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Disentangling goods, labor, and credit market frictions in three European economies☆

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HIGHLIGHTS

- We build a flexible model with search frictions in three markets: credit, labor, and goods market. We then apply this model (called CLG) to three different economies: a flexible, finance-driven economy (the UK), an economy with wage moderation (Germany), and finally an economy with structural rigidities (Spain).
- Goods and credit market frictions play a dominant role in entry costs and account for up to 75% to 85% of total entry costs.
- The demand side amplification effects of adverse supply shocks (through income losses of consumers) remains limited to a range of 15% to 25% of the total impact of these supply shocks.
- Finally, the speed of matching in the goods market and in credit market accounts for a small fraction of unemployment: most of the variation in unemployment comes from the speed of matching in the labor market.

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ABSTRACT

We build a flexible model with search frictions in three markets: credit, labor, and goods markets. We then apply this model (called CLG) to three different economies: a flexible, finance-driven economy (the UK), an economy with wage moderation (Germany), and an economy with structural rigidities (Spain). In these three countries, goods and credit market frictions play a dominant role in entry costs and account for 75% to 85% of the total entry costs. In the goods market, adverse supply shocks are amplified through their propagation to the demand side, as they also imply income losses for consumers. This adds up to, at most, an additional 15% to 25% to the impact of the shocks. Finally, the speed of matching in the goods market and the credit market accounts for a small fraction of unemployment: most variation in unemployment comes from the speed of matching in the labor market.

1. Introduction

This paper develops a model of credit, labor, and goods market frictions introduced in a symmetrical way, with matching functions associating, respectively, financial institutions and "projects," job seekers and vacancies, and "selling firms" and "customers." In particular, it introduces a structure of search in the goods market and its relation to income that facilitates the exposition of the main concepts and, importantly, implies a convenient recursive structure for the model. As a result, solutions in each market are derived sequentially with equilibrium tightness in the goods market determined first. This leads to transparent and closed-form solutions characterizing a labor market equilibrium, extending the canonical search models. This also allows for a transparent calibration to several European economies, determining the role of entry costs in each of the three markets, the respective role of price and wage markups, and finally the role of complementarities between frictions in each market.

We then apply this model (called CLG) to three different economies: a flexible, finance-driven economy (the UK), an economy with wage moderation (Germany), and an economy with structural rigidities (Spain). Our calibration strategy is to match moments on each markets using flows data in the labor market, capacity

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utilization rates for the goods market, and aggregate data from national accounts in the credit market. In these three countries, goods and credit market frictions play a dominant role in entry costs. They account for the largest part of total entry costs (more than 75%). In the goods market, adverse supply shocks are amplified through their propagation to the demand side, as they also imply income losses for consumers. This adds, at most, an additional 15% to 25% to the impact of the shocks. Finally, the speed of matching in the goods market and the credit market accounts for a small fraction of unemployment: most variation in unemployment comes from the speed of matching in the labor market.

Goods market frictions were introduced in the classical search literature wtih consumers prospecting in the goods market in order to consume (e.g., Diamond, 1971; Diamond, 1982). Diamond (1982) assumed that two consumers were needed to consume indivisible units of goods (the coconuts). Diamond (1971) instead assumed two sides in the market, consumers and sellers. Only consumers searched for different shops. Shops were located in different places. The striking result of Diamond (1971) was that prices would converge to the monopsony price even with infinitely small search costs.

A recent and growing literature has revived these ideas. A similar logic where consumers and sellers are linked through a matching function in the goods market has been introduced in Wasmer (2009), Lehmann and Van der Linden (2010), Bai et al. (2011), Michaillat and Saez (2014), Petrosky-Nadeau and Wasmer (2015). In this paper, we encompass these approaches and assume that firms have imperfect access to financial markets, then imperfect access to the labor market, and finally imperfect access to consumers. Consumers themselves face frictions to consume certain goods and must spend time and resources to access these search goods. As long as they are unsuccessful they have excess income, which they spend on a non-frictional good playing the role of a numeraire. This convenient assumption of a numeraire absorbing the excess liquidity when agents do not access the search good is reminiscent of the night-and-day markets in the search and money literature (Lagos and Wright, 2005; Nosal and Rocheteau, 2011). When the frictionless market opens in these models, any excess liquidity is absorbed so that agents start the next day being ex ante identical. This has been a decisive step to simplify quite substantially the rich money-search literature and develop its application in a large number of domains.

