firms was not found to be significant.

D. The Determinants of Firms’ Internationalization

17. This section examines the extent to which the change in the firm’s export-to-operating ratio can be explained by firm- specific factors such as profitability, liquidity, leverage, size, labor productivity, and the share of fixed asset. As in the previous section, we apply a dynamic panel approach, which can be represented as follows:

$$(2) \ dExport_{it} = \alpha_0 + \alpha_2(dExport_{it-1}) + \beta_1(lnEmpl_{it}) + \beta_2(lnAge_{it}) + \beta_3(dGearing_{it}) + \beta_4(dLprod_{it}) + \beta_5(dLiquidity_{it}) + \beta_6(dCflow_{it}) + \beta_7(Fassets_{it}) + \beta_8(Time_t) + \varepsilon_{it}$$

18. The change in the firm’s export-to-operating revenues ratio, *dExport*, serves as a proxy for the change in the firm’s degree of internationalization. This ratio is explained by its one-period lag and by other firm specific factors, including the firm’s size, measured by the logarithms of the number of employees, *lnEmpl*; the logarithms of the firm’s age, *lnAge*; the change in labor productivity, *dLprod*, which measures annual efficiency gains at the firm level, and fixed tangible assets to total assets, *Fassets*. The latter may capture the firm’s capital intensity, and also the availability of collateral for bank financing, which affect the risk classification of the firm.¹¹ Furthermore, the specification includes several financial variables, which include the change in the firm’s financial leverage, *dGearing* (measured by the ratio of non-current liabilities and loans-to-shareholders’ funds); the change in the firm’s liquidity, *dLiquidity* (measured by the change in the ratio of current assets minus inventories to current liabilities); and the change in the firm’s profitability, *dCflow* (profit plus depreciation-to-operating revenue ratio). The financial variables are interacted with *High*—a dummy variable, which obtains a value of one if the firm’s ratios are above the average in the sample, and zero otherwise. Lastly, the estimation allows for a time variable, *Time*, to capture macro-economic effects. All of the firm’s specific variables, apart from the firm’s age, are treated as endogenous variables, thus instrumented with their lags. This methodology controls for unobserved individual effects, thus variables that are time invariant, such as the sector in which the firms operate, were dropped. Summary statistics are presented in Tables 5.

¹⁰ The possible endogeneity problem is addressed by using the variables’ lags as instruments.

¹¹ Duenas-Caparas (2007) used capital intensity to capture past innovations and knowledge.

Table 5. Summary Statistics, Firm Level Variables N=2400, 2006–13

	Mean	Standard Dev.	Min	Max
<i>Export ratio</i>	29.69	30.44	0.01	99.95
<i># of Employees</i>	86.68	53.06	10.00	249.00
<i>Firm Age</i>	15.09	4.54	0.00	31.00
<i>Labor productivity</i>	41.69	42.67	2.50	486.67
<i>Gearing ratio (%)</i>	64.50	100.58	0.00	968.81
<i>Liquidity ratio</i>	1.21	1.14	0.06	15.42
<i>Cash flow (%)</i>	6.85	7.18	-79.91	43.17
<i>Fixed tangible assets to total assets (%)</i>	34.78	23.47	0.00	100

19. Table 6 presents the correlation matrix. It shows that SMEs with higher export ratio are, on average, more profitable, have more employees, and maintain a higher share of fixed assets. Moreover, SMEs with higher leverage (gearing ratio) maintain lower levels liquidity and are less profitable, perhaps reflecting the high debt service payments. Interestingly, the correlation of export ratio with labor productivity is negative.

Table 6. Correlation Matrix

	<i>Export ratio</i>	<i># of Employees</i>	<i>Firm Age</i>	<i>Labor productivity</i>	<i>Gearing ratio (%)</i>	<i>Liquidity ratio</i>	<i>Cash flow (%)</i>	<i>Fixed assets ratio (%)</i>
<i>Export ratio</i>	1							
<i># of Employees</i>	0.301*	1						
<i>Firm Age</i>	0.006	0.044*	1					
<i>Labor productivity</i>	-0.149*	-0.412*	-0.081*	1				
<i>Gearing ratio (%)</i>	0.040*	-0.033	-0.069*	0.070*	1			
<i>Liquidity ratio</i>	-0.025	-0.067*	0.053*	-0.049*	-0.252*	1		
<i>Cash flow (%)</i>	0.076*	0.042*	-0.076*	-0.158*	-0.194*	0.222*	1	
<i>Fixed assets (%)</i>	0.214*	0.231*	-0.005	-0.307*	0.164*	-0.180*	0.205*	1

* indicates significance level of 5 percent.

20. The estimation results are presented in Table 7. They show that, while the firm's profitability and age do not affect the firm's export ratio, other factors have a significant effect on the firm's degree of internationalization. In particular, the results suggest that:

- **Size.** Large firms, with a large number of employees, have, on average, higher export share. This finding is broadly in line with previous studies that suggest that the penetration into foreign markets entails large resources (personnel, financial, research and development, and marketing) that are often beyond the means of small firms (Bonaccorsi, 1992). OECD (2009) indeed highlighted that, beyond the financial barriers (which are also a function of size), lack of managerial skills and knowledge about new markets, which are likely to be more prevalent among SMEs, remain among the top obstacles for internationalization. The positive link between firm's size and export share can be supported by a possible economies-of-scale effect, and by the notion that smaller firms tend to expand their domestic markets first due to lower uncertainty and risk (Cavusgil and Noar, 1987).

- **Labor productivity.** SMEs that became more productive (i.e., increased labor productivity) registered higher export-to-revenue share. This finding indicates that more productive firms are more likely to enter the export market, suggesting that competitiveness plays an important role in internationalization (e.g., Golovko and Valentini, 2011).

Table 7. Estimation Results, Determinants of SMEs' Internationalization ¹						
	<i>dExport</i>	<i>dExport</i>	<i>dExport</i>	<i>dExport</i>	<i>dExport</i>	<i>dExport</i>
<i>dExport (lagged)</i>	-0.081	-0.092***	-0.086**	-0.088***	-0.073	-0.084***
<i>lnEmpl</i>	3.802*	3.370**	2.660**	1.825***	1.375	0.860
<i>dLprod</i>	0.026	0.0329	0.027***	0.032**	0.033**	0.032***
<i>lnAge</i>		-0.000	0.133	0.185	-0.082	0.003
<i>dGearing</i>			0.027***	0.032**	0.029**	0.026**
<i>dGearing*High</i>			-0.029**	-0.034**	-0.030**	-0.028**
<i>dLiquidity</i>				1.341***	1.212***	1.329***
<i>dLiquidity*High</i>				-1.119	-0.9300	-1.095
<i>dCflow</i>					-0.014	-0.005
<i>dCflow*High</i>					-0.024	-0.064
<i>Fassets</i>						0.035***
<i>Time</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Constant</i>	-15.505**	-14.016**	-11.385	-7.547	-5.362	-4.586
<i># of observations</i>	1,799	1,799	1,799	1,799	1,799	1,797
<i># of firms</i>	300	300	300	300	300	300
<i>A-B test (1) p-value</i>	0.000	0.000	0.000	0.000	0.000	0.000
<i>A-B test (2) p-value</i>	0.882	0.794	0.795	0.750	0.888	0.758
<i>Hansen test</i>	0.136	0.229	0.599	0.280	0.295	0.335

¹Significance level: * significant at 1 percent, ** significant at 5 percent, *** significant at 10 percent.

- **Access to finance.** Leverage was found to have a positive effect as long as it remains at moderate levels. The positive and significant coefficient of *dGearing* ratio implies that financing constraints not only affect the firms' growth (Bechetti and Trovato, 2002) but they also limit the firm's expansion into foreign markets. That said, the estimation shows that "excessive" leveraging (i.e., beyond the sample's average (65 percent) eliminates this positive effect. This finding is consistent with that of Demijan (2014), who examined the link between financial soundness and performance among firms in Slovenia and found that excessive indebtedness undermine the firm's exports.
- **Liquidity.** Liquidity-constrained firms are less likely to increase their export-to-operating revenue ratio, perhaps due to the negative effect on firm's investment, and ability to direct resources to productive uses. Liquidity-constrained firms are also less likely overcome the cost associated with accessing and operating in foreign markets.¹²

¹² This result is broadly consistent with Chaney (2005) who found that a relaxation of liquidity constraints causes firms to increase export.

- **Fixed assets.** The impact of the fixed assets-to-total assets is positive and significant. As discussed above, this variable may reflect several channels, including the availability of collateral for bank financing, which affect the firm's riskiness and cost of capital, as well as the firm's degree of capital intensity, technology, and sophistication.

E. Conclusions and Some Policy Implications

21. The SME sector remains an important driver for Hungary's economic growth and employment creation. However, its heavy reliance on the domestic economic activity has limited its opportunities to expand, develop, and reap the benefits of globalization. Moreover, the collapse of domestic demand in 2009 and the weak domestic economic activity in subsequent years adversely affected the SMEs' performance, and their employment and value added have yet to return to their pre-crisis levels.

22. This paper investigated the effects and the firm-level determinants of internationalization among Hungarian SMEs. While the results need to be treated with caution, given the limited sample size, and the turbulent sample period, which largely covers the effects of the global financial crisis, we find strong evidence that an increase in the SMEs' export-to-operating revenue ratio has a nontrivial effect on SMEs' growth, both in terms of revenues and number of employees. This finding perhaps corroborates the "learning-by-exporting" hypothesis, which suggests that greater degree of internationalization can generate positive spillovers through technology and knowledge transfer, and ultimately lead to productivity and competitiveness gains.

23. The analysis also identified some of the firm-level factors that contribute to higher internationalization. Specifically, larger firms with a high share of fixed tangible assets tended to increase more their level of internationalization. Moreover, higher labor productivity, more favorable liquidity position, and higher leverage are also associated with higher degree of internationalization, though the positive effect of the leverage ratio diminishes when its level is "excessive".

