HUMAN CAPITAL AND SCALE ECONOMIES AS DRIVERS OF EMPLOYMENT AND EXPORTS IN IRAN

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MOTIVATION

Employment and exports rightly as major concerns of economic policy-making in Iran

Disappointing employment performance

Some achievements with exports, but still a long way to go

In this paper:

- We probe the effects of major factors influencing Iran's manufacturing exports and employment. We focus on factors that are associated with the activities of firms—including total factor productivity (TFP), efficiency, and economies of scale—as well as on human capital.

Figure 1: Rates of Unemployment, Youth Unemployent, and Labor Force Partication

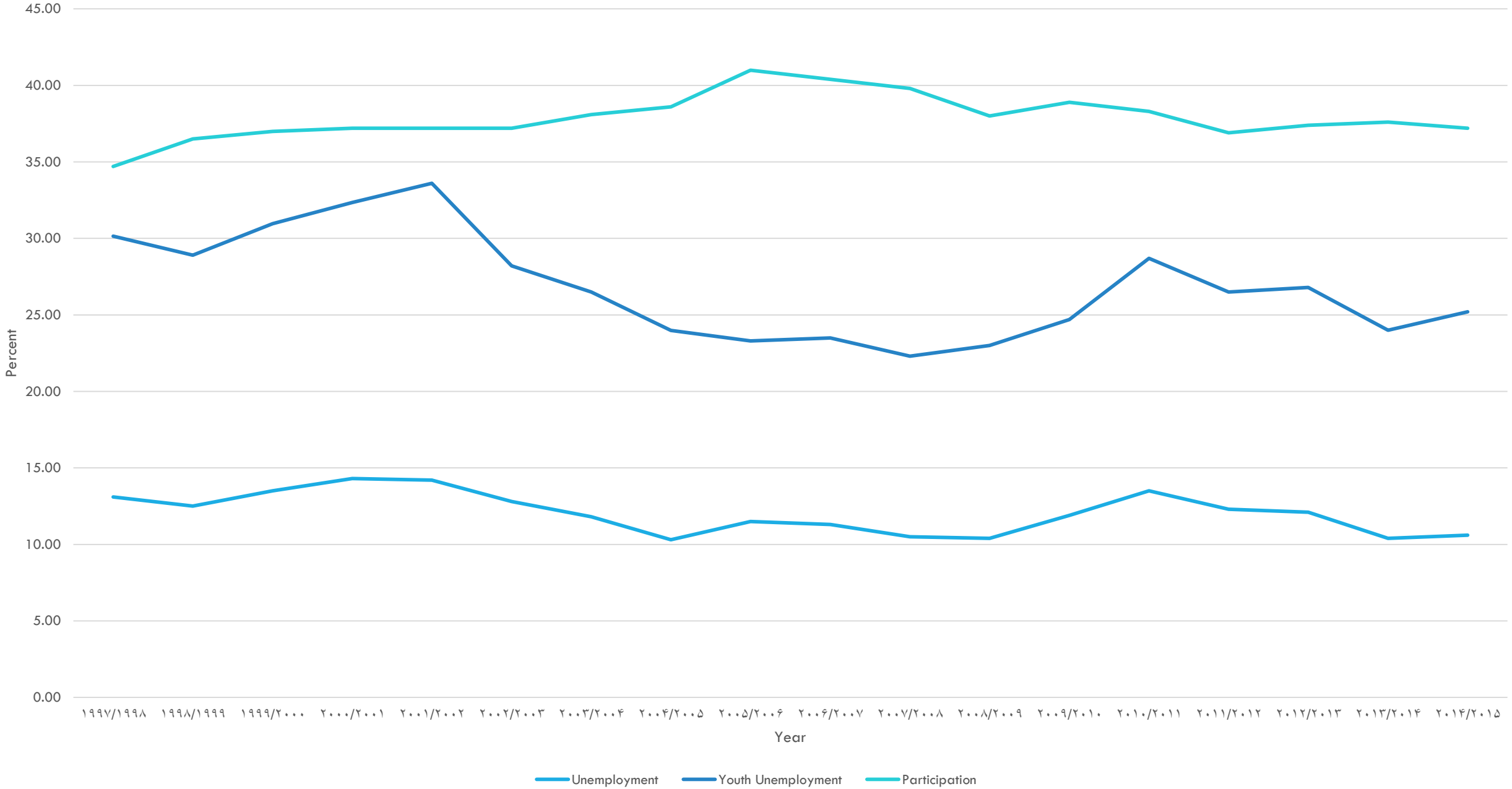
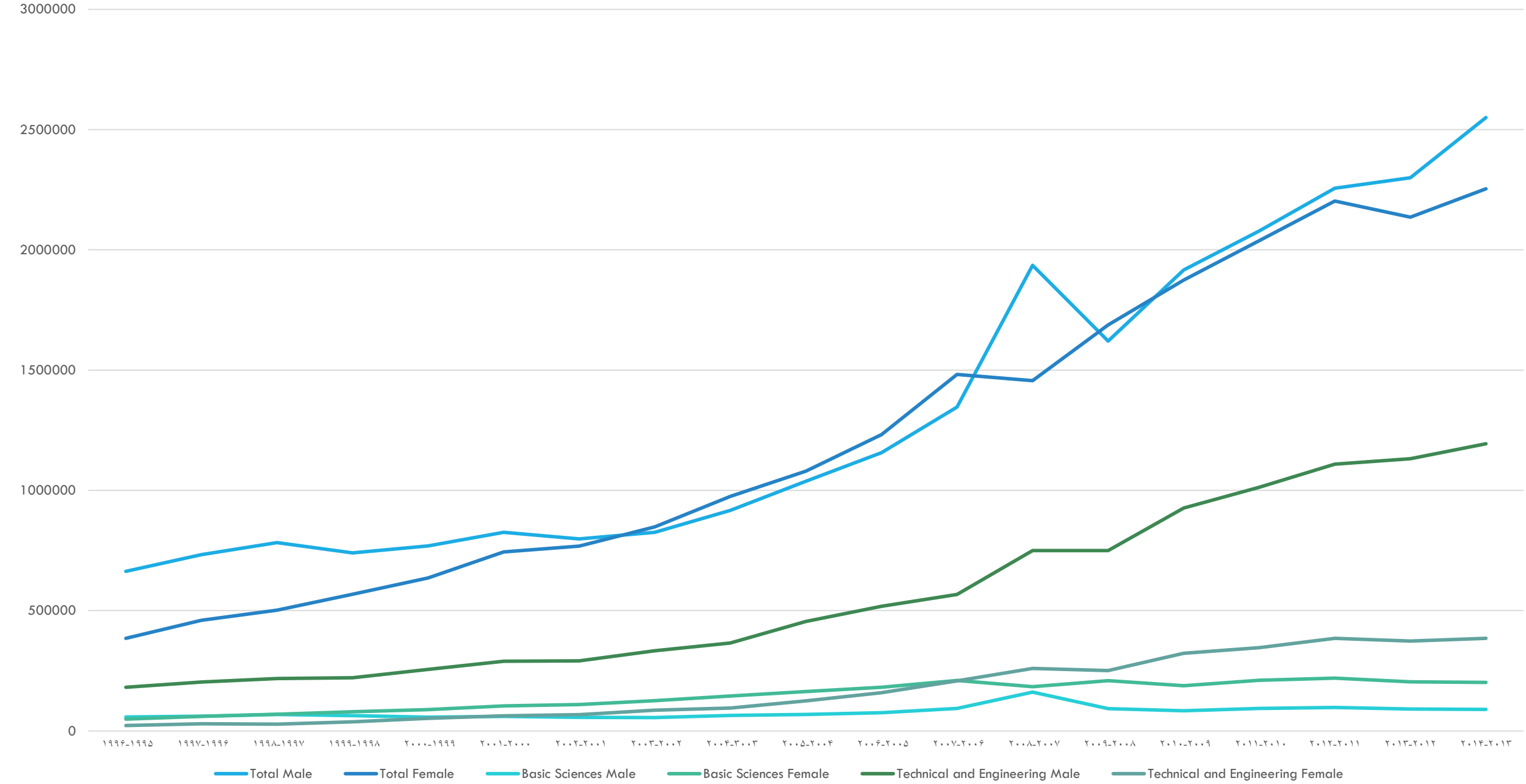


