Unveiling the Leaky Pipeline

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Abstract

Women and historically disadvantaged groups remain underrepresented in many fields especially at the highest levels of work in those fields. Often a so-called “leaky pipeline” is blamed for this phenomenon.

For this project, I will take the proportion of women in select STEM fields (at various points in their educations and careers) as an illustrative example to show that the leaky pipeline has an effect from college through higher level careers.

Introduction

Overview and Motivation

Research has consistently shown that a diverse workplace is a more innovative and productive workplace. Moreover, an ideal world should have diverse groups working in all fields. With the goals of economic success and justice in mind, we should strive for diversity in all fields.

However, it is hard to effectively combat a problem that is not well-understood. The lack of gender diversity in STEM is an example of this. Lack of gender parity is widespread across multiple fields and levels of STEM fields and results from a wide array of underlying issues. A “leaky pipeline” analogy explains the nature of this problem. The logic behind this is as follows:

1. A certain field of work or study lacks a given demographic which is evident because that demographic makes up a smaller proportion of the people in that field than the proportion they make up in surrounding society.
2. This is even more pronounced in higher level occupations in the field.
3. There is overall a smaller population size in the higher level occupations in that field.

A leaky pipeline means even as the pipeline of overall individuals narrows for each additional step up a given field’s career ladder, more women and other disadvantaged minorities “leak” out of the pipeline than privileged groups. This explains why the overall demographics of these fields grows worse from a diversity standpoint at each higher step. However, the “leaky pipeline” phenomenon is not well-known or -understood, and it has not been shown in the context of a

specific field in a user-friendly way. Without understanding the basis of a problem, one cannot apply a solution. This project aims to provide that clear explanation of the state of the problem.

Related Work and Audience

I was inspired by my own experience in physics and by the shared experiences of other women and minorities in other fields. My audience is a general one who I do not expect would have any background or significant prior knowledge of the state of diversity in these fields. I would like to publish my results online and would aim for them to be publicly available. I intend to use some of the following to support my argument:

- The leaky pipeline in the Swiss university system: identifying gender barriers in postgraduate education and networks using longitudinal data
- Women and science careers: leaky pipeline or gender filter?
- The Leaky Pipeline for Postdocs: A study of the time between receiving a PhD and securing a faculty job for male and female astronomers
- Academic Careers and Gender Inequality: Leaky Pipeline and Interrelated Phenomena in Seven European Countries
- Fixing the Leaky Pipeline: Strategies for Making Economics Work for Women at Every Stage
- Statistics from the National Girls Collaborative Project
- Data Sources from the National Science Board

Initial Questions

Though anecdotal evidence for a leaky pipeline is often cited, it is rare to see compelling analysis that fully illustrates the existence of the leaky pipeline. More often, a specific step in the pipeline is shown, but showing that a smaller proportion of women than men major in a given field or that overall numbers of women lag men at any given stage in their career is not sufficient evidence for a leaky pipeline.

I want to answer the following questions for select STEM fields and women:

- What is the leaky pipeline? How does it apply to women in these fields?
- Does it actually exist in academia? Do more women than men proportionately “leak” out of these fields?
- When “leaking” from academic pursuits of these fields, do more women than men also leak out of industry occupations related to their field of study?

Data

Data sources will include:

- College Major Data from 538's data repository on GitHub: this data breaks down college majors by (among other things) gender.
- STEM Career Data from BLS: this will provide overall data on the state of STEM occupations and a reference for which occupations the US government classifies as STEM.
- US Census Bureau Microdata showing occupation numbers by gender: this source provides data on the gender breakdown of all occupations.