24. These results suggest that there is scope to take policy actions to alleviate the barriers for internationalization to support SMEs' growth. Developing a stronger infrastructure to improve the capacity of SMEs to trade internationally, including by simplifying procedures for exports—an area that Hungary is lagging behind its peers, is critical. Additionally, there is scope to expand public sector's support to help SMEs penetrate foreign markets, including by reducing skill mismatch; and promote innovation activities so as to enhance factors' productivity and external competitiveness. Fostering greater cooperation of SMEs with large multi-national companies can also facilitate positive spillovers through knowledge and technology transfer and better infrastructure for internationalization. As the results also show that greater access to financing is an important contributor to SMEs' internationalization, it is important to ensure that financial intermediation is repaired, including by cleaning up banks' portfolio and reducing the heavy tax burden. Finally, developing an infrastructure for non-bank financing may also alleviate funding constraints.

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Appendix I: Supplementary Figures and Tables

Table 1A. Percentage of SMEs with International Business Activities

	EU	Hungary
SMEs with direct exports	25%	17%
SMEs with direct imports	29%	41%
SMEs invested abroad	2%	2%
SMEs with technological cooperation with enterprises abroad	7%	4%
SMEs has been a subcontractor to a foreign main contractor	7%	7%
SMEs had foreign subcontractors	7%	11%
Total firms	9,480	206

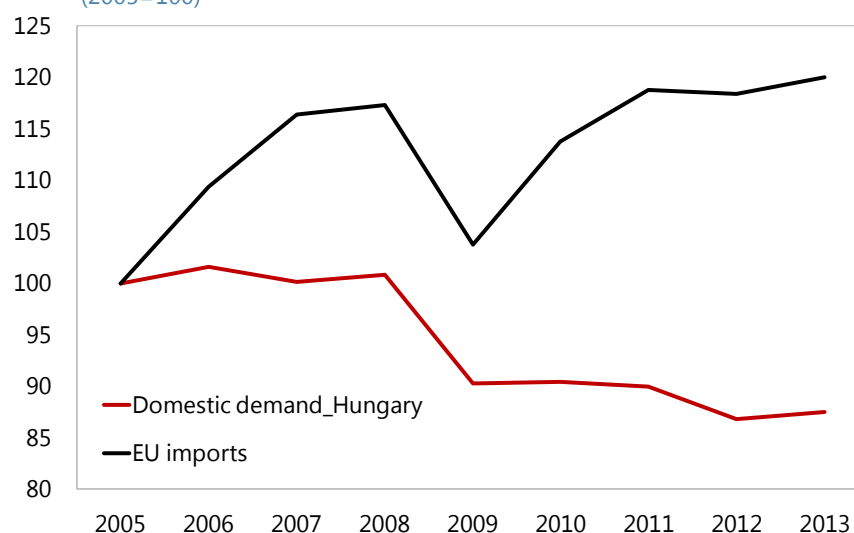
Source: Survey 2009, Internationalization of European SMEs EIM/GDCC.

Table 2A. IV panel estimation results, internationalization and growth, full sample¹

	<i>dlnOprev</i>		<i>dlnEmp</i>	
	Fixed effect	Random effect	Fixed effect	Random effect
lnAssets	-0.344*	0.004	-0.064	0.003
dExport	-0.001	-0.003	-0.002	-0.002
dExport*SME	0.006***	0.010***	0.004**	0.006***
lnAge	0.021	-0.014	-0.233**	-0.011
Time	Yes	Yes	Yes	Yes
# of observations	2,249	2,249	2,249	2,249
# of firms	459	459	459	459
Hausman test		0.000		0.076

¹Significance level: * significant at 1 percent, ** significant at 5 percent, *** significant at 10 percent.

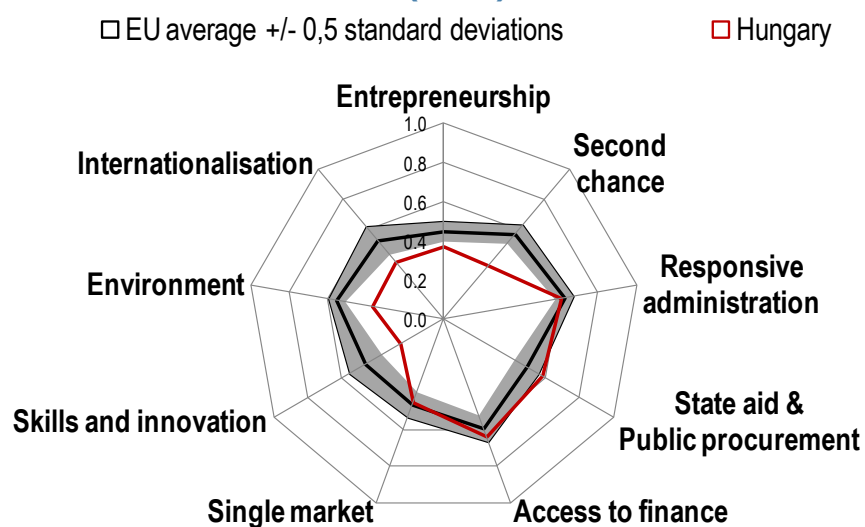
Figure 1A. Domestic Demand in Hungary and the EU Imports (2005=100)



Sources: Haver and IMF staff's calculations.

Table 3A. Dependent and explanatory variables		
Variable	Definition	Interpretation
<i>dlnOprev</i>	Difference between the logarithms of the firm's operating revenue in period t and t-1	Proxy for the firm's growth
<i>dlnEmp</i>	Difference between the logarithms of the firm's employment in period t and t-1	Proxy for the firm's growth
<i>dExport</i>	Difference between the ratio of exports to operating revenues in periods t and t-1	Proxy for the change in the firm's internationalization
<i>LnEmp</i>	Logarithm of the firm's number of employees	Proxy for the firm's size
<i>LnAge</i>	Logarithm of the number of years since incorporation	Years of existence
<i>dCflow</i>	Difference between the ratio of cash flow to operating revenue in periods t and t-1	Proxy for internally generated income
<i>dGearing</i>	Difference between the ratio of non-current liabilities and loans to shareholders' funds in periods t and t-1	Proxy for the change in the firm's leverage
<i>dLprod</i>	Difference between the ratio of operating revenue to the number of employees in periods t and t-1	Proxy for the change in the firm's labor productivity
<i>LnAsset</i>	Logarithm of the firm's total assets	Proxy for the firm's size
<i>dLiquidity</i>	Difference between the ratio of current assets minus inventories to current liabilities in periods t and t-1	Proxy for the change in the firm's liquidity
<i>Fassets</i>	The ratio of fixed tangible assets to total assets	Proxy for capital intensity, and collateral for bank financing

Figure 2A. Hungary's Small Business Act (SBA) Profile (2014)



Source: European Commission, DG Enterprise and Industry.

MONETARY POLICY SURPRISES AND MARKET REACTION IN HUNGARY—AN EVENT STUDY APPROACH¹

A. Introduction

1. The National Bank of Hungary (MNB) uses the policy rate, along with other monetary policy instruments, to maintain price stability under its inflation targeting framework. The impact of monetary policy on the economy is transmitted through various channels, including through its effect on current money market interest rates and on market expectations regarding the state of the economy, the inflation outlook, and the future trajectory of the policy rate. Therefore, the new information embedded in the monetary policy council's (MPC) communication and decisions is likely to trigger a recalibration of market expectations, and an adjustment in financial market variables.

2. This paper aims at identifying monetary policy surprises in Hungary, examine how they changed over time, and evaluate to what extent they affected various asset prices. It applies Kuttner's (2001) and Bernanke's and Kuttner's (2005) methodology, in which the unexpected change in the policy rate ("monetary policy surprise") is extracted from the forward rates on the day of the policy rate announcement, assuming that their change is mainly driven by the new information embedded in the MPC decisions.² While this approach is subject to several caveats, including the potential "omitted variables" problem and the possibility that monetary policy decisions are influenced by movements in asset prices ("endogeneity" problem), it has the advantage that it uses a market measure to gauge interest rate expectations, which does not depend on model selection.

3. The paper finds that monetary policy surprises in Hungary were relatively large compared to ones in regional peers, particularly during the global financial crisis (2008–09). In recent years, however, the magnitude of the unexpected change in the policy rate declined significantly, perhaps reflecting greater transparency about the direction of the policy rate. Moreover, the results show that, while market expectations were in line with MNB's decisions to tighten the monetary policy stance or keep the policy rate on hold, in episodes of monetary easing, the actual policy rate cut tended to be larger-than-expected by the market, perhaps as a way to signal to market participants that the MNB is determined to move ahead with the monetary easing.

¹ Prepared by Nir Klein.

²The literature offers several approaches to identify monetary policy surprises, including the "identification-through-heteroscedasticity" that was introduced by Rigobon and Sack (2004) and was applied by Rosa (2009), and Rezeszy (2005). See Wang and Mayes, 2012, for literature review.

4. The paper also shows that monetary policy surprises had a significant impact on key financial market indicators. In particular, it finds that “positive” monetary policy surprises contributed to an increase in the medium and long-end of the yield curve, and to a decline in stock market prices (and vice versa).³ Interestingly, the results also indicate that, in episodes of monetary policy tightening and unchanged policy rate, “positive” monetary policy surprises contributed to an increase in the sovereign risk premia, particularly in the post-crisis period. This result may suggest that “positive” surprises exacerbated market concerns about financial stability risks.

5. The remainder of the paper is structured as follows: Section B briefly outlines the methodology used in this analysis to decompose the expected and unexpected change in the policy rate from the policy rate decisions. This section also discusses the calculation results and compares them to those of Hungary’s regional peers. Section C explores the effect of the expected and unexpected changes in the policy rate on four financial market indicators and validates the results through several robustness checks. The conclusions are presented in section D.

