The overarching theme of my dissertation is the dynamics of heterogeneous firms when factor markets exhibit frictions, and the effects of these dynamics on the aggregate economy. My analysis focuses on the cross-sectional and business cycle implications of firms’ entry, growth and exit while allowing for partial irreversibility of investment in physical capital. I start by documenting empirical patterns of firm dynamics across sectors in the US economy. In addition, I utilize existing evidence from the literature on the various margins of firm adjustment both over time and in the cross-section. These facts motivate the subsequent formal analysis. I incorporate them into a dynamic general equilibrium model and develop an analytical framework that is suitable for assessing the aggregate consequences of firm-level behavior. Numerically solving and simulating the model reveals that empirically plausible firm dynamics amplify and propagate effects of aggregate productivity shocks on the macro economy. Importantly, this framework allows me to quantitatively assess respective contributions of distinct features of my model, such as firm size distribution, or investment irreversibility, to the observed outcomes. Finally, my model is suitable for evaluating government policies aimed at affecting activities of investment, hiring and layoff, and firm entry and exit in an economy.

The first chapter “Sectoral differences in firm dynamics and job flows” documents several empirical facts about the cross-sectoral variation in patterns of firm entry, growth and exit, and their potential determinants. I explore information on firms’ age- and size-specific dynamics and job turnover for broad sectors in the US economy from the Business Dynamics Statistics data set of the US Census. Consistently with a recent study by Haltiwanger et al. (REStat 2013), the evidence reveals a substantial cross-sectoral variation in the rates of firm entry and exit and in the dynamics of post-entry growth. Subsequently, I employ various data sets from the Bureau of Economic Analysis and the US Census Bureau to calculate the industry-specific values for capital-labor ratios, concentration ratios, and rates of firm turnover. I use these observations to calculate descriptive statistics in order to generate suggestive evidence on the cross-sectoral links between firm dynamics and their potential determinants, such as capital intensity, or the degree of market competition. The fact that the sector-specific rates of plants’ exit negatively correlate with the capital-labor ratios motivates the subsequent formal analysis.

In the second chapter “Firm entry and exit, investment irreversibility, and business cycle dynamics” I assess the contribution of firm entry and exit to the magnitude and persistence of business cycle fluctuations. I start with the empirical observation that the size of firms’ adjustments along the extensive margin comoves with the aggregate economic activity, in particular during recessions. My focus is on the investment decisions of new firms, both at the entry stage and later in their life-cycles. On this point, Cooper and Haltiwanger (REStud 2006) document a relative scarcity of plant-
level observations with a negative level of investment, and Ramey and Shapiro (JPE 2001) observe a substantial discount on the price of physical capital sold by exiting firms. I use these facts as an indication of serious impediments faced by firms trying to detach and liquidate their stock of physical capital. I model this pattern as partial investment irreversibility. Departing from the framework by Hopenhayn (ECMA 1992), I develop a dynamic general equilibrium model featuring firms that are heterogeneous in their respective levels of productivity and stocks of physical capital. Important ingredients are, additionally, investment irreversibility and endogenous entry and exit decisions. The model is calibrated to match the cross-sectional empirical moments of US private sector data and solved using advanced numerical methods. The main result is that entry and exit of firms substantially amplify and propagate responses of the aggregate economy to productivity shocks. An increase in the level of aggregate productivity raises both the number and the size of entering firms, which further boosts economic activity. Moreover, this effect is endogenously propagated over time via a built-in selection device, where the growth of successful entrants over their life-cycles surpasses the dampening effect due to exits of the least productive firms.

Assessing the quantitative contribution of firm dynamics for the business cycle is also central to the third chapter “Firm dynamics, interrelated factor demand and the business cycle” (joint with Monika Merz and Michael Reiter). This project departs from observations on the firm-level changes in physical capital and employment, which indicate the existence of non-trivial, interrelated costs associated with these decisions. Our aim is to understand the role of frictions for the timing of factor adjustments over the business cycle. We use the existing evidence to assess under which conditions firms adjust capital and labor simultaneously or successively. We augment the stochastic general equilibrium model from the previous chapter by competitive directed search in the labor market following closely the approach by Kaas and Kircher (AER 2015). This analytical environment is rich enough to encompass several patterns of firm-level adjustment, and is thus suitable to evaluate quantitatively the relevance of these phenomena for aggregate dynamics, and the effectiveness of relevant government policies.