Paris Conference on Goods Markets, the Macroeconomy and Policy

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Summary Report of Presented Papers

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Summary

The *Paris Conference on Goods Markets, the Macroeconomy and Policy* aimed to gather leading scholars on macroeconomic market frictions and provide a forum to discuss new and exciting research which assesses the importance of trading frictions in the goods market for the performance of the macroeconomy and the design of policy. Trading frictions prevent the equality of aggregate demand and aggregate supply of goods on the market as presented in classical Walrassian theory (the well-known cross in a quantity-price plan). Instead, sellers may have difficulties in finding buyers and vice versa, implying an additional cost to bear. Taking into account this effect leads to new mechanisms and new conclusions in terms of public policy. Advertising, building a loyal customer base, or more broadly searching on the goods market are economic activities that have, so far, not received much attention by macroeconomists. This conference emphasises the role of goods markets in understanding both microeconomic behaviors, such as advertising expenditures or time devoted to shopping activities, and macroeconomic shocks such as demand shocks, fiscal shocks or shocks to household expectations. The range of modeling approaches proposed by the papers presented, and the wide scope of conclusions reached, demonstrates how this economic approach forms a promising field of research. This report provides a summary of each paper presented over the course of this two day conference.

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Summary of Presentations

Session 1: "Empirics of frictions"

Robert Hall (Stanford University)
"What the Cyclical Response of Advertising Reveals about Markups and other Macroeconomic Wedges"

Understanding why we observe episodes where sales of firms are lower than they could be while there is a readily available labour force willing to work at prevailing wages remains a central motivation of macroeconomics. For a long time, the field has focused principally on the notions of price stickiness proposed by Calvo to explain why firms do not significantly cut prices to compensate for lower demand during economic slumps. This raises important questions regarding other potential adjustment mechanisms available to firms; if firms cannot cut prices, they ought to use other tools available to them.

One such mechanism available to firms is advertising. Applying standard advertising theory assumptions to macroeconomic models would suggest that advertising should be strongly countercyclical. In periods of slumps when firms cannot cut prices, lower demand should lead to lower output and lower costs, either by shifting down a firm's upward sloping short-run marginal cost curves or because factor markets with flexible prices for firm inputs should have lower prices. This implies higher profit margins which should lead to an expansion in advertising. However, as this paper shows, aggregate data on advertising expenditures between 1950 and 2010 reveals that the ratio of advertising to GDP remains relatively constant over a year when employment remains steady, and falls by around 1 percent for each percentage point drop in employment in the previous year. This suggests that other factors are present which lead firms to cut advertising in order to compensate for sales losses rather than boost advertising to recover lost business.

The paper takes from early works on the economics of advertising developed by Dorfman and Steiner and by Nerlove and Arrow in the 1950s-1960s and proposes a model of firm activity with advertising capital which includes price stickiness and product market frictions. Firms face sticky prices which introduce a standard profit-margin wedge, as well as product market frictions which add a second, product-market, wedge. Firms however face no such frictions in advertising and can fully adjust their volume of advertising. Solving the model, the profit-margin wedge and product-market wedge can be expressed as functions on the labour share, the ratio of advertising to GDP and the residual elasticity of demand.

Taking these derived expressions, the paper applies a linear filter with a lag polynomial to time series business cycle data in order to quantitatively evaluate the values of these wedges and assess their effects on employment. The calculated filtered time series for each wedge indicates that the product-market wedge is highly procyclical, while the profit-margin wedge appears quite flat. The profit-margin wedge is close to uncorrelated with either current year or previous year unemployment. The product-market wedge, on the other hand, is not correlated with current year employment, but is strongly correlated with changes in previous year employment, which suggests that adverse effects of this wedge do not appear in a year of recessionary employment contraction

but do materialize in the following year. This wedge is further responsible for a fall in the ratio of advertising to GDP and a decline in labour share following a contraction in employment.

Yan Bai (Univ. Rochester)
***"Demand Shocks that Look Like Productivity Shocks"*,**
joint paper with Jose-Victor Rios-Rull and Kjetil Storesletten

A popular idea in macroeconomics stipulates that demand and demand shocks affect business cycles. However, standard growth models have counterfactual implications when assuming decreasing returns to scale in labour. Under standard neoclassical assumptions, the production function requires that a change in output implies either a change in productivity or a change in inputs (capital or labour). Decreasing returns to scale then requires that labour productivity and wages drop if labour increases. But such movements are not supported by business cycle data which tend to indicate that capital inputs stay relatively fixed over business cycle fluctuations while labour and labour productivity do not move in opposite directions.