Although in this paper we focus on steady-state relations between markets, existing work has studied interesting cyclical properties of goods market frictions, and in particular in relation to the cyclical properties of intensive search margins (consumer search effort and shopping time, advertising efforts by firms). Procyclicality of goods market search effort has been established in Hall (2012) for advertising. Petrosky-Nadeau et al. (2016) provide an empirical test of the procyclicality of search effort by consumers. Their conclusions stand in contrast to Kaplan and Menzio (2013), who argue instead that consumer search effort is larger in recessions. The implications for fiscal policy in the face of procyclical disposable income, and the underlying question of fiscal multipliers, has been explored in Petrosky-Nadeau and Wasmer (2014). In Bethune et al. (2015), drops in demand from credit constrained consumers affect the labor market through a search frictional goods market in which firms' marginal revenue declines with the level of demand faced in the goods market. This mechanism also appears in Petrosky-Nadeau and Wasmer (2015).

Section 2 first introduces search in the goods market and emphasizes several important differences from classical economies, including labor search economies, that need to be clarified. The general equilibrium properties of the model are derived in the steady-state in Section 3. Price and wage bargaining solutions are explored in Section 4. We quantify the role of each friction and the various complementarities between markets in three different European economies in Section 5. Section 6 concludes.

2. A model with search in goods markets

2.1. Setup

Time is continuous. Consumers have access to two types of goods: (i) one type of good is accessible with no frictions, indexed by 0, can be thought of as a set of inferior goods (food, basic services, standard goods), and its price is normalized to unity; (ii) the other type of good, indexed by 1, is subject to search frictions, and can either be interpreted as services or the flow consumption of a durable good such as cars, housing service, etc. This second good is produced by firms, while goods 0 will be produced by consumers, as discussed below.[1]

Hence, goods 0 are the goods regularly consumed without the need to search for them. Instead, goods 1 represent goods needing new search from time to time, due to both the arrival on the market of new consumption goods (e.g., a new restaurant in the neighborhood, a new brand of consumption good), or replacement of old goods previously consumed and hit by various shocks, specified below, such as changes in "consumer tastes" or the inability of firms to produce the good for a period of time.

2.2. The life cycle of a new good

A new search good can be produced through the following sequence. First, the firm develops a new project. The firm can be either an entirely new firm or an existing firm. In the latter case, this is the marginal project of that firm. This project has to be financed externally. Hence, in this early stage denoted by c, the firm attempts to form a first match with a financial intermediary. The intermediary and the "project" subsequently form a block that is called a "firm." However, this match can break down from time to time following exogenous events, dissolving the match in the financial market. Second, this newly formed block recruits a worker in a stage denoted by v according to the standard labor matching process. Third, once the worker is recruited, the firm is able to produce and advertise to sell its good, and begins to search actively for a consumer. However, the firm does not generate profits yet. In the third phase of the life cycle of a firm, "search in the goods market" indicated by subscript g, the firm makes no revenue and incurs losses due to wage payments and operating costs. This stage precedes the final profit stage called stage π, in which it can sell to consumers and generate profits. Fig. 1 summarizes the timing and notation of the various transitions between the different stages.

In the special case of the absence of search frictions in the goods market, stages g and π are confounded. In that limiting case, stage g lasts an infinitely small amount of time. Instead, with a period of a positive length in stage g, the firm has to pay the wage to its worker, denoted by w_g. In stage π, after meeting with a consumer, the firm will obtain a price per period $\mathcal{P}$ from the consumer who will purchase the flow of service of the goods, as a long-term relationship. This assumption characterizes the existence of specificity in the match formed in the goods market. The firm pays a wage w_π.

2.3. Random matching in labor and credit markets

As in Wasmer and Weil (2004), denote by p the rate at which the project, $\mathcal{N}_c$, meets the creditor, $\mathcal{B}_c$, and by $\check{p}$ the rate at which the creditor

[1] A convenient intuition to think of the differences between the two goods is to think of the two main sources of heterogeneity across goods: spatial (similar goods are sold in different places), and horizontal (some differentiation across products). Both types of heterogeneity lead to higher search frictions. Goods 0 are goods for which search is small, because they are sold in places known to the consumers and the degree of differentiation is low enough, or because the consumer has kept a record of their location and characteristics. Goods 1 are goods for which, either locations must be found or characteristics must be investigated. Once consumed, though, they are not subject to search frictions, until the consumption match dissolves.

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