Figure 2: Enrollment in Institutions of Higher Education



TERTIARY EDUCATION: SOME OBSERVATIONS

Total enrollment in tertiary educational institutions rose from 1,284,668 in 1995/6 to 4,8040,37 in 2013/14

Number of students enrolled in basic science fields more than doubled while the number of those enrolled in technical and engineering fields rose by a factor of close to 6.5 to reach the astonishing figure of 1,578,331

As of 2013/14, around 11.2 million persons in Iran have some level of tertiary education

But:

- Little per capita GDP growth
- Increasing unemployment rate among those with tertiary education
- Continuing low participation rate
- Stagnant or declining labor productivity and TFP

PRODUCTIVITY

Figure 4: Labor Productvity (in 1997/8 rials)

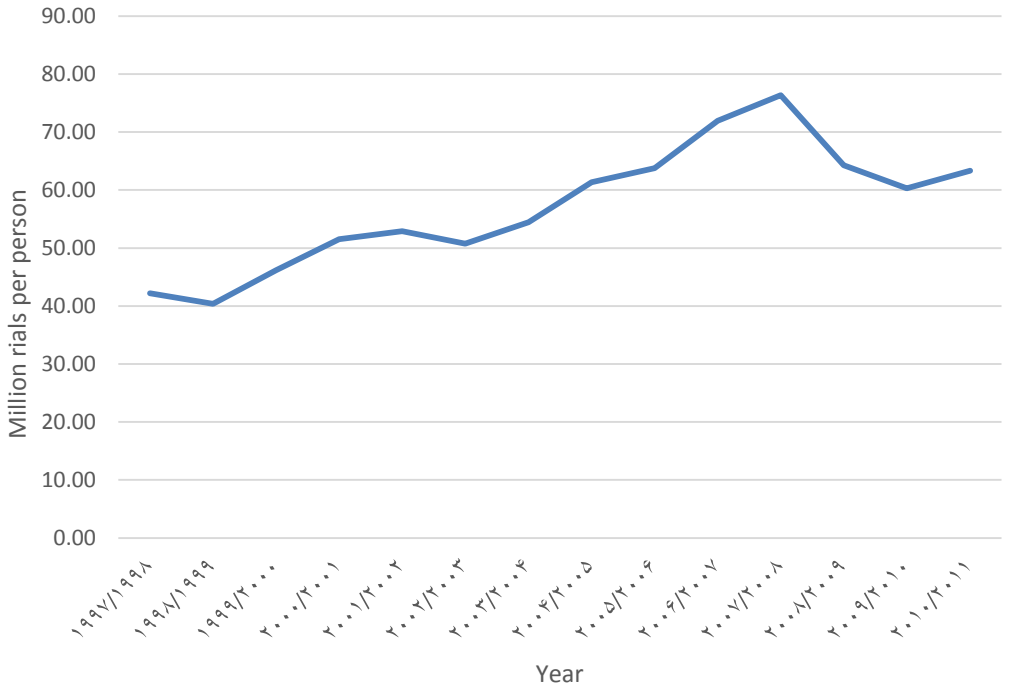
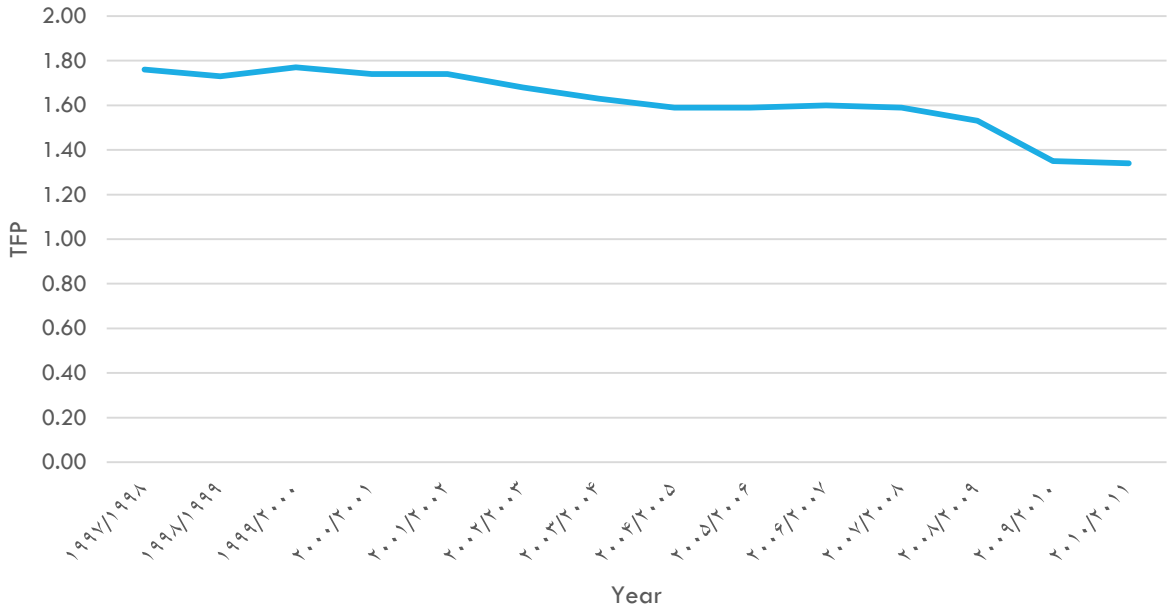