This paper proposes a framework where the search for goods, or demand for goods, plays a direct productive role in the economy. Customers search for goods on different markets characterised by standard matching frictions. Firms post prices and customers face a trade-off between prices and congestion. In this setting, increased search efforts will lead to an increase in output and total factor productivity (TFP) as demand creates its own supply and demand shocks cause fluctuations in measured productivity. The demand-driven business cycle models presented here imply that changes in demand will increase output even when keeping inputs, and the intensity with which they are used, constant.

The authors first build on a Lucas-tree model and introduce standard search frictions. The model assumes a competitive search protocol where agents choose to search in specific markets indexed by prices and market tightness measured as the ratio of producers (trees) to shoppers. The probability that a household's shopping effort leads to a successful match depends on the ratio of matches to the aggregate number of shoppers. Once a match is formed, output is traded at the posted price. The Solow residual then becomes a function of search effort where an increase in search effort squeezes greater output out of the economy through higher aggregate matches, making it more productive. As opposed to standard Lucas Tree models where changes in demand are absorbed by changes in prices, here, an increase in demand implies a higher search effort which leads to a partial increase in consumption, output and productivity, as well as an increase in prices.

Having laid out their basic framework, the authors extend their search model to a standard growth model with shopping for both consumption and investment goods in order to analyse effects of shocks on consumption and investment demand, shocks on the marginal rate of substitution between consumption and leisure, and true technology shocks. They use Bayesian estimation techniques with quarterly US time series data from 1960 to 2009 for output, consumption, work hours and measures of the Solow residual (total factor productivity). This exercise finds that demand shocks need to be given a much greater role compared to productivity shocks in order to match the observed data. Technology shocks only account for a small share of fluctuations of the Solow residual while shocks to demand can generate procyclical movements in measured TFP. From the perspective

of this model, increases in resource utilization arising from more effective search on the part of consumers and investors would appear as technology shocks in standard growth models.

Session 2: "Policy and frictions I"

Pascal Michaillat (LSE)
"A Model of Aggregate Demand, Labor Utilization and Unemployment",
joint paper with Emmanuel Saez

The seminal work of Barro and Grossman published in 1971 introduced a model that captured strong economic intuitions of recession periods. Crises result from a disequilibrium in markets, explained by excess demand or excess supply. Movements of aggregate demand cause unemployment, which is not the case in models with perfect competition on the goods market. Nevertheless, the hypothesis of disequilibrium creates difficulties in fitting such a model to data and seems unrealistic.

This article aims to capture the basic ideas of the Barro-Grossman model and address part of its drawbacks. Here, a model without disequilibrium which defines a smooth system of equilibrium conditions is introduced. It is also measurable thanks to empirical series for labour utilization and recruiting costs. The main trick consists in assuming the existence of matching frictions on the goods market. The authors propose a theoretical decomposition of unemployment into three terms: frictional, classical and Keynesian unemployment. Aggregate demand determines unemployment through the following mechanism: when aggregate demand is low, firms find customers with more difficulties, hence reducing labour utilization. Labour profitability declines and firms then compensate by lowering their labour demand. Compared to the conference paper presented by Robert Hall, here firms are not able to adjust for low aggregate demand by reducing their advertising expenditures.

In the basic model in which the labour market and the goods market are superposed, the equilibrium with rigid prices is either slack, tight or efficient. It is slack when the buyer-seller ratio (i.e. the tightness) is too low, the price is too high and the quantity of traded goods is not maximized. Conversely, the equilibrium is tight when the ratio is too high, the price is too low and the quantity of traded goods is still not maximized. In between, the equilibrium is efficient, meaning that the traded quantity is maximized. Notice that the hypothesis of competitive search on the goods market, as in the article presented by Yan Bai, implies an equilibrium price that decentralizes the social optimum.

In the model with labour, the Solow residual, i.e. the measured TFP, is affected because of matching frictions on the goods market. The unemployment rate is a combination of three components, each corresponding to a type of unemployment. Because of search frictions on the labour market, some job seekers do not find an employer, which results in frictional unemployment. The marginal productivity of the last worker is higher than the real wage, thus implying classical unemployment. Lastly, aggregate demand determines labour utilization of employed workers, which affects their productivity and creates Keynesian unemployment.