B. Methodology

Extracting the monetary policy surprises

6. We extract monetary policy surprises by calculating the change in the forward rate agreements on the days of the policy rate announcement by the MPC. Since the market may react to the lack of change in the policy rate, if a change had been anticipated, the calculation includes all the MPC decisions, as follows:

$$\Delta i_t^u = FRA1X4_t - FRA1X4_{t-1}$$

where Δi_t^u is the unexpected change in the policy rate, and t denotes the day of the MPC announcement. As in Gregoriou et al. (2009), the forward rate for three months ($FRA1X4$) is used as an indicator of market expectations of future policy change. Once the unexpected change in the policy rate is computed, the expected change can be derived as the difference between the actual and the unexpected change in the policy rate, as follows:

$$\Delta i_t^e = \Delta i_t - \Delta i_t^u$$

where Δi_t^e and Δi_t denote the expected and the actual changes in the policy rate on the day of the MPC announcement, respectively.

³ “Positive” (“negative”) monetary surprises refer to episodes in which the actual change in the policy rate resulted in a tighter (looser) monetary stance than the one expected by the markets.

7. The expected and unexpected changes in the policy rate are calculated from July 2004 until December 2014.⁴ During this period, there were only two occasions in which the MPC deviated from this practice: the first, on October 22, 2008, when the MPC held an extraordinary meeting and decided to increase the interest rate by 300bp to 11½ percent to curb the pressures on the exchange rate. The second occasion was on December 8, 2008, at the first scheduled MPC meeting of that month, by reducing the interest rate by 50bp to 10½ percent.

Table 1. Monetary Policy Council Meetings, July 2004–December 2014	
# of MPC meetings to discuss the policy rate	128
# of changes in the policy rate	66
Of which	
Policy rate cuts	53
Policy rate hikes	13
# of no change in the policy rate	62

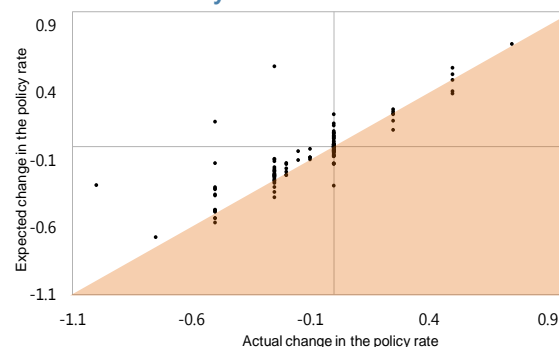
8. Overall, the sample includes 128 meetings, in which the MPC considered to change the policy rate (Table 1). Data on the timing of MPC meetings and the policy rate decisions was taken from the MNB website and data on forward rate agreements was taken from Bloomberg. In slightly more than half of the meetings (52 percent), the MPC decided to change the policy rate. Interestingly, the data also shows that the frequency of policy rate cuts is significantly higher than that of policy rate hikes, reflecting in part the MNB's cautious and gradual approach in easing the monetary policy stance, while monetary tightening was applied rather abruptly, often in response to adverse shocks.

Results

9. The results show that about 38 percent of the monetary policy decisions were fully anticipated, i.e., did not trigger a change of 5bps or more in the forward rate agreements.

The majority of these cases occurred when the MNB decided to keep the policy rate on hold (Table 2). Additionally, the results show that, while revisions to market expectations were to both sides when the MNB decided to keep the policy rate on hold or to tighten, in episodes of policy rate cuts, the actual change in the policy rate was larger than

Hungary. Actual and Expected Change in the Policy Rate, July 2004–December 2014



Source: IMF staff calculations.

*Chart excludes the decision of October 22, 2008.

⁴ In July 2014 the MNB established the practice of making policy rate decisions at the second scheduled MPC meeting of each month. Prior to that, the MPC discussed the policy rate twice a month and, in a few cases, the policy rate was changed irregularly outside the MPC's meetings calendar.

expected by the market (chart). In this regard, in 72 percent of the decisions involving policy rate cuts, expectations were for a smaller policy rate cut and—in two occasions—expectations were for a policy rate hike. The “undershooting” of expectations in episodes of monetary policy easing is also prominent in magnitude: the actual policy rate cuts were 32bps, on average, while the expected policy rate cuts were 23bps on average.

Table 2. Policy Change and Market Expectations, July 2004–December 2014

	Policy rate cuts	Policy rate hikes	No change
# of episodes which resulted in a looser-than-expected stance	38	5	11
# of episodes which resulted in a tighter-than-expected stance	9	3	13
# of episodes in which the actual change was fully anticipated 1/	6	5	38
Total	53	13	62
1/Unexpected change was below 5bps.			

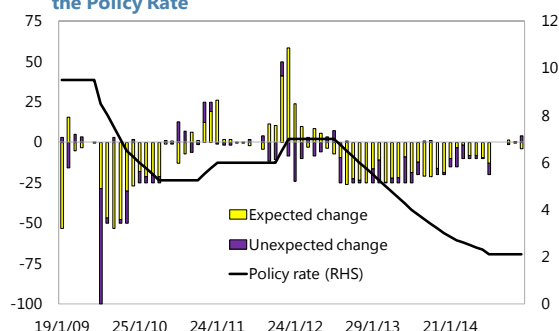
10. The “undershooting” of expectations was also prominent in the two monetary policy easing cycles since the onset of the crisis. In these two episodes (December 2008–October 2010, and August 2012–July 2014), the markets’ expectations were almost persistently below the actual policy rate cuts and, accordingly, expectations were revised downwards following the policy rate announcements (chart).

11. The uncertainty surrounding the monetary policy actions has recently declined significantly. The unexpected change in the policy rate has moderated (in absolute values), and the standard deviation of the unexpected change in the policy rate (adjusted to the actual change in the policy rate) has reached the lowest level in nine years. This perhaps suggests that the MNB’s transparency with regard to the direction and magnitude of future policy rate changes has somewhat increased (chart).

Comparison with peers

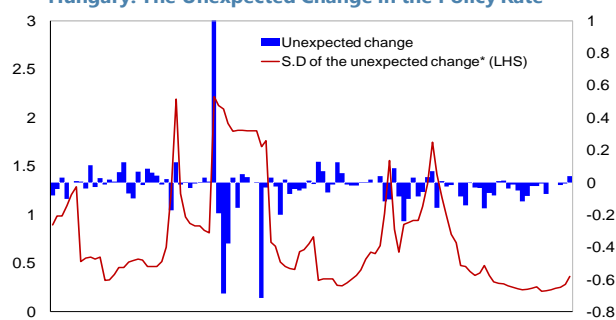
12. We compare the monetary policy surprises in Hungary to those in Poland and the Czech Republic. While the comparison needs to be taken with caution given the differences in the economic environment and magnitude of the shocks faced by the three economies, it shows that the distribution of the unexpected changes in the policy rate differed significantly (Table 3). In particular, while in all three countries the mean of the monetary policy surprises is not significantly

Hungary. The Unexpected and Expected Change in the Policy Rate



Source: IMF staff calculations.

Hungary. The Unexpected Change in the Policy Rate



*S.D. adjusted to the average change in the policy rate (in absolute values, 18-month MA).
Source: IMF staff calculations.

different from zero, Hungary had the highest variability of monetary policy surprises (adjusted to the changes in the policy rate). This in part reflects the sizable shock that the economy faced in 2008 and the high volatility of inflation. In the last four years, however, the volatility of the unexpected change in policy rate in Hungary declined significantly below that of its regional peers.⁵

Table 3. The Unexpected Change in the Policy Rate (in percentage points)			
	Hungary	Czech Rep.	Poland
	Full sample ¹		
Mean	-0.022	-0.021	-0.030
Maximum	1.903	0.127	0.588
Minimum	-0.846	-0.660	-1.677
Adjusted standard deviation ²	2.882	1.730	2.685
	2008-09		
Mean	-0.013	0.002	-0.086
Maximum	1.903	0.127	0.041
Minimum	-0.714	-0.100	-1.677
Adjusted standard deviation ²	9.203	0.418	5.466
	2010-2014		
Mean	-0.026	-0.002	0.002
Maximum	0.128	0.082	0.185
Minimum	-0.240	-0.120	-0.265
Adjusted standard deviation ²	0.966	1.106	2.113
¹ For Hungary the sample period is 7/2004-7/2014; for Czech Rep. it is 1/1999-7/2014; and for Poland it is 11/2001-7/2014. ² Adjusted to the absolute value of the average change in the policy rate.			

13. The undershooting of expectations was also prevalent in the Czech Republic. The analysis shows that the expected cut in the policy rate was below (5bps or more) the actual cut in the policy rate in 64 percent of the times (compared to 30 percent in Poland), while, in episodes of policy rate hikes, the expected increase in the policy rate was below the actual increase in 91 percent of the times (compared to 26 percent in Poland).

⁵ Data on monetary policy decisions in Poland and Czech Republic was taken from the central banks' websites.

C. The Effect of Monetary Policy Surprises

The baseline model

14. To explore whether monetary policy surprises have an impact on financial market developments, we examine the change in key financial market indicators on the day of the policy rate announcement (t). The financial market indicators that we consider are: the daily change in the yields of 5-year and 10-year government bonds ($\Delta GB5_t$ and $\Delta GB10_t$, respectively), and the daily change of the stock market price index (ΔBUX_t). In addition, we look at the impact of the monetary policy surprise on sovereign risk premia (measured by Hungary's 5-year CDS spread, ΔCDS_t) given that monetary policy surprises may change investors' perceptions regarding financial stability risks. The relationship between monetary policy surprises and the financial variables can be expressed as follows:

$$\Delta Y_t = \begin{pmatrix} \Delta GB5_t \\ \Delta GB10_t \\ \Delta BUX_t \\ \Delta CDS_t \end{pmatrix} = \alpha + \beta_1 \Delta i_t^{un} + \beta_2 \Delta i_t^e + \delta_j X_{j,t} + \varepsilon_t$$

where ΔY_t is a vector of the aforementioned financial market indicators. The coefficient β_1 measures the response of the financial market indicators to the monetary policy surprise, Δi_t^{un} . The coefficient β_2 measures the response of the financial market indicators to the expected change in the policy rate, though the prior assumption is that there should be no response since financial indicators are likely to internalize market expectations before the monetary policy announcement takes place. Additionally, the specification contains a couple of additional variables (X_j): the change in the Standard and Poor's 500 stock price index ($\Delta S\&P500_t$) to control for the impact of external factors, and a dummy for monetary easing cycles (*MP_Easing*), which is also interacted with both the expected and unexpected change in the policy rate. This dummy is included to evaluate whether the response of the market to these two components depends on the direction of the policy rate change. The tendency of market expectations to undershoot the change in the policy rate in episodes of monetary policy easing may suggest that there is an asymmetric effect. A constant (α) is included to capture any trends in the dependent variables, and ε_t is a white noise.