Figure 5: Total Factor Productivity

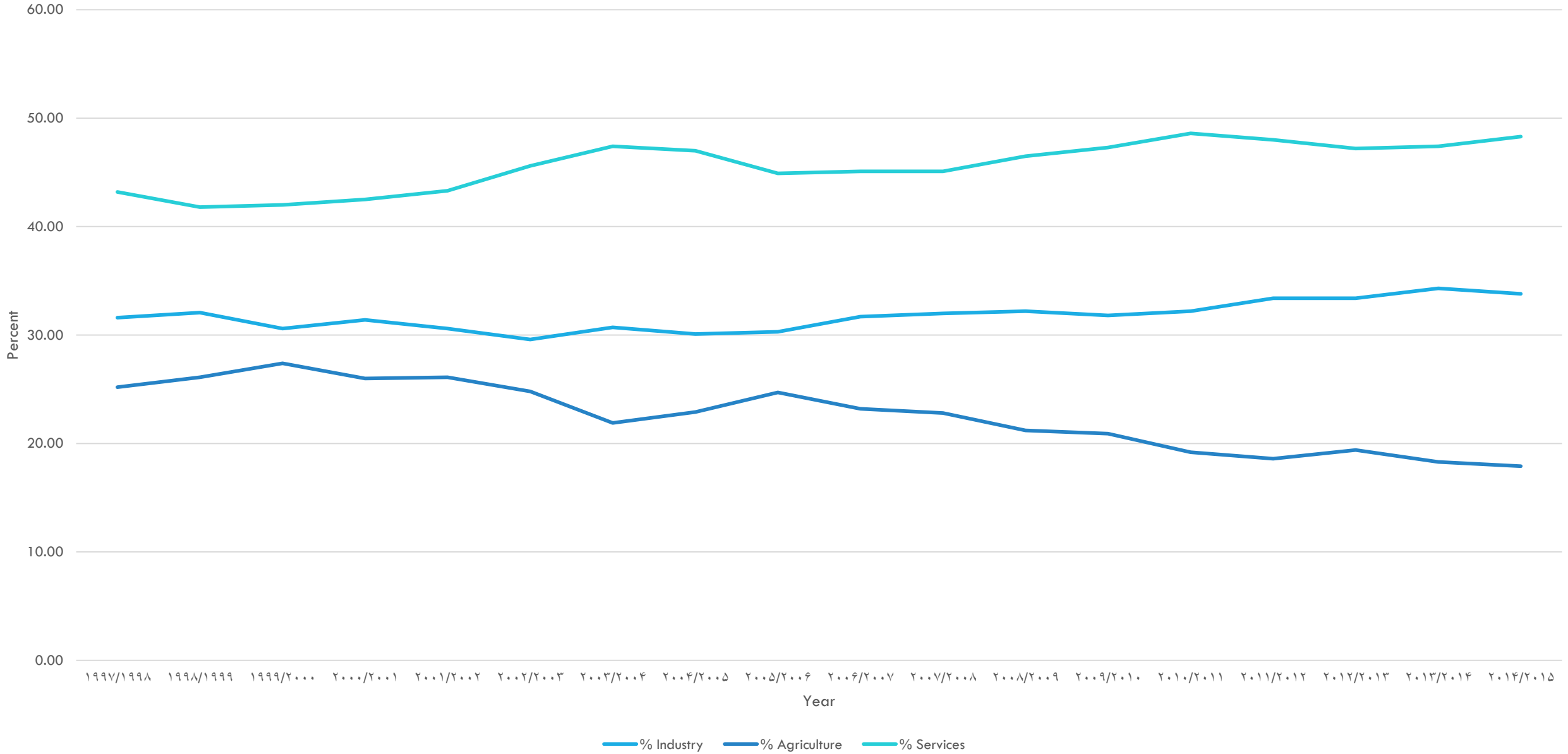


SOME SPECULATIONS ON WHY INCREASING STOCK OF THOSE WITH COLLEGE/UNIVERSITY EDUCATION IS NOT REFLECTED IN GROWTH, EXPORTS, OR EMPLOYMENT

Of the more than elven million persons with some tertiary level education in Iran, close to 43 percent are college and university students. As a result low level of labor force participation, especially by women, total number of economically inactive persons reached 5.7 million in 2013/14. Furthermore, of the 5.43 million persons considered economically active in the, 1.03 million persons were unemployed.

Share of manufacturing sector employment has barely kept above one third, while the service sector has continued to grow at the expense of agricultural activities. Furthermore, while the largest number of college/university students major in technical/engineering or basic sciences, available evidence suggests that those who seek work are more likely to end up in the service sector rather than manufacturing.

Figure 3: Sector Shares of Employment



OTHER REASONS

Low quality education (expansion of low quality private institutions)/decreasing per student public sector expenditures on education.

Mismatch of received education and the human capital needs of jobs that are actually created in various sectors of the economy may also be a major culprit.

The gloomy employment situation despite rapid improvements in human capital may look different if we look at more detials.

OUR APPROACH AND DATA

In the literature the focus has been on the effects of trade liberalization on productivity and scale economies

Iran has in fact increasingly liberalized its trade in the past 12 years

Labor productivity and TFP were shown; we now calculate scale economies, TFP , and efficiency for 101 manufacturing subsectors using translog cost and production functions

Four-digit ISIC data for the period 1996-7 (Persian calendar year 1375) through 2013-14 (Persian calendar year 1392) for 101 manufacturing subsectors (all data from SCI and Iran Customs Organization)

Probing effects of scale economies, TFP , efficiency, and human capital on exports and employment