The authors exploit empirical series for labour utilization and recruiting costs. Large fluctuations in labour utilization and labour market tightness require some price and wage rigidity. Intuitively, a flexible price would absorb most of the shocks; tightness would not move enough according to the model. The observed positive correlation between employment and recruiting costs leads the authors to conclude that employment fluctuations are mostly driven by labour demand shocks, as labour supply shocks imply a negative correlation. Lastly, because of the observed positive correlation between output and labour utilization, the model concludes that labour demand shocks mostly reflect aggregate demand shocks and not technology shocks.

Nicolas Petrosky-Nadeau (Carnegie-Mellon)
"Fiscal Multipliers and Policy in a Model of Goods, Labor and Credit Market Frictions",
joint paper with Etienne Wasmer

The Great Recession has renewed interest in the fiscal multiplier, namely the impact of a one unit increase in public spending on GDP. This article proposes a convenient setup to describe both qualitatively and quantitatively the effect of a fiscal stimulus. Presumably, the fiscal multiplier can vary according to a variety of situations: its position and timing during business cycle fluctuations, the nature of a particular recession, or the way it is financed. Previous research estimated the fiscal multiplier in the U.S. to range between (slightly above) 0 during a period of expansion and 2.5 during a recession. According to the theory of optimal intertemporal behaviour, households wish to smooth their consumption over time. If they were able to do so then the fiscal multiplier would be 0 in the short run and 1 in the long run. In other words, any additional public spending is smoothed away in future consumption. Two ingredients are required to produce a larger multiplier: 1) the inability to smooth consumption, because of an imperfect financial market for instance; and 2) a disequilibrium model with rationing. The authors propose a model with goods markets frictions which incorporates frictions on the credit and labour markets as possible sources of amplification.

The sequencing of the model is given as follows. A firm must first find creditors on the financial market. Then, it must find workers on the labour market. Lastly, it must find customers on the goods market. The authors are agnostic on the size of frictions in each of these markets. In the limit case, a market can be frictionless. Search frictions on the goods market are consistent with the data, both on the supply side (advertising expenditures and capacity utilisation are procyclical) and on the demand side (shopping time is procyclical). Theoretically, frictions on the goods market are the key mechanism generating persistence and hump-shaped responses to shocks. The fiscal multiplier is the cumulative discounted variation in output relative to government spending. The fiscal shock has persistence over time and debt is repaid at a fixed interest rate in the long run. The model mainly builds upon a previous paper (Petrosky-Nadeau, Wasmer, 2011). Importantly, household utility is no longer assumed to be linear in order to obtain a non-trivial multiplier. Both producers and buyers on the goods market endogenously decide on the amount to spend on search efforts. The price is determined through Nash bargaining and the wage is set by a simple rule with constant elasticity relative to the marginal product of labour. Job creation depends on the three types of frictions. In particular, wages and advertising costs attenuate the role of goods frictions whereas search efforts and persistence of policy amplify it.

The empirical exercise proposed in this paper consists of looking at the impulse-response functions of a fiscal shock in the model with calibrated parameters. In their standard model, the authors find a multiplier of 1.5 for an expansionary policy, and 1.51 for a contractionary policy. This is, however, the effect on the nominal GDP. Once deflated, the multipliers are much smaller (around 1.03). A fiscal stimulus increases search efforts devoted to consumption, more firms enter the market and prices increase. Three mechanisms may be important sources of amplification in this framework. These are: 1) the concavity of the utility function (or equivalently risk aversion); 2) the persistence of fiscal shocks; and 3) the search technology on the goods market (search intensities on both side of the market are strategic complements). The authors finally retain 1.1-1.2 as a benchmark of the fiscal multiplier in normal times.

Session 3: "Policy and frictions II"

Sanjay K. Chugh (Boston College and Kiel Institute)
"Optimal Fiscal and Monetary Policy in Customer Markets",
 joint paper with David M. Arseneau, Ryan Chahrour and Alan Finkelstein-Shapiro

Business cycle fluctuations in advertising and the intensity of household shopping activities have gained increasing attention in macroeconomics. Inefficiencies in customer markets and advertising related markets can create important wedges. A key question is whether optimal monetary and fiscal policies can manage distortions from these wedges and restore efficiency in customer markets in the presence of search frictions.