15. Table 1A in the Appendix presents a selection of descriptive statistics for the variables included in the estimation. The statistics are reported for 128 observations for the examined period (July 2004–December 2014). The correlation matrix, which is presented in Table 2A in the Appendix, shows that the correlation of the unexpected change in the policy rate with the financial market indicators has broadly the expected sign: There is a positive correlation with the yields on 5-year and 10-year government bonds as well as with the CDS spread. The latter may suggest that larger-than-expected increase (reduction) in the policy rate is associated with episodes of increased (lower) uncertainty in the financial markets. In addition, there is a relatively low correlation between the unexpected and the expected change in the policy rate, and between the unexpected change in the policy rate and the change in the S&P500, thus dismissing concerns about possible co-linearity.

16. Estimation results are presented in Table 4. They indicate that monetary policy surprises had a significant impact on all four financial market indicators and, for some indicators, the unexpected changes in the policy rate have a non-trivial effect. More specifically, while the results suggest that the impact was less pronounced during episodes of monetary policy easing, a surprise of 100bps contributed on average to a change of nearly 40bps on the yield on the 5-year government bond during other episodes.⁶ The impact on the 10-year yield is somewhat lower—as was also found in Kuttner (2001) and Rezessy (2005)—suggesting that a surprise of 100bps contributed on average to a change of nearly 20bps. The latter result appears significant in episodes of monetary easing and tightening as well as after decisions to keep the policy rate on hold.

Table 4. The Effect of Monetary Policy Surprises on Selected Financial Market Indicators¹								
	$\Delta GB5^2$		$\Delta GB10^2$		ΔBUX		ΔCDS^2	
c	1.292	1.064	1.748	1.512	-0.305**	-0.299	1.273	1.667
$\Delta i^{un,2}$	0.396*	0.376*	0.197*	0.163*	-0.017*	-0.011*	0.167*	0.169*
$\Delta i^{un} * MP_Easing$	-0.328*	-0.304*	-0.082	-0.036	0.012	-0.008	-0.141*	-0.185*
$\Delta i^{e,2}$		0.026		0.005		0.007		-0.097
$\Delta i^e * MP_Easing$		-0.012		0.033		-0.038*		0.052
$\Delta S\&P500$		-0.332		-1.17**		0.330*		-1.364*
<i>MP_Easing</i>	-5.596*	-4.977**	-6.52*	-4.85**	0.919*	-0.055	-2.326	-3.635**
<i>Adjusted R²</i>	0.342	0.328	0.179	0.186	0.104	0.247	0.128	0.205
<i>D.W statistic</i>	2.082	2.111	1.878	1.981	2.027	2.117	1.967	1.897
<i># of Obs.</i>	128	128	128	128	128	128	128	128
¹ The model is estimated using Ordinary Least Squares (OLS) with Newey-West standard errors.								
² Expressed in percentage points.								
* Indicates significance level of 5 percent, ** indicates significance level of 10 percent.								

17. Similar to previous studies (Bernanke and Kuttner, 2005, and Gregoriou et al. 2009), the results confirm a negative effect of monetary policy surprises on stock market returns. In this regard, a positive (negative) monetary policy surprise of 100bps contributed to a decline (increase) of nearly 1.1–1.7 percent in stock market prices. The response of the latter may reflect a rebalancing of investors' portfolio as the new information about the trajectory of the policy rate can potentially affect the firms' future liquidity, cost of capital, and overall profitability.⁷

18. The results also suggest that positive monetary policy surprises had a perverse impact on the sovereign risk premia. The estimations show that positive (negative) monetary policy

⁶ While the coefficient of the interaction $\Delta i^{un} * MP_Easing$ has an opposite sign compared to the coefficient of Δi^{un} , a Wald test, which tests the null hypothesis that the sum of the two coefficients equal to zero, is rejected at a significance level of 10 percent.

⁷ In a standard valuation model, the value of the firm reflects the value of its expected future net revenues. Expectations for a higher interest rate can reduce the value of the firm simply by increasing the discount factor.

surprises during episodes of monetary tightening or unchanged policy stance were associated with an increase (decline) in the CDS spread. One plausible explanation is that episodes of monetary tightening or unchanged policy rate were associated with episodes of increased uncertainty and pressure on reserves, and positive monetary policy surprises tended to exacerbate markets' concerns about financial stability risks.⁸

19. As expected, the coefficients of Δi^e turned out to be insignificant, thus implying that, by and large, market expectations are already internalized in financial variables. The only exception is the impact on the stock market prices during the monetary policy easing cycles, which suggests that that expectation for a lower policy rate contributed to an increase in the stock prices.

Robustness

20. We complement the baseline model with three alternative specifications to ensure the robustness of the results. First, we test whether the results remain valid for the recent period, which includes the global financial crisis and the subsequent economic recovery. Second, we examine whether the magnitude of the effect of the monetary policy surprises are dependent on sign of the surprise. And third, we re-evaluate the results by controlling for regional shocks rather than global financial shocks.

- **Sample stability:** Eq. (1) was estimated for the pre-crisis period and for the subsequent period. The collapse of Lehman Brothers (LB) in September 2008 was chosen as the starting point of the second period ("post-LB"). The results, which are presented in Table 3A in the Appendix, show that the effect of an unexpected change in the policy rate on the yields of government bonds is significantly higher in the pre-LB collapse, but only during monetary tightening and unchanged monetary policy stance. The impact on the risk premia is evident only in the post LB collapse, and only during monetary tightening or unchanged monetary policy stance. The effect on the stock market prices is significant and negative only during the post LB collapse.
- **Direction of the surprise:** As the magnitude of the markets' response may depends on the sign of the surprise (e.g., Wang and Mayes, 2012), a dummy (*Neg_surprise*), which obtains a value of one for 72 episodes in which the monetary policy surprise was negative, was included with interaction with the unexpected change in the policy rate.⁹ The results, which are presented in Table 4A in the Appendix, show that the interaction term $\Delta i^{un} * Neg_surprise$ has a negative and significant impact on $\Delta GB5$ and ΔCDS , suggesting an asymmetry in the magnitude of the effect. More specifically, they show that a positive monetary surprise of 100bps increases the yield on 5-year government bonds by about 35bps while a similar size negative surprise reduces

⁸ The results remain robust even when the observation of the extraordinary meeting on October 22, 2008 is dropped from the sample.

⁹ A "negative surprise" reflects episodes in which markets revised their interest rate expectations downwards following the MPC's announcement.

it by about 16bps.¹⁰ In the case of ΔCDS , the results show that only a positive monetary surprise contributed to an increase in the sovereign spread, though the magnitude is relatively small.

- **Regional shocks:** As Hungary's financial variables may be driven more by regional events rather than global developments, we replaced $\Delta S\&P500$ with the change Poland's sovereign CDS spread (ΔPOL_CDS) as an alternative specification.¹¹ The results, which are presented in Table 4A in the Appendix, indicate that, even controlling for the regional effects, the unexpected change in the policy rate had a significant effect on the financial market indicators. In this regard, the effect on the yield of 10-year government bonds was found significant regardless of the policy rate's direction; however, the effect of the monetary policy surprise on 5-year yields and the change in the sovereign CDS spread is significant, but mainly during episodes of monetary tightening and unchanged policy rate. Interestingly, stock market prices reacted to both monetary surprises and expected change in the policy rate during monetary policy easing cycles.

D. Conclusions

21. This study explores the characteristics of monetary policy surprises in Hungary in the last ten years (July 2004–December 2014), and the markets' response to these surprises. The paper shows that, although the uncertainty regarding the policy rate change was considerably high (compared to peers), particularly during the crisis period (2008–09), it has declined significantly recently, suggesting that the MNB's transparency with regard to the course of monetary stance has somewhat increased. Moreover, the results show that, in episodes of monetary easing, the actual policy rate cut tended to be persistently larger than expected by the market, indicating that the market participants were, on average, more conservative than the central bank.

22. The paper also finds that monetary policy surprises in Hungary had a significant impact on key financial market indicators. The results show that a positive (negative) surprise contributed to a decline (increase) in stock market prices, and an increase (decline) in the yields of 5-year and 10-year government bonds, though the effect on the 5-year yield was less pronounced during episodes of monetary easing. Interestingly, during episodes of monetary tightening and unchanged policy rate, positive monetary policy surprises had a perverse impact on the sovereign CDS spread as a tighter-than-expected monetary policy stance contributed to an increase in the risk premia. This may suggest that positive monetary policy surprises during the examined period tended to exacerbate market participants' concerns regarding financial stability risks.

¹⁰ A Wald test rejects the null hypothesis that the sum of the two coefficients equal to zero.