TRANSLOG COST AND PRODUCTION FUNCTIONS

$$LnTC = \alpha_0 + \alpha_1 LnY + \alpha_2 (\frac{1}{2})(LnY)^2 + \alpha_3 LnPK + \alpha_4 LnWAGE$$

$$+\alpha_5 (\frac{1}{2})(LnPK)(LnWAGE) + \alpha_6 (LnY)(LNPK)$$

$$+\alpha_7 (LnY)(LnWAGE) + \alpha_8 T + \alpha_9 (\frac{1}{2})(T^2)$$

$$+\alpha_{10} T (LnY) + \alpha_{11} T (LnPK) + \alpha_{12} T (LnWAGE)$$

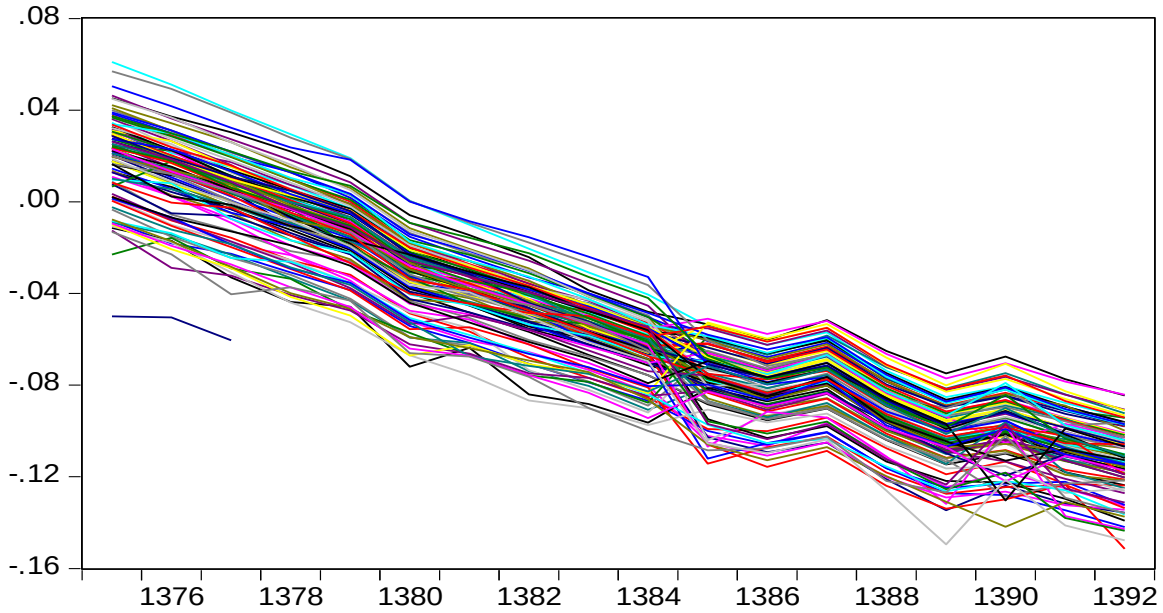
TC= Total cost
Y= Output
PK= Price of capital
WAGE= Real wage
T= Time trend

ELASTICITY OF COST WITH RESPECT TO OUTPUT AND SCALE ECONOMIES

$$\varepsilon_{CY} = {\partial LnTC}/{\partial LnY} = \alpha_1 + \alpha_2 LnY + \alpha_6 LnPK + \alpha_7 LnWAGE + \alpha_{10} T$$