This paper proposes to describe the behaviour of advertising and household time allocation using a customer search and matching framework, similar to the one proposed by Diamond, Mortensen and Pissarides applied to setting where some markets display sticky prices. The authors begin with a cash-good, credit-good structure and include product differentiation and new-Keynesian sticky prices, allowing for a fraction of goods to require search and matching efforts from both buyers and sellers. Advertising is present in both cash search markets and credit search markets. Here, congestion externalities due to frictions in matching markets can lead to inefficient customer market pricing. The model further adds a government component which introduces linear taxes and provides some payoff to households which fail to find a match in the goods market.

With this setup, the authors conduct a positive analysis of their model using a Bayesian estimation approach and unbalanced U.S. panel data from 1964 to 2010, first with exogenous fiscal and monetary policy, then with Ramsey-optimal policy. They find that a large shift away from efficient pricing in advertising markets is needed to capture the empirical volatility of advertising. Replacing exogenous policy with optimal endogenous policy in the estimated model has little effect on aggregate business cycle co-movements. Volatility in advertising is however much smaller than in the data, largely because Ramsey-optimal fiscal policy has a strong trade stabilizing effect which offsets congestion externalities in customer markets. Estimation results would suggest that the volatility of advertising observed in the data is inefficiently high.

The Ramsey-optimal policy regime analysed in the paper finds that high variability of fiscal policy instruments can help achieve efficient pricing in customer markets by smoothing the fluctuations of inefficient wedges that arise in the estimated exogenous policy model. Optimal monetary policy, on the other hand, does not directly target price distortions. Optimal inflation volatility and nominal interest rate volatility are quite small due to the price stickiness features of the framework. Optimal inflation volatility would however be much higher when assuming flexible prices. In a setting with a constrained set of policy instruments which only includes labour tax and inflation, labour taxes can dampen congestion externalities. With a complete set of instruments, optimal policy would call for a sizable volatility of instruments which directly affect customer search markets, such as sales taxes or advertising subsidies, and relatively constant labour income tax.

Emmanuel Fahri (Harvard University)
"A Theory of Macroprudential Policies in Presence of Nominal Rigidities",
joint paper with Iván Werning

The Great Recession has broken a prevailing consensus on the sole use of monetary policies in response to business cycle fluctuations. Macroprudential policies, meaning direct interventions in financial markets, have gained in popularity. Yet a theory for thinking of macroprudential policies and monetary policies together is missing. The authors present a general model that consists of an Arrow-Debreu framework with frictions in the form of price rigidities and constraints on monetary policy. Policy makers dispose of monetary policy and macroprudential policies, which here are taxes and quantity restriction in financial markets. Monetary policy constraints may be reaching the zero lower bound or a fixed exchange rate. For instance, the zero lower bound makes the nominal interest rate an irrelevant tool because inflation is such that the real interest rate is close to zero. Other instruments are not discussed. In the proposed model, monetary policy is not sufficient to stabilize the economy and macroprudential policies are required. An intuitive optimal taxation schedule is derived from the model. In an earlier paper, Eggertsson and Krugman (2012) provide an example in which such macroprudential policies are useful. In their setting, borrowers are suddenly required to pay down their debts. In some cases, the economy hits the zero lower bound and enters a recession where monetary policy is then powerless. The present article states that macroprudential restrictions are efficient on ex-ante borrowing.

Economists have traditionally justified the use of macroprudential policies because of pecuniary externalities. This is an efficiency issue when markets are incomplete or when agents have private information and borrowing constraints. Here, the authors assume complete markets but other frictions, leading to aggregate demand externalities. Nominal rigidities create wedges, meaning departures from efficient allocations in the economy with fully flexible prices. Macroprudential policies should encourage state contingent payments to increase consumption of goods featuring large wedges. The benefits from this stabilization mechanism are actually aggregate demand externalities and, then, are not internalized by agents.

The proposed model is general and can be simplified to focus on particular applications. The optimal financial taxes are such that the private marginal utilities equal the social marginal utility. Without taxes, the equilibrium is always constrained Pareto inefficient. The key conclusion remains

that monetary policy is not sufficient and macroprudential policies are useful. Macroprudential measures are ex-ante interventions; the model is also able to give insights on ex-post interventions such as optimal redistribution. The optimal redistribution conditions are the equalities between the private marginal value of income and the social marginal value. An application is studied in the spirit of Eggertsson and Krugman.

