

The Labor Supply of Women in STEM*

Eva Schlenker
Universität Hohenheim

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Abstract:

This paper analyzes the determinants of female employment behavior with special focus on women in science, technology, engineering and mathematics (STEM). The importance of the quantity and quality of the labor force in STEM for economic growth has been shown by several studies. Since the German economy strongly relies on production industries the demand for highly skilled engineers and technicians of all kind is already high today. However, labor supply at all will decline in Germany as well as in all other industrialized countries. The shortage of skilled workers in STEM is, therefore, about to become a key factor of economic growth due to aging societies and globalized markets. To encounter this challenge many policies have been introduced recently to increase women's employment rates on the one hand and their share of workers in STEM occupations on the other hand. To combine both policies it has to be known whether women in STEM occupations react differently to political measures in terms of labor supply. If so, is the effect less or more pronounced for these groups compared to women in general? This paper will answer these questions.

Apart from the already mentioned necessity to guarantee a sufficient supply of high-skilled workers in STEM the topic of gender equality matters: Politicians wonder during the last years how occupational choice of girls can be influenced to make more of them choose highly rewarded jobs in STEM instead of jobs in the tertiary sector which are often precarious. Overall jobs in STEM are characterized by a high educational level and – even compared to jobs with similar levels of education – extraordinary high wage premiums. However, until today the gender segregation in occupations in STEM is extremely high. Even high wages do not draw young women and girls into those occupations and those who do enter STEM fields do often drop out especially while starting a family. This paper combines both aspects while analyzing whether women in STEM react differently to political and social changes in terms of employment behavior. Furthermore, it is accounted for unobserved differences between these women and women in general. Little research has been devoted to analyzing relations between occupation choices and labor market behavior until now. Some studies,

*Corresponding author: Eva Schlenker, 520B, Universität Hohenheim, D-70599 Stuttgart, Tel: 0049-711-459-22932, Email: Eva.Schlenker@uni-hohenheim.de.

though, show that educational field and occupation do significantly influence women's and men's fertility. Since employment behavior and fertility are correlated, the influence of educational field and occupation on labor market behavior seems plausible.

Using data from the European Survey on Income and Living Conditions (EU-SILC) for the years 2005 to 2010, I estimate panel data models to test how women in STEM react to policies like child bearing in terms of labor market behavior. I isolate women in STEM using the 2-digit ISCO88 classification available in EU-SILC and add information about institutional and cultural settings in different countries to the dataset. Three subsamples are analyzed separately for finding their characteristics in the labor market behavior: On the one hand women in STEM occupations are compared to other women and on the other hand they are contrasted with the labor market behavior of men in STEM occupations. I use the number of hours worked per week as dependent variable and therefore, panel data estimation for binary and ordinal data is used as well as double-hurdle-models. Using these estimation method unobserved heterogeneity can be controlled for and causal relationships between policy changes and labor market behavior can be identified while controlling for sociodemographic characteristics like the number of children, the age of the youngest child, marital status, education and income levels.

In general estimation results show that women in STEM occupations do work more frequently and to a larger extend than women in general. Then again women in STEM do also work less than men in these occupations. These findings are confirmed for all countries. However, estimation results show also significant differences in the labor market behavior of women in STEM across European countries. I find that a high density of child care facilities has a significant and positive effect on the labor supply of women in STEM. Countries that offer these child care facilities like Scandinavian countries or France have higher female employment rates in general. Hence, the positive effect is even more pronounced for the subsample of women in STEM than for women in general. Furthermore, estimation results show a significant influence of country's tax system. Tax systems that apply family splitting of household's income seem to enlarge labor supply for women in STEM. Standard marital status reliefs like to tax system in Germany offers, however, do not show these positive effects. Altogether the panel data estimation shows that the human capital of women in STEM is not completely exploited in all European countries. Germany does even perform worse in this context compared to many other EU member states. Politicians might offer increase incentives for women in STEM to supply (more) labor by enlarging the density of child care facilities.

JEL classification: J16, J21

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