$$Scale = \left({1}/{\varepsilon_{CY}} - 1 \right)$$

SCALE ECONOMIES



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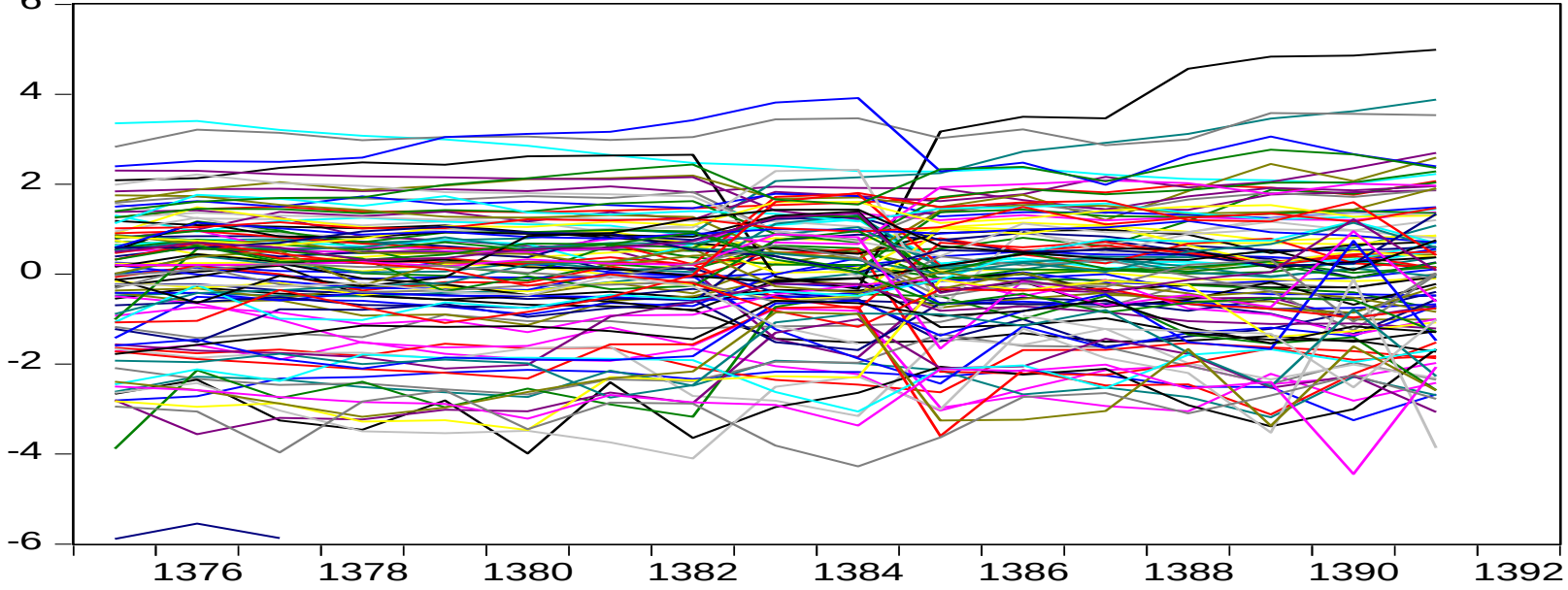
TFP (IN LOGARITHMIC FORM)