In policy debate, some consider that monetary policy should lean against credit booms (BIS view, Borio, Stein, etc.). Others think that macroprudential policies should be used instead and that monetary policy should target full employment (Krugman, Evans, Svensson, etc.). This question on which monetary policy to implement was especially relevant in Sweden for instance, which simultaneously faced a recession and a housing boom. According to the theory proposed here, monetary policy is not sufficient and macroprudential policies are required.

Session 4: "Frictions, Price determination and Wedges"

Luigi Paciello (Einaudi Institute for Economics and Finance)
"Price Dynamics with Customer Markets",
joint work with Andrea Pozzi and Nicholas Trachter

Broad consensus suggests that the dynamics of a firm's customer base (the set of customers purchasing form a firm) form an important determinant of firm performance. This drives firms act strategically in order to influence its evolution. As such, customer markets can significantly affect the optimal pricing policy of firms and present a natural example of price rigidity.

Building on the works of Phelps and Winter first introduced in 1970, this paper proposes a model of price setting with competition for customers in the presence of a sticky customer base. Price dispersion of homogenous goods supplied by firms with heterogeneous productivity gives customers incentives to hunt for lower prices, which leads to shifts in the customer base. Search frictions on the goods market introduce stickiness in customer dynamics which leads firms to consider customers as an asset and results in reduced mark-ups.

Under the proposed setup, each customer is matched to a particular firm at a point in time. At the start of each period, firms begin with an initial customer base (endogenously affected by past actions), draw an idiosyncratic productivity shock, and set a price common to all customers. Each customer then observes the price posted by their matched firm, draws their own search cost, and takes search and exit decisions. Customers have perfect information on the characteristics of their supplier as well as on the distribution of characteristics of all suppliers in the economy and, every period, decide whether or not to search for a new supplier. If customers do search, they incur a utility cost and are randomly matched to a new firm. After observing the characteristics of the new match, they chose either to switch firms or stay with the old one. Firms face a trade-off between maximizing static profits and expanding their customer base. On the intensive margin, current price will affect standard downward sloping demand of each customer. On the extensive margin, prices will also affect the size of the customer base. For example, a decrease in price will reduce current per-customer profits, but persistently increase the future profits through a better retention and

acquisition of customers. This competition for customers leads to lower optimal mark-ups over marginal costs than would otherwise be seen if the customer base was inelastic.

Having set up their model, the authors empirically assess the relationship between price and customer dynamics using scanner data which documents household grocery purchases from a large US supermarket chain between 2004 and 2006. Under preferred estimations using a linear probability model, they find that a 1 percent change in the price of a customer's typical basket of goods increases the likelihood of leaving the retailer's customer base by about 0.2 percentage points. The authors then take this price elasticity and use data on store level prices to infer the volatility and persistence of the idiosyncratic productivity process and calibrate the model's parameters in order to quantitatively assess the relevance of customer markets for price dynamics. The model finds that customer markets substantially magnify the real effects of shocks to nominal spending and predicts a distribution of prices of homogenous goods which is consistent with the empirical evidence reported by Kaplan and Menzio (paper presented at a later point in this conference). Compared to an identical economy with an inelastic customer base, the presence of sticky customers delivers a substantial increase in the dispersion of mark-ups and a reduction in prices. The cumulated impulse response of output to nominal shocks is four times larger in the presence of customer markets, while persistence measured by the half-life of output response is three times larger, highlighting the importance of taking into account firms' customer base when examining business cycle fluctuations.

François Gourio (Federal Reserve Bank of Chicago)
***"Investing in Demand over the Business Cycle"*,**
 joint paper with Leena Rudanko

This presentation emphasises the behaviour of firms on the demand side of the goods market over business cycles. Firms devote significant efforts in the form of marketing and advertising to find new buyers and keep their regular customers. Customers tend to be quite loyal to their retailers. This long-term relationship between a firm and a customer may be thought of as a form of customer capital. Previous presentations in this conference have shown the procyclicality and volatility of advertising. The originality of this paper is to exploit occupation data from labour surveys. In particular, the authors look at the link between employment in sales-related occupation and aggregate employment. The growth rates of these two variables are positively correlated and variations in sales-related employment are more volatile over time. There is also a positive correlation between these two growth rates during the Great Recession across states in the U.S.

