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Credit cards and inflation ☆

John Geanakoplos^{a,b}, Pradeep Dubey^{c,a,*}^a Cowles Foundation, Yale University, United States^b Santa Fe Institute, Santa Fe, NM, United States^c Center for Game Theory in Economics, SUNY, Stony Brook, United States

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ABSTRACT

The introduction and widespread use of credit cards increases trading efficiency but, by also increasing the velocity of money, it causes inflation, in the absence of monetary intervention. If the monetary authority attempts to restore pre-credit card price levels by reducing the money supply, it might have to sacrifice the efficiency gains.

When there is default on credit cards, there is even more inflation, and less efficiency gains. The monetary authority might then have to accept less than pre-credit card efficiency in order to restore pre-credit card price levels, or else it will have to accept inflation if it is unwilling to cut efficiency below pre-credit card levels. This could be a source of stagflation.

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We argue that the introduction and widespread use of credit cards increases trading efficiency but must cause an increase in price levels, other things being equal. Government monetary intervention sufficient to stop these price increases might undo much of the efficiency gains that credit cards bring. Things are worse if there is default on credit cards: the price increases are greater, and the monetary authority might have to engineer even more reductions in trading efficiency to bring back the old price levels.

In modern economies, more and more transactions take place via credit cards. They are perhaps the single most visible and talked about economic innovation in the last 40 years. Yet credit cards have not been extensively studied by general equilibrium theorists or monetary theorists, presumably because it has been thought that the effects of credit cards are negligible, or easily managed by monetary interventions. After all, credit cards only postpone the need for money, so one might wonder whether they have any effect. An older macroeconomic literature in the 1950s and 1960s did raise these

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* Corresponding author.

E-mail address: pradeepkdubey@yahoo.com (P. Dubey).

issues about “near monies”, but this was before the advent of credit cards, in an intellectual era of reduced form models in which it would have been impossible to directly analyze credit cards anyway.¹

We introduce a one-period general equilibrium model in which all agents have easy access to bank loans and to credit cards. They choose whether to buy goods with cash or credit cards, and prices adjust in order to clear all markets. No assumptions are needed on the number of commodities or the form of the utilities (beyond the usual general equilibrium hypotheses of continuity and concavity). We show in a series of theorems that credit cards must have a profound inflationary effect on price levels, and that monetary interventions to prevent price increases can be problematic. We do not deal with the transition from the regime without credit cards to the new regime with credit cards, preferring to keep the analysis as simple as possible by restricting ourselves in this paper to the comparison of a one-period model with and without credit cards. In a multi-period equilibrium we would expect to see several periods of rapid inflation after credit cards are introduced, tapering off only when prices settle down at much higher levels; after the inflationary transition, credit cards would continue to enable efficient trade, but would no longer contribute to inflation.

The surge in price levels in the United States in the 1970s and early 1980s coincided with the introduction of credit cards. Though we do not make an empirical connection between credit cards and the stagflation in the 1970s and early 1980s, our model provides a theoretical possibility of a causal connection. Many countries have introduced credit cards at different times over the past 30 years, with differing levels of default. In future work we hope to take advantage of this data to provide some empirical evidence for the theoretical conclusions we derive here.

In order to bring out the inflationary effect of credit cards in the starkest manner, our model makes the extreme assumption that all agents have the access to bank loans and credit cards. Under this assumption credit cards double the velocity of money, because the cash proceeds from the sale of goods can be used again to defray the debt on credit card purchases. The same dollar in effect can be used by one agent for purchases in the cash-commodity market and simultaneously by another for purchases in the credit card-commodity market. This creates a massive inflation, on the order of 100%.

In reality, the inflationary effect of credit cards may be less than in our stark model. Many agents who do not have access to bank loans can borrow today via credit cards. Such agents could easily be incorporated into our model, as we illustrate via an example in Section 4.2.² In their presence, credit cards create big efficiency gains in trade, and therefore, with the same amount of money chasing more goods, the inflationary impact of credit cards is diminished. In reality, there are also intermediate producer goods that are not purchasable via credit cards. They too could easily be incorporated into our model.³ They would also have the effect of reducing the impact of credit cards on inflation, since credit cards do not enable money to do double work for agents whose trading is focused on these intermediate goods.

The paper is organized as follows. In Section 1 we recall the one-period monetary economy that we ourselves introduced (Dubey and Geanakoplos, 1992, 2003a).⁴ We could probably have studied credit cards in other monetary models, but ours appears to be the simplest.⁵ Our model embodies the distinction Gurley and Shaw emphasized between inside and outside money; this distinction is crucial to the existence of a positive value of money in a one-period economy. Theorem 1 reprises our old observation that monetary equilibrium does exist if there are enough gains to trade available from the initial endowment. The model also displays in rudimentary form the trade-off the monetary authority faces between efficiency and inflation.⁶

Credit cards are introduced in Section 2, and for simplicity, we first examine the idealized situation where default does not occur. Consumers choose whether to buy goods with cash or credit cards, raising the question whether money can survive. Indeed many commentators refer to the coming “cashless” economy in which the supply of inside and outside money (i.e., cash) will be irrelevant. It is tempting to think that if credit cards became available to all households for the purchase of all commodities, and if there were no credit limits, then virtually all transactions would be conducted via credit cards, eventually eliminating the use of money altogether. Who would borrow money at positive interest to buy with cash when he could pay by credit card without interest? The puzzle is resolved in our one-period model because credit card prices are higher than cash prices, or in other words, cash purchases are made at a discount. (In a multi-period model, equality of cash and credit card prices could be maintained, provided there are consumers who pay interest on their credit card debt.) We are able to show quite generally in Theorem 2 that money remains viable with credit cards (though less valuable), i.e. that an equilibrium exists in which money has positive (albeit diminished) value.

Theorem 2 also shows that credit cards improve trading efficiency. This is not because we suppose that going to the bank to get cash wears down shoe leather. In fact, bank transactions nowadays are done sitting at the computer, or with debit

¹ See for example Gurley and Shaw (1960), Brainard and Tobin (1963), Tobin (1963), and Brainard (1964).

² See also the section on limited market participation in Dubey and Geanakoplos (2003b).

³ See again Dubey and Geanakoplos (2003b).

⁴ Shubik and Wilson (1977) introduced a central bank loaning inside money, but they did not have individual endowments of outside money. Without default, the bank interest rate must then always be zero and trade must be efficient. In contrast we allow for individual endowments of money, which leads to a positive bank interest rate and inefficient trade even when there is no default.

⁵ The famous Lucas and Stokey (1987) model is a natural candidate. But that model has an infinite number of periods, making calculations unwieldy. Incidentally, Lucas and Stokey do include credit goods (goods that can be bought without cash in advance). But these goods cannot be bought with cash. The choice of whether to buy with cash or credit cards, and how the market gives incentives for each, is central to our model. There is also no default on credit in the Lucas and Stokey model.

⁶ Inflation normally means the