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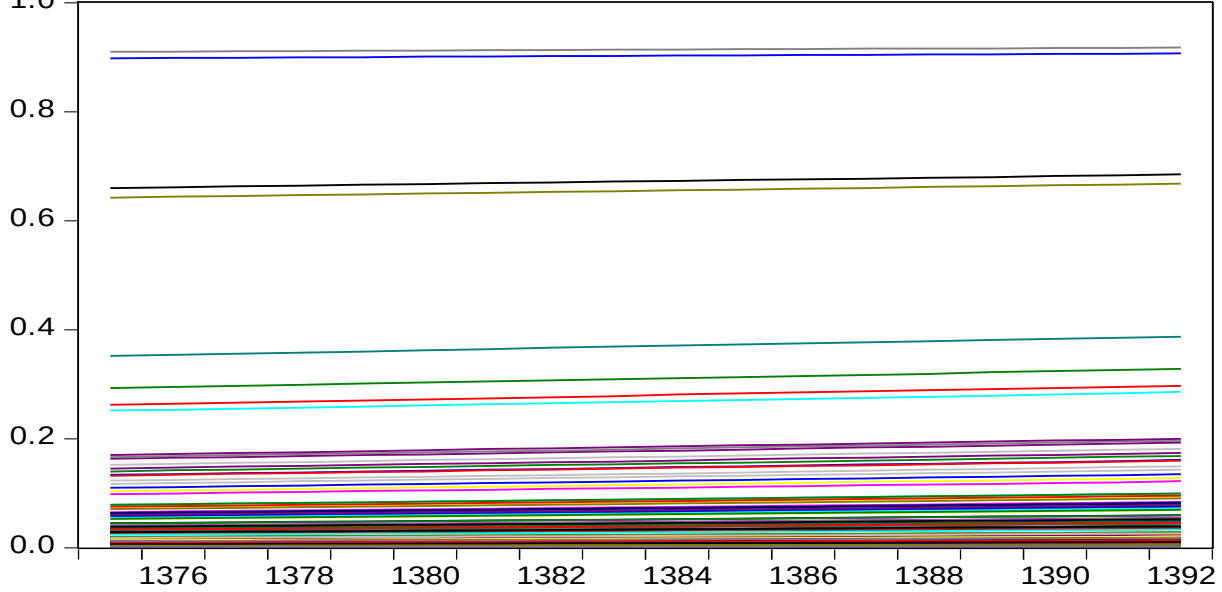
EFFICIENCY (STOCHASTIC FRONTIER)



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THEREFORE,

With such a picture of the manufacturing sector, it is more appropriate to check the effects of economies of scale and human capital on exports and employment

EFFECTS OF SCALE, TFP, EFFICIENCY, AND HUMAN CAPITAL ON TOTAL EMPLOYMENT OF INDUSTRIAL SECTOR

Table 2.docx

Excellent fit.

Each additional unit of scale – which has been found for every industrial subsector separately – results in the rise in employment by a factor greater than one.

TFP and efficiency have negative effects on total industrial employment—as with increased TFP and efficiency, attempts are made to reduce employment.

Exports also have a modest positive impact on employment.

Most importantly, the effect of human capital (denoted by EDUEXP) on exports is found to be positive and significant.

Note: Using educational enrollment figures does not work.

EFFECTS OF ECONOMIES OF SCALE, HUMAN CAPITAL, WAGE, TFP, EFFICIENCY, AND ONE- AND FIVE YEAR INTEREST RATES ON SUBSECTOR EMPLOYMENTS

Table 3.docx

Human capital has a large and positive impact on employment.

Improvements in efficiency have negative effects on employment as suggested by theory (firms reduce employment as they gain efficiency). Yet, productivity has a positive effect on employment (equal to 0.58 percent) for each sector.

With increasing scale, firms become more likely to hire more workers, since their total costs do not increase as fast as their production.

Our results indicate that while one-year interest rate increases employment, the five-year interest rate has a negative impact on employment.

Furthermore, rising wages result in higher levels of labor force participation.

ESTIMATION RESULTS FOR IMPACT OF EXPORT UNIT VALUE, HUMAN CAPITAL, AND SCALE ON EXPORTS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-68.63255	3.645415	-18.82709	0.0000
LOG(EXD/EXW)	0.018108	0.020650	0.876928	0.3807
LOG(EDUCEXP)	2.912438	0.106229	27.41668	0.0000
SCALE	19.08477	1.381127	13.81826	0.0000

TABLE 5: ESTIMATION RESULTS FOR IMPACT ON EXPORTS OF 101 MANUFACTURING SUBSECTORS

Table 5.docx

Economies of scale has the largest impact on exports. However, the impact is negative for some industries while positive for others.

Productivity and efficiency have positive impacts on exports.

Human capital has a significant and positive effect on exports (increasing it by 0.92 percent for every one percent increase in education expenditures).

SUMMING UP AND RECOMMENDATIONS

Strong effect of human capital (expenditure on education) on exports and employment

- Investment in raising the quality of human capital

Effects of economies of scale on exports are asymmetric

- Room for various aspects of industrial policy and intervention to boost economies of scale