The theoretical model outlined in this paper reproduces hump-shaped responses of GDP to various shocks and provides a foundation of the labour wedge and the mismeasurement of TFP. The intuition underpinning the model is similar to the one proposed in the previous presentation, but the main difference comes from the assumption that firms are able to discriminate between old and new customers by posting a different price. New customers and retailers face search frictions to meet each other. After the first trade, a customer joins the pool of old customers, which evolves exactly like a capital stock. Finding new customers is analogous to making an investment.

The model is calibrated with standard business cycle parameters to match the empirical selling time and buying time. A productivity shock and a discount factor shock are simulated. The impulse

response functions are compared with a standard real business cycle model (RBC). The model presents hump-shaped responses of output and investment which is contrary to the responses in the standard RBC model. The theoretical reason is that it takes time for a firm to build customer relationships. A labour wedge arises because of matching frictions on the goods market, as in many articles presented during this conference. This causes a mismeasurement of TFP (when it is measured as the Solow residual), which can be quantified according to the parameter values. As a drawback, the current model gives too much volatility in sales labour when compared to real data.

Paul Beaudry (UBC)
"Reconciling Hayek's and Keynes' views of recessions",
 joint paper with Dana Galizia and Franck Portier

The literature centring on competing theories of recessions tends to present views and policy prescriptions associated with Keynes and Hayek as polar opposites. The liquidation view often associated with Hayek interprets recessions as a necessary evil; the result of over-accumulation in the economy which leads to a liquidation phase. Stimulating demand is then ill-advised as it will only postpone the adjustment process. Under the aggregate demand view often associated with Keynes, recessions are inefficient and gains-from-trade are not properly exploited. Stimulating consumption and investment is then desirable in order to overcome deficient aggregate demand.

In order to reconcile these two seemingly opposed narratives, the authors propose to revisit the liquidation perspective of recessions within the context of an environment with flexible prices and search frictions where trade is not entirely coordinated through centralised markets. Households, each composed of a worker and a shopper, begin a period with an endowment of goods and simultaneously send work to the labour market and shop on the goods markets. Following standard search frictions, competitive firms are matched with workers on the labour market and produce goods, while some workers may end up unemployed. Households don't know their employment status when making their purchasing decision but take into account the probability of being employed when solving their utility maximisation problem and choosing consumption. In equilibrium, all shoppers spend the same amount, leading to positive assets for employed households and negative assets for those that are not. The possibility of unemployment leads to precautionary savings and lower consumption, which represent unexploited gains from trade. This, in turn, creates a wedge by causing the marginal rate of substitution between leisure and consumption to be low relative to the marginal productivity of labour. Unemployment risk further introduces a multiplier process for demand shocks. Households have higher consumption demand when they believe that many firms are searching to hire, which translates into higher probability of employment and a lower probability of subsequent debt while firms, in turn, look to hire more workers if they believe consumption to be high. As such, greater consumption favours higher employment, which in turn further reinforces consumption.

Under this setup, the size of household endowments will affect the degree of distortion in the economy, with higher endowments generating a positive and growing wedge and creating a feedback effect on economic activity. Intuitively, when households start a period with low endowments there are substantial gains from trade to be made, which will favour employment,

while higher endowments will reduce demand on the goods market. The mechanisms built into the model give rise to three states of the economy depending on the level of endowments. Under a certain level, increasing endowments is compatible with full employment and consumption increases with endowments. Past a certain threshold, the economy enters an unemployment regime and consumption decreases with endowments. For a high level of endowments, trade collapses completely and consumption is simply equals to endowments. Decreasing consumption with increasing endowments under the unemployment regime s a result of the multiplier process described. Here, an increase in endowments leads to a fall in household expenditures on the goods market, which reduces the demand for goods perceived by firms. Lower perceived demand then results in less search for workers by firms, which increases the risk of unemployment and causes households to further cut expenditures and amplifies the initial effect of endowments on expenditures. This negative effect is not present when the economy is in the full employment regime as increases in endowments below a certain threshold do not trigger precautionary savings, the key mechanism at play.

This model suggests that Keynes' and Hayek's views of recessions may be much more closely linked than previously recognized. Bouts of liquidation can amplify coordination problems and produce periods where frictions in the economy are particularly inefficient and socially desirable trade is under-exploited. This suggests that interventions aimed at stimulating aggregate demand face the trade-off emphasised by Hayek where current stimulus postpones the adjustment process and prolongs recessions. However, policies which stimulate current consumption at the cost of lower future consumption can still be welfare-improving when the economy features unemployment and may nevertheless remain desirable, even if they postpone a recovery.