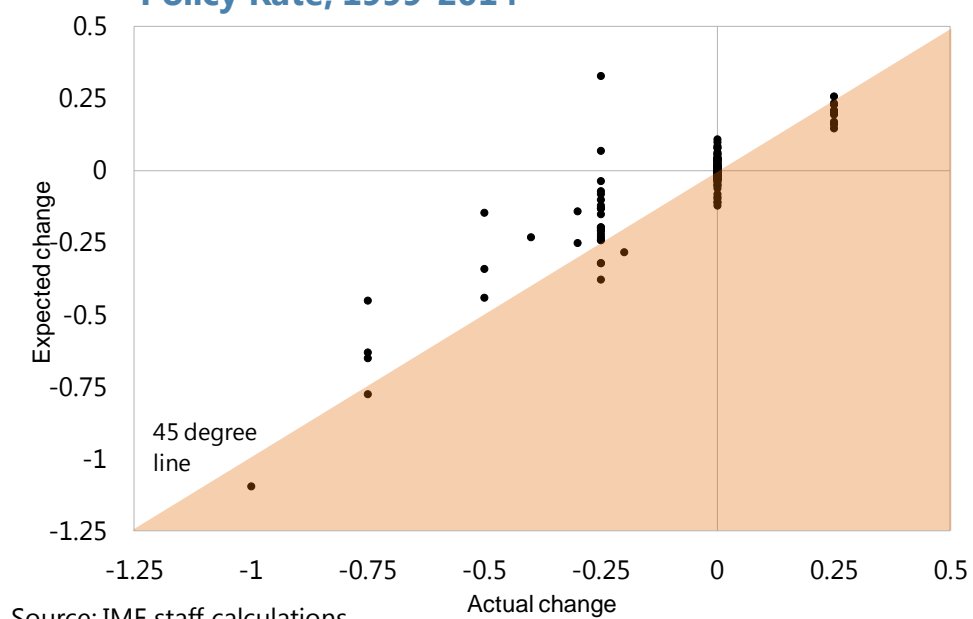
¹¹ The variable $\Delta S\&P500$ is dropped from the regression given that its correlation with the change in Poland's CDS spread is relatively high (-0.50).

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Appendix I: Supplementary Figures and Tables

Czech Rep. Actual and Expected Change in the Policy Rate, 1999-2014



Poland. Actual and Expected Change in the Policy Rate, 2001-2014

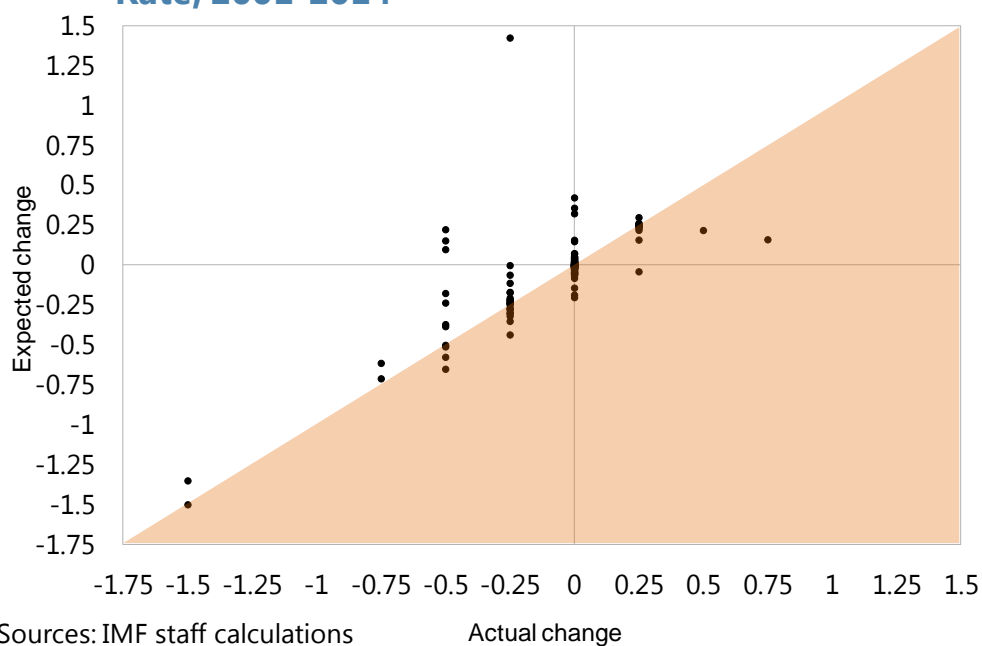


Table 1A. Summary statistics

	Δi^{un}	Δi^{ex}	$\Delta GB5$	$\Delta GB10$	ΔBUX	ΔCDS	$\Delta SP500$
Mean	-2.16	-5.18	-0.68	-1.07	0.07	0.48	0.00
Median	-1.25	-3.45	-1.50	-1.00	0.22	0.00	-0.05
Maximum	190.30	109.70	71.00	41.00	7.58	57.16	7.08
Minimum	-84.60	-67.25	-53.00	-55.00	-3.88	-30.00	-8.79
Std. Dev.	22.03	25.43	13.31	12.32	1.65	8.66	1.71
Obs.	128	128	128	128	128	128	128

Table 2A. Correlation matrix

	Δi^{un}	Δi^{ex}	$\Delta GB5$	$\Delta GB10$	ΔBUX	ΔCDS	$\Delta SP500$
Δi^{un}	1	0.229	0.529	0.373	-0.245	0.341	-0.305
Δi^{ex}	0.229	1	0.314	0.261	-0.266	0.080	-0.174
$\Delta GB5$	0.529	0.314	1	0.755	-0.295	0.408	-0.235
$\Delta GB10$	0.373	0.261	0.755	1	-0.457	0.393	-0.290
ΔBUX	-0.245	-0.266	-0.295	-0.457	1	-0.453	0.427
ΔCDS	0.341	0.080	0.408	0.393	-0.453	1	-0.367
$\Delta SP500$	-0.305	-0.174	-0.235	-0.290	0.427	-0.367	1

Table 3A. The effect of monetary policy surprises on selected financial market indicators¹

	$\Delta GB5^2$		$\Delta GB10^2$		ΔBUX		ΔCDS^2	
	Pre-LB collapse	Post LB collapse	Pre-LB collapse	Post LB collapse	Pre-LB collapse	Post LB collapse	Pre-LB collapse	Post LB collapse
c	-0.323	1.697	-0.909	2.752	-0.206	-0.402**	0.802	3.270
$\Delta i^{un,2}$	0.648**	0.388*	0.611*	0.188*	-0.002	-0.016*	0.003	0.224*
$\Delta i^{un} * MP_Easing$	-0.723**	-0.308*	-0.657**	-0.036	0.027	-0.012	0.020	-0.236*
$\Delta i^{e,2}$	0.115	-0.022	0.156	-0.087	0.003	0.016	-0.083	-0.199
$\Delta i^e * MP_Easing$	-0.274	0.142	-0.308*	0.274	0.008	-0.072*	0.096	0.143
$\Delta S\&P500$	-0.702	-0.370	-1.516	-1.210	0.430	0.307*	0.224	-1.440*
MP_Easing	-10.91	-3.134	-9.055	-3.191	1.461	-0.500	0.210	-5.804**
Adjusted R ²	0.100	0.403	0.140	0.216	0.066	0.371	0.168	0.222
D.W statistic	2.092	2.224	2.084	2.010	2.029	2.257	2.476	1.875
# of Obs.	50	78	50	78	50	78	50	78

¹The model is estimated using Ordinary Least Squares (OLS) with Newey-West standard errors.

²Expressed in percentage points.

*Indicates significance level of 5 percent, ** indicates significance level of 10 percent.

Table 4A. The effect of monetary policy surprises on selected financial market indicators¹

	$\Delta GB5^2$		$\Delta GB10^2$		ΔBUX		ΔCDS^2	
c	0.533	1.122	1.533	1.281	-0.213	-0.254	1.085	1.457
$\Delta i^{un,2}$	0.349*	0.384*	0.108*	0.117**	-0.004	-0.001	0.165*	0.126*
$\Delta i^{un} * MP_Easing$		-0.306*		0.021		-0.021**		-0.126**
$\Delta i^{un} * Neg_surprise$	-0.191*		0.097		-0.001		-0.191*	
$\Delta i^{e,2}$	0.044	0.025	0.051	0.023	-0.005	0.003	-0.079**	-0.078
$\Delta i^e * MP_Easing$		-0.007		0.021		-0.036*		0.042
$\Delta SP500$	-0.355		-1.256**		0.349*		-1.380*	
ΔPOL_CDS		-0.009		0.601*		-0.142*		0.620*
MP_Easing	-3.116	-4.989**	-3.754	-4.578**	0.550	-0.118	-4.138**	-3.356**
Adjusted R ²	0.309	0.326	0.195	0.215	0.214	0.308	0.201	0.254
D.W statistic	2.131	2.121	2.075	1.985	2.133	1.923	1.912	2.003
# of Obs.	128	128	128	128	128	128	128	128

¹The model is estimated using Ordinary Least Squares (OLS) with Newey-West standard errors.

²Expressed in percentage points.

*Indicates significance level of 5 percent, ** indicates significance level of 10 percent.

CREATING A LEVEL PLAYING FIELD: GENDER INEQUITIES AND GROWTH IN HUNGARY¹

Our analysis focuses on gender gaps in Hungary and their potential implications for growth. The key channel through which gender inequities affect growth outcomes in Hungary is low female participation in the labor market, in particular of mothers. To a large degree, disparities in labor outcomes reflect a widely-held preference for traditional gender roles that is reinforced by government policies, such as extended parental leave. Policy recommendations focus on measures to encourage female labor force participation by expanding women's options in reconciling work and family life and creating a more level playing-field (including through the reform of parental benefits, greater availability of childcare, and steps to reduce the gender wage gap).

A. Introduction

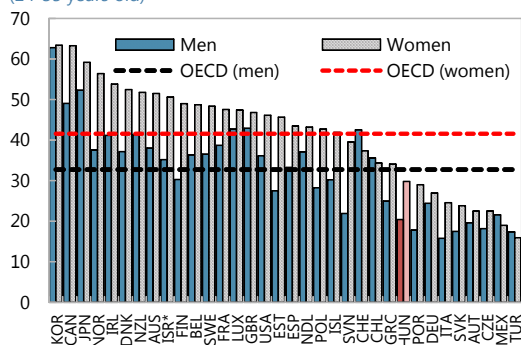
1. Gender gaps are pervasive and can have a significant impact on economic outcomes.

Gender inequities transcend the political, social, legal and economic realms across the globe. While economic development tends to be associated with a reduction in gender gaps—in particular with regard to educational attainment or legal impediments—development in itself has shown to be insufficient to eliminate persistent inequalities at the workplace, at home, and in political representation. At the same time, these inequities can have a substantial impact on economic outcomes, including by constraining the size and productivity of the labor force and affecting the decision-making and resource allocations of households, businesses and governments (Chattopadhyay and Duflo, 2004; Miller, 2008; Duflo, 2012).

