

**Examining the Role of Job Transitions in Prolonging Work  
in the Manufacturing Sector: Policy Brief**

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Over the last two decades, behaviors and attitudes related to work and transitions into retirement have changed considerably. While some industries have been able to adjust to older worker needs by providing reduced hours, offering flexible schedules or allowing workers to share jobs as a way to extend labor market engagement (Institute of Medicine, 2012; Johnson, 2009), sectors such as the manufacturing sector make it difficult for workers to have the necessary channels to work longer (Sweet et al, 2010). Some reasons are due to rigidities in the production processes itself such as the need to work on site and keep production lines in operation. Other reasons have to do with the legacy of retirement incentives such as defined benefit pensions which provide incentives and substantial wage replacement to encourage workers to exit the labor force completely at specific ages. Still other reasons have to do with deteriorating health which may be exacerbated by the nature of manufacturing work where physical demand and noxious exposures are common. Studies suggest that older workers would stay in the workforces if they could transition to job that accommodated them with less stress or job demands (Johnson, 2009).

Manufacturing workers also have high levels of physical job demand and experience noxious environmental exposures during work-life that may hamper an individual's opportunity to work longer (Neophytou et al., 2014; Costello et al. 2015; Li & Sung, 1999). Given that job demands and noxious exposures are quite prevalent, the question remains whether there might be

ways to encourage or accommodate workers in sectors with these exposures to prolong employment by transitioning to less demanding or noxious jobs.

Given the limited options manufacturers have in providing flexibility to their ageing workforce, we examined work trajectories of manufacturing workers and explore one determinant—job transitions to lower demands and exposures—as a means to prolong work-life while maintaining good health and productivity. This project exploits the unique trove of time-varying administrative data that make up the Alcoa data, including human resources, real-time injury, medical health claims, pension availability, 401K balances, and wage data. We will then link these data to physical & psychosocial job demand and environmental exposure data by each workers' job title.

We completed three studies to examine different facets of the role of job characteristics and exposures on health and work. Their findings are summarized as follows:

**Study 1:** The purpose of this study was to explore the overall contribution of the workplace exposures to a common health condition, hypertension. We focused on 24 potentially modifiable aspects of the work environment as a critical first step to understand what level of priority the workplace should take as the target for public policies to improve health. The analysis examined a variety of exposures including measures of psychological hazard, physical hazard and the work social environment in order to estimate the relative importance of the workplace environment for hypertension. We used regression modeling to examine how each of the 24 factors were associated with prevalent hypertension, controlling for additional individual level demographic factors. We found that having a job with high levels of psychological demands was associated with higher levels of hypertension. This may be because the firm provides many exposure mitigation protections, i.e. facemasks for dust, ergonomic assistance and heat protective gear. In addition, this study was cross-sectional and therefore may be subject healthy worker survivor bias where healthier workers select into the most demanding jobs.

**Study 2:** The purpose of this study was to characterize trajectories of periods of work and disability across the working life of a working population in the manufacturing sector as they vary across demographic groups, working conditions and health conditions. To do so, we employed two techniques. First, we used cluster analysis to group workers across common trajectories of work and disability. Secondly, we described demographic and job-specific characteristics associated with these trajectories. We find that while a majority of workers have

stable work patterns, a large number have disruptive work patterns, including many episodes of short-term disability. Over one percent of workers end up on company-sponsored long-term disability. We also find that those with disruptive work patterns have greater exposure to cumulative particulate matter as well as higher rates of psychosocial demand such as having to work faster and having competing work demands.

**Study 3:** The purpose of this paper was to understand the relation between *changes* in job demands and exposures and changes in work status while accounting for the selection process into physically and environmentally demanding work. We focused our analysis on cases of reorganizations where a subset of employees changed jobs not by choice but due to plant-level decision makers. These job changes are therefore plausibly exogenous. We first document substantial selection into more noxious exposures; workers that moved to worse exposure were more likely to stay employed. This likely because of the wage premium offered in these jobs. When we focus on exposure changes due to reorganizations, we find that workers that move to worse exposures in physical demand, heat, decision latitude and PM<sub>2.5</sub>, were more likely to leave.

**Summary:**

- Psychosocial job demand is associated with hypertension.
- A large number of workers have disruptive work patterns including a number of short-term and long-term disability events.
- Higher levels of cumulative PM<sub>2.5</sub> exposure is associated with greater short-term disability events and with a greater likelihood of leaving the workforce prematurely.
- Higher levels of both physical and psychosocial demands due to reorganization are associated with greater likelihood of leaving one's job.

**Conclusions and Policy Interventions:**

Taken together, these findings show that both occupational exposures to dust as well as psychosocial job demands have a number of important and deleterious consequences on worker health and, as a result, their ability to work in both short-term and longer-term horizons. Based on these findings, policy prescriptions should focus on creating protections for workers from heavy physical and psychosocial demand. Our work shows that these protections are important throughout the tenure of a worker, not just at older ages, in order to keep workers working longer and in better health. These protections could take the form of increased opportunities for workers to transition within the same firm out of highly noxious jobs or jobs with heavy psychosocial

demand and into similar jobs with lower demands. Moreover, because there is evidence of selection into jobs with higher exposures as well as selection into longer tenures within high-exposure jobs, further work is need to understand the mechanisms and individual-level reasons for this selection.

**Table 1: Summary of the direction of associations to various physical and psychosocial job exposures.**

	Physical Demand	Heat Exposure	Psychosocial Demand	Decision Latitude	Particulate Exposure
Hypertension	NS	NS	+	NS	NS
Short-Term Disability	NS	NS	+	+	+
Leave Alcoa Job	+	+	-	+	+

NS= No significant association

## References

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