Guido Menzio (UPenn)
"Shopping Externalities and Self-Fulfilling Unemployment Fluctuations",
joint paper with Greg Kaplan

The unemployed shop differently than the employed. This observation is the starting point of the work presented in this paper. The unemployed exert more efforts for shopping, by visiting more stores and spending more time on shopping activities. For instance, their shopping time is 25% higher than that of the employed. They also pay less for identical goods; between 2% and 5% less than what employed workers pay. Lastly, when the employed switch to unemployment, they reduce their expenditures. The authors build a model reproducing these stylized facts and focus on the effect of a non-fundamental shock in the form of a change in individual expectations.

Equilibrium unemployment results from search frictions on the labour market. The employed and the unemployed do not receive the same income, leading to a different shopping behaviour on the goods market. Sellers post different prices in equilibrium. A high price yields more per unit of output sold but reduces the number of traded units. Buyers can search with different intensity according to their income, or equivalently their employment status. The unemployed search more at equilibrium and, thus, are more likely to meet low-price sellers. A change in the unemployment rate has three effects on the sellers' revenue. When more buyers are unemployed, sellers loose in monopoly power because more buyers have alternative offers; this is the market power effect.

Secondly, the unemployed have a lower income and buy less. The sellers' revenue tends to reduce because of this demand effect. Lastly, a tightness effect tends to increase revenue since the product market gets more favourable to sellers. The employment decision made by a firm creates externalities on its rivals. When a firm hires one more worker, it reduces the unemployment rate of buyers through shopping externalities, which is the sum of the three effects mentioned above. This, however, deteriorates the conditions on the labour market for other firms by reducing their job-filling probability through a congestion externality. When shopping externalities are positive and dominate the congestion externality, the employment behaviours of firms are strategic-complement, meaning that increasing the workforce in a firm creates an incentive for other firms to do so. In this case, the model may exhibit multiple equilibria, characterised by different unemployment rates. Individuals' expectations matter in determining which equilibrium occurs.

The authors analyse a shock on individuals' expectations. By defining an optimistic regime as a regime in which individuals expect the low unemployment rate equilibrium as opposed to a pessimistic regime, they are able to reproduce the dynamics of unemployment in the United States from 2007. Interestingly, this theory predicts that the unemployment rate in the United States may not go back to the pre-crash level of about 5% as long as individuals' expectations are pessimistic.

Wouter den Haan (LSE)
"Inventories and the Role of Goods-Market Frictions for Business Cycles"

This paper investigates frictions on the goods market by focusing on the behaviour of inventories along business cycles. The author proposes a measure of goods-market efficiency and documents cyclical behaviour through a theoretical model. Goods-market frictions are shown to be a strong amplification mechanism for shocks striking the economy. Data exhibits a procyclicality of inventory investments. Goods-market frictions are the reason for the existing difference between production and sales, the first one being more cyclical than the second one. Sales are also positively correlated with the variation of inventories. The model is aimed at reproducing the fact that inventories are procyclical and that, on the contrary, the inventory-sales ratio is countercyclical.

The goods-market efficiency measure is defined as sales over products available for sale. This can be expressed as a decreasing function of the inventory-sales ratio. This index is thus procyclical, meaning that goods markets are less efficient in periods of recession. The main particularity in this model, when compared to the other articles presented over the course of the conference, is the generalizability of frictions which are not micro-founded and intervene only as a reduced form. Firms can sell only a share of their production, which corresponds to the goods-market efficiency, as defined above. It is assumed to be linearly increasing in aggregate production (Diamond externality) and decreasing in aggregate inventories (congestion externality). In the model, any unit which is not sold can be stocked (and accounted as inventory) and sold for the next period. Firms freely fix their price and account for the fact that only a share of produced goods is traded. The model is calibrated to match employment and wage volatility, as well as inventory facts.

Cyclical change in goods-market efficiency may be not important. First, it cannot be too dependent on aggregate production regarding the data, otherwise we should observe an increase in inventories during recessions, for instance. Second, the negative dependence with aggregate

inventories is important and suggests that cyclical changes in efficiency are short-lived. In conclusion, the author finds that interactions between goods-market frictions and labour-market frictions do not seem to be important in such a model with flexible prices and wages.