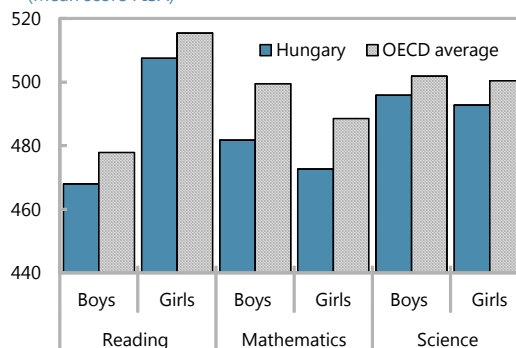
2. Hungarian women are more educated than men, on average, and do not face discriminatory legal restrictions; however, gender gaps are sizeable in politics and at the workplace (Figure 1). Women in Hungary do not face legal restrictions when it comes to owning property, starting businesses, or participating in the labor force (Gonzalez and others, 2015). Also, like in most of Europe, a higher share of women than men holds tertiary degrees. However, despite their good education, women are significantly behind when it comes to employment and earnings, as well as their representation in decision-making bodies in business and politics. For example, only 12 percent of board members of the largest companies are women—compared with an EU average of 20 percent; and Hungary's share of female lawmakers (at 10 percent) is the lowest in the EU.²

¹ Prepared by Eva Jenkner (FAD).

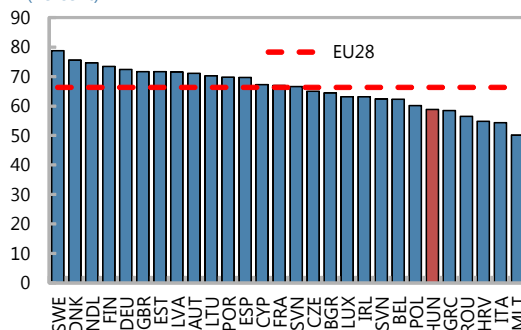
² On average, women accounted for almost 30 percent of members of the single or lower houses of parliaments in the EU countries: almost three times as much as in Hungary.

Figure 1. Hungary: Gender Gaps in Education, Business and Politics**Proportion of the Population with Tertiary Education, 2009**
(24-35 years old)

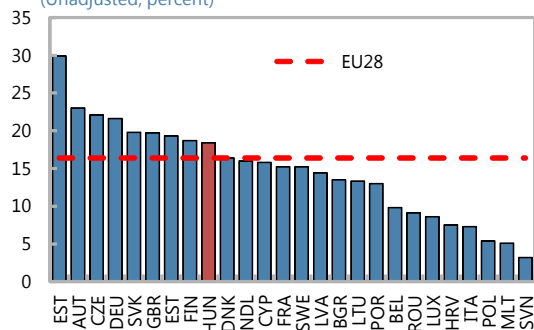
Sources: OECD (2012).

Student Performance by Gender, 2012
(Mean score PISA)

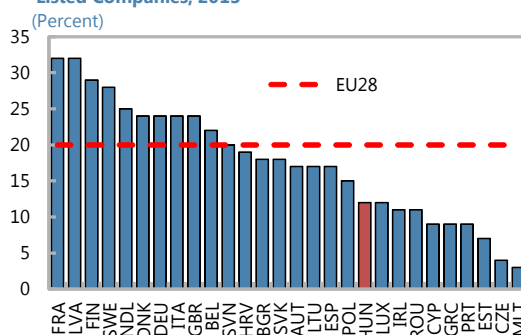
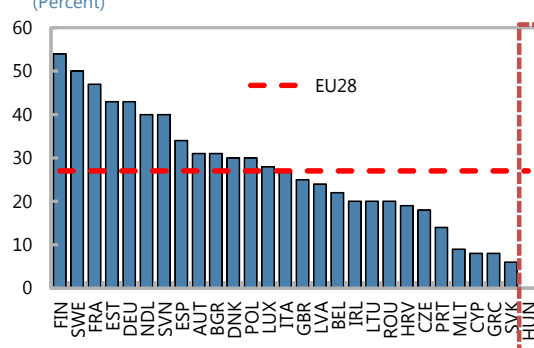
Sources: OECD (2015).

Female Labour Force Participation Rate, 2013
(Percent)

Sources: OECD.

Gender Pay Gap
(Unadjusted, percent)

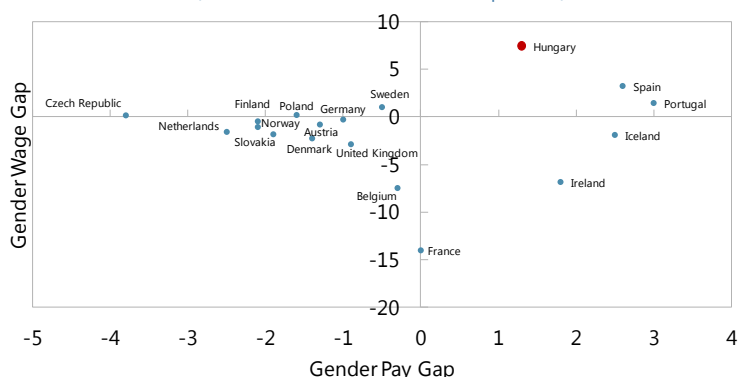
Sources: Eurostat.

Proportion of Women in Political and Economic Decision-Making: Board Members of Largest Publicly Listed Companies, 2013
(Percent)**Proportion of Women in Political and Economic Decision-Making: Cabinet, 2013**
(Percent)

3. In addition—unlike in most of Europe—women have been losing ground over the last years. In politics, women in Hungary have been practically

shut out of the executive: the share of women amongst government ministers dropped to zero between 2009 and 2012, and again at the middle of 2014 (EC, 2014a). At the workplace, Hungary has been one of only a few countries where the gap in earnings between women and men went up across various metrics between 2009 and 2012 (Figure 2). This appears to have transcended to households, with Hungarian households beating the almost universal European trend towards greater earnings equality by becoming *more* reliant on male sole income earners between 2007 and 2010, on average (EC 2014b).

Figure 2: Gender Gap in Earnings
(Difference between 2009–2012, percent)



Note: The Gender Pay Gap (unadjusted) represents the difference between average gross hourly earnings of male paid employees and of female paid employees as a percentage of average gross hourly earnings of male paid employees. The Gender Wage Gap (unadjusted) is measured as the difference between male and female median earnings expressed as a percentage of male median earnings.
Sources: Eurostat; OECD

4. This paper focuses on gender inequities in Hungary that have the most direct impact on economic outcomes, including growth. It is organized as follows. Section B provides a short overview of gender gaps in Hungary, focusing on the labor market, and analyzes underlying factors and the efficiency of current policies. Section C discusses potential implications for growth and presents some estimates of the impact of gender gaps on long-term potential growth. Section D concludes by laying out policy options for reducing gender gaps in the labor market.

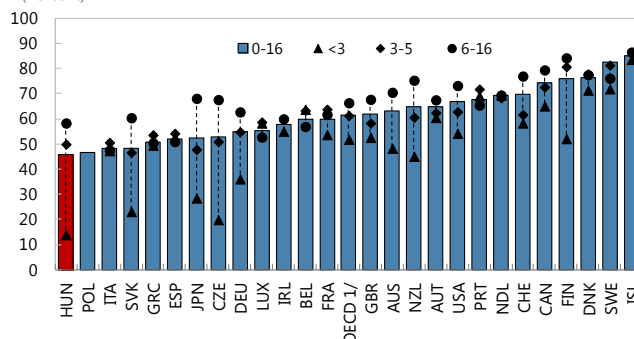
B. Women and the Labor Market: Explained and “Unexplained” Factors

Background

5. Female labor force participation (FLFP) in Hungary is low; in particular of mothers.

FLFP in Hungary is below EU and OECD averages, and also lags participation rates in its peer countries in Eastern Europe. Across the EU, the impact of parenthood on labor market participation is very different for women and men—only about two-thirds of women with children under 12 work, as opposed to more than 90 percent of men (EC, 2015). However, even against this backdrop, employment of mothers with small children is extremely low in Hungary. For instance, barely 10 percent of mothers with children under 2 were employed in 2007 (OECD, 2011a; Figure 3).

Figure 3: Maternal Employment Rates by Age of Youngest Child, 2007
(Percent)

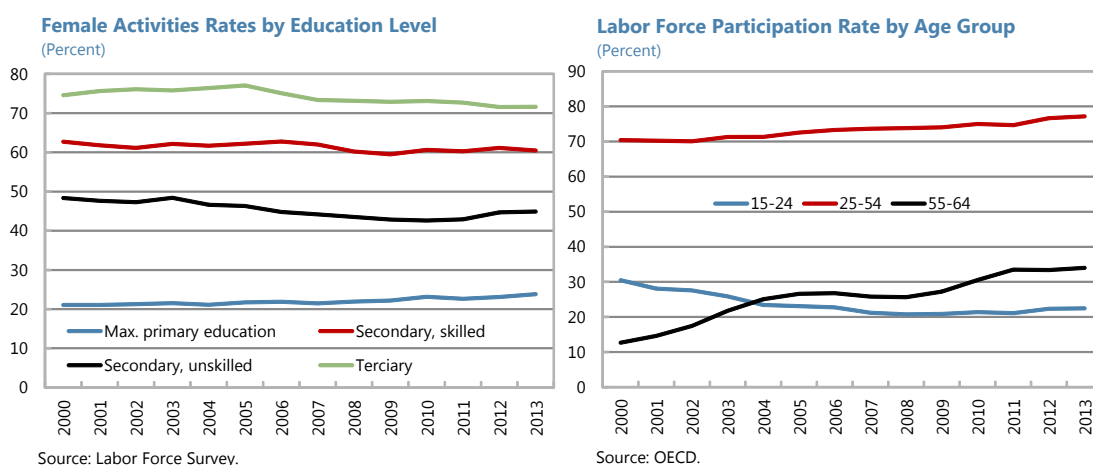


1/ Average of 26 countries.
Source: OECD (2011a)

6. The female labor force participation rate (FLFPR) picked up over the last decade, but this aggregate trend masks important differences across education levels and age groups.

Analyzing trends in participation rates for each level of educational attainment separately shows that, over the past decade, only participation amongst women with primary education increased (Figure 4). In contrast, the LFPR of women with tertiary or secondary degrees declined overall. In terms of age groups, it was older cohorts between 55 and 64 years of age that increased their participation most significantly.

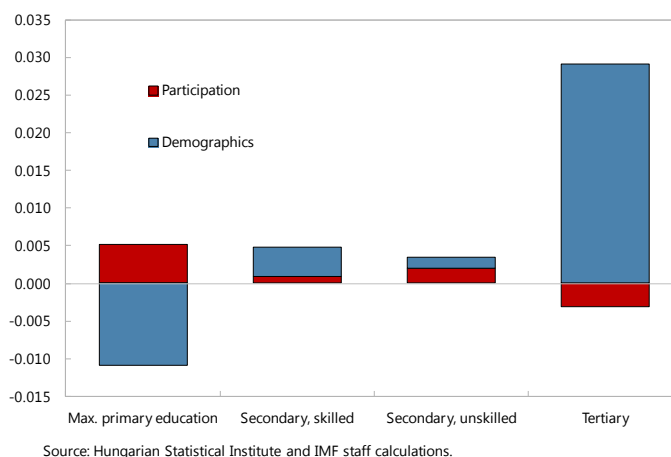
Figure 4. Hungary: Trends in Female Labor Force Participation, 2000–13



7. Disentangling behavioral changes from underlying trends illustrates that the increase in FLFP over the last 5 years was primarily driven by the growing share of women with higher education in the working age population.

Between 2008 and 2013, the FLFPR increased by 2.8 percentage points, to 50.6 percent in 2013. However, controlling for changes in the composition of the female labor force confirms that the increase in the FLPR was largely due to the growing share of women with tertiary education (shown in blue in Figure 5). In other words, as new entrants to the female labor force were better educated, on average, than cohorts that left to retire, this demographic shift provided the most significant boost to the LFPR.³

Figure 5: Decomposition of the Change in FLFPR between 2008 and 2013 by Education Level, Controlling for Changes in Labor Force Composition



³ As Figure 4 illustrates, FLFPRs tend to increase with the level of educational attainment.

8. The decomposition of factors underlying recent trends in FLFPRs indicates that the impact of recent activation policies has been uneven. Specifically, activation policies seem to have induced a significant increase in participation amongst women with primary education or less (Figure 5): while the share of women with primary education in the female labor force decreased substantially, their participation rate went up significantly, possibly induced by measures such as tightened access to benefits and participation requirements in the public works program. At the other end of the spectrum, participation of women with tertiary education decreased, calling into question the efficacy of activation policies aimed at the higher end of the income spectrum, including tax incentives under the Job Protection Act (JPA) and the limited increase in flexibility for recipients of childcare allowances.

What is holding women back?

9. A number of policies can affect women's participation in the labor market. Common obstacles to FLFP in advanced and emerging economies that are discussed in the literature include financial incentives inherent in the tax system; lack of flexible work options; lack of affordable child care options; and poorly designed parental leave policies.⁴ For example, women are found to be more responsive to financial incentives than men in their labor supply decisions (OECD, 2011b). As a result, the high second-earner tax wedge in tax systems that are based on family income (instead of individual income) can act as a strong deterrent for women to enter the labor market (Jaumotte, 2003).

10. In Hungary, work disincentives predominantly arise from the design of parental leave policies and a shortage of affordable childcare and primarily affect mothers. The Hungarian tax system works on an individual basis, and is therefore relatively neutral (OECD, 2014a). In addition, there is a tax reduction for employers that reemploy mothers of small children under the JPA;⁵ and the revised labor code offers more flexible employment options. However, there are a number of obstacles to FLFP inherent in the design of family policies and practices in the workplace (Figure 6):

- **Parental leave:** While paid leave policies are generally found to benefit FLFP, extended leave periods beyond 24 months tend to have a negative impact, including by weakening mothers' attachments to the labor market and putting them at a disadvantage from a prospective employer's point of view (OECD, 2012; EC, 2014b). Evidence shows that long periods of parental leave are also associated with a wider pay gap (Arulampalam and others, 2007). In Hungary, parents can take up to 3 years of leave, and the overwhelming share of caregivers are women (Korintus, 2014). Moreover, benefits are tilted towards mothers of young children staying at home: maternity leave and the insurance-based childcare benefit GYED can only be taken by

⁴ See e.g. OECD (2012); EC (2014b); or Elborgh-Woytek and others (2013) for further discussion.

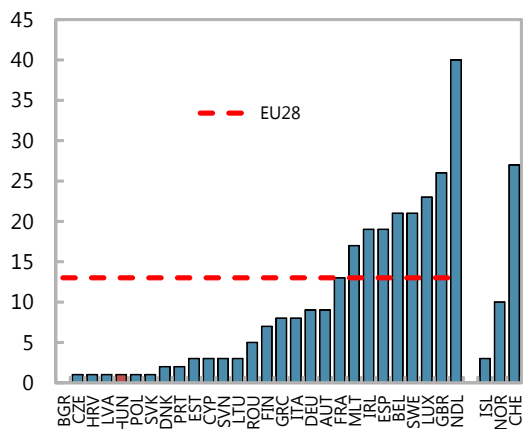
⁵ With the objective of "balancing out" the advantage that men hold because they "leave their work-related duties less frequently than mothers." (Prime Minister Orban, quoted in Nacsa, 2014)

mothers until the child's first birthday; and a parent receiving childcare benefits cannot work until the child's first birthday.⁶

Childcare: Extended parental leave options tend to coincide with low availability of formal childcare, severely constraining women's ability to take up paid employment outside the house.

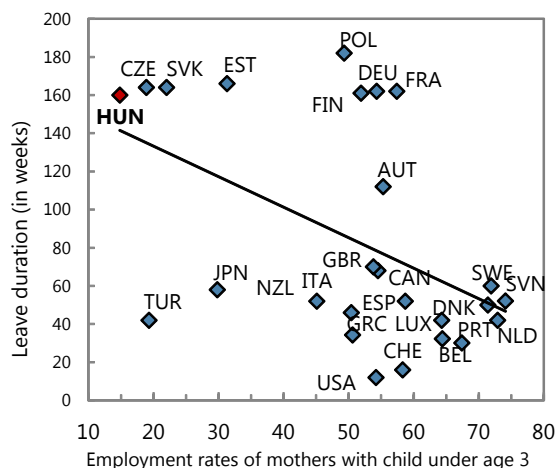
Figure 6. Hungary: What is Holding Women Back?

Formal Childcare under the Age of 3, 2013 1/



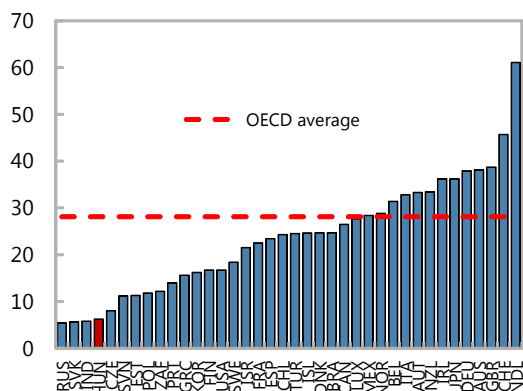
1/ 2012 data for Lithuania
Sources: Eurostat SILC 2013.

Employment Rates for Mothers with Children below Age 3 and Leave Duration



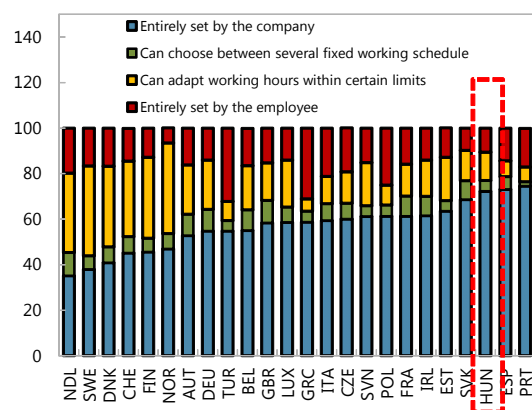
Sources: OECD.

Share of Women in Part-Time Employment, 2013 2/



2/ Brazil, India, Russia and South Africa are not OECD members. 2012 data for Russia.
Sources: OECD.

Proportion of employees having working time set, 2009 (Percent)



Sources: OECD.

⁶ There are two types of childcare benefits: GYES is universally available (and equal to the minimum old-age pension); GYED is insurance-based (and equal to 70 percent of average daily earnings, capped at 70 percent of twice the minimum daily wage).

(OECD, 2012; Blau and Kahn, 2013). This phenomenon is especially prevalent in Hungary: more than 70 percent of children below three are cared for only by their parents; representing the second-highest prevalence in the EU (Eurostat, 2014).⁷ At the same time, there is a significant shortage of affordable childcare facilities for children under the age of three (EC 2014a).

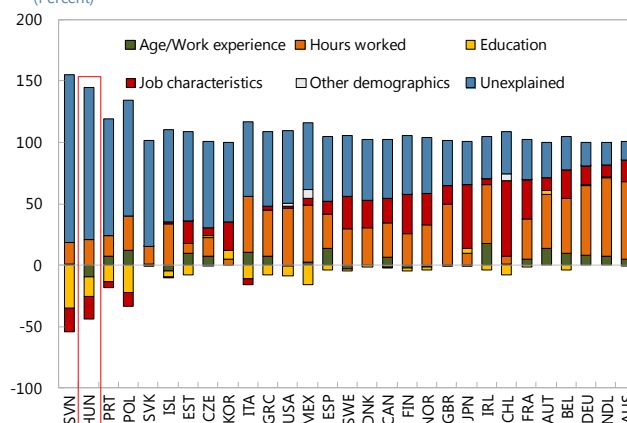
- **Job flexibility:** Studies have shown that job flexibility, including the availability of temporary part-time employment, can have a strong positive impact on FLFP (OECD, 2012). While the Hungarian labor code promotes flexibility in theory, workplace practices still seem to lag behind, with workers reporting to have little control over their hours. Also, few women take advantage of part-time work opportunities to stay more connected to the labor market while their children are small: Hungary has one of the lowest rates of part-time employment in the European Union.⁸

11. There are also obstacles to the employment of older women, however. Older women's activity rates are also constrained by domestic obligations: apart from grandchildren, they often care for sick elderly relatives in light of limited availability of long-term care. Also—in contrast to highly successful efforts to roll back early retirement schemes in general, a new early retirement program for women was established in 2011.

Honing in on the pay gap

12. The large unexplained component of the gender pay gap in Hungary points to the presence of biases against women at the workplace. Throughout the European Union and OECD countries, women tend to earn only 84 cents on each euro earned by men (EC, 2014a). Up to a degree, differences in pay between men and women can be explained by differences in occupations, experience, education, and hours worked; with education almost always reducing the pay gap in favor of women. For example, as Figure 7 illustrates, the large share of women employed only part-time in the Netherlands or Germany explains a significant part of the pay gap in these countries. However, the large disparity in earnings that cannot be explained illustrates a persistent bias against women (Duflo, 2012). While the absolute level of Hungary's gender pay gap is low in cross-country comparison, it has the second highest unexplained component in the OECD.

Figure 7: The Unexplained Component of the Pay Gap in Hungary is Large
(Percent)



Note: Countries are arranged from left to right in descending order of the proportion of the unexplained gender pay gap.
Source: OECD (2012).

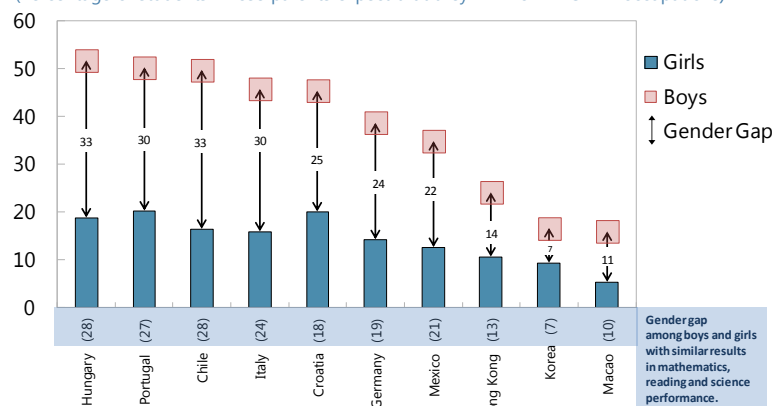
⁷ The EU-28 average is 50 percent; Bulgaria has the highest share at 80 percent (Eurostat 2014).

⁸ Temporary part-time employment can help parents stay connected to the labor market; at the same time, targeted measures should facilitate the transition back into full-time work.

13. Surveys confirm that traditional views on gender roles are still very much *en vogue* in Hungary:

- **A woman's place:** Along with other European countries, such as Germany or Poland, Hungary espouses a traditional view of gender roles: more than half of Hungarian parents with children under 15 agree or strongly agree that "women should be prepared to cut down on paid work for the sake of the family" (*European Social Survey*, 2010). As a reflection of unequal expectations on housework and childcare, Hungarian women do more than twice as much unpaid work than men (Miranda, 2011).
- **Unequal expectations for girls and boys:** Also, there is a significant gap between parents' expectations for girls and boys, with more than half of male students expected to be working in science, technology, engineering, and mathematics (STEM) occupations versus less than a fifth of girls (Figure 8; OECD, 2015).⁹ Though the share for girls is relatively high in absolute terms, the gap in expectations can undermine girls' confidence vis-à-vis their male peers and exacerbate their relatively weaker performance in STEM subjects further.

Figure 8: Parent's expectations for their children's careers
(Percentage of students whose parents expect that they will work in STEM occupations)



Note: All gender differences are statistically significant. STEM stands for science, technology, engineering, and mathematics. Countries and economies are ranked in descending order of percentage of boys whose parents expect that they will work in STEM occupations when they are 30 years old.
Sources: OECD (2015)

While attitudes and behaviors are drivers of policymaking (Kammerman and Moss, 2009; Lewis, 2009), they can also reinforce and permeate gender inequities even where policy changes open a window of opportunity. This is reflected in low take-up rates of paternity leave, for instance, and in the unequal burden in unpaid work and childcare responsibilities that continues to hold back women at the workplace (Moss, 2014).

C. Implications for Growth

14. There are three main channels through which improvements in gender equality can affect growth outcomes: labor, human capital, and total factor productivity.¹⁰ First, traditional gender roles and women's disproportionate share of domestic unpaid work hamper their ability to participate in paid labor (Miranda, 2011). This constrains their productivity and the size of the active labor force. Second, discrimination against women and girls can affect human capital accumulation:

⁹ Expectations are unrelated to *actual* performance (OECD, 2015).

¹⁰ This sets aside reverse-causation arguments: see Section A.

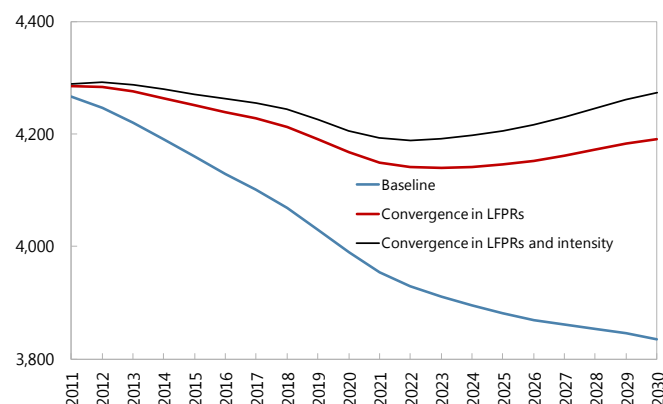
women may have less access to higher levels of education; and lower female contributions to household earnings further reduce female bargaining power in families, potentially resulting in less being spent on human capital accumulation (Sen, 1990; Klasen and Wink, 2003; Duflo, 2003).¹¹ Third, the efficiency of overall resource allocation and total factor productivity in the economy is expected to rise once women can fully develop their human capital and hold more decision power (Stotsky, 2006; Cuberes and Teignier, 2012).

15. Increasing FLFP is the main priority for shoring up long-term growth in Hungary. In

many advanced and emerging economies, population ageing and low fertility rates are compressing the size of active labor forces. This issue is also very acute in Hungary. Taking into account current trends, Hungary's labor force will shrink by around 10 percent by 2030 (Figure 9). Increasing low FLFP will be a necessity to help offset these adverse trends and boost long-term growth. The OECD estimates that full convergence in participation rates by 2030 can increase average annual per capita growth rates in Hungary by 0.6 percent (OECD, 2012).

Figure 9: The Effect of Converging Participation Rates between Men and Women on the Size of the Labour Force

(Thousands)



Source: OECD.

16. In addition, keeping a large share of highly productive workers out of the labor market is economically inefficient. Family policies that favor extended career interruptions and discontinuous employment of mothers are likely to have a negative impact on overall productivity. In this regard, the drop in LFP of women with tertiary degrees as described in Section B is a particular concern; and higher employment of women with primary education or less in workfare programs is unlikely to compensate in terms of contributions to long-term growth.

17. Further research needs to determine how women's weakened positions in households and government may be affecting resource allocations. As described in Section A, household surveys indicate that women's shares in household earnings have declined; and female representation in the executive and legislature is at an exceptional low. Further analysis should explore the extent to which these shifts may have affected policy priorities and resource allocations—with potential repercussions for human capital accumulation and productivity, and, as a result, Hungary's long-term growth potential.

¹¹ In addition, this can perpetuate inequality as male children may be favored over female ones. Outside crises, evidence of this phenomenon is mixed, however (Duflo, 2012).

D. Conclusion: Towards a More Level Playing Field

18. Significant gender gaps, in particular in the labor market, need to be addressed more effectively. While Hungary fares relatively well on a number of indicators, including its legal framework, women's education and the neutrality of the tax system, growing inequities are a source of concern. In particular, policies to encourage FLFP (such as the option to receive childcare allowances while working) appear to have only had partial success; and *de facto* workplace flexibility remains constrained. Also, despite the government's commitment to expand the availability of childcare facilities, significant geographical gaps remain.

19. Key measures should aim at expanding women's choices in reconciling work and family life. This could be done in a fiscally neutral manner as savings in universal leave benefits are used to expand childcare options.

- **Childcare:** affordable childcare for children under 3 years of age should be made widely available.
- **Work-friendly leave policies:** the work prohibition for recipients of childcare benefits should be lowered further; and the total duration of leave parents can take (including maternity, paternity and parental leave) should be capped at two years.
- **Equitable parental leave policies:** GYED should be made fully gender-equitable (i.e. it should be made available to fathers before the child's first birthday).
- **Flexible employment options:** promote workplace flexibility in support of women's continuous employment and career progression.

20. Progress towards higher FLFP will also require creating a more level playing field and tackling biases that reinforce the gender division of labor:

- **Reduce the pay gap:** a shortening of leave periods and greater availability of childcare, as recommended above, should have a positive impact on the disparity in earnings (see Section B). In addition, equal pay provisions should be strictly enforced; and public awareness of anti-discrimination laws and pay transparency should be strengthened.
- **Encourage fathers to take advantage of parental leave options:** more fathers should be enticed to take up parental leave, including by reserving a share of parental leave for exclusive use by fathers (as done in Iceland, Sweden and Norway) or bonus parental leave if fathers take up a minimum amount (Germany, Portugal).¹²

¹² As a result of these policies, the proportion of fathers taking parental leave increased to around 25 percent in most of these countries (OECD, 2012). Evidence shows that fathers that took time off after the birth of their child are also more likely to care for the child later on (Nepomnyaschy and Waldfogel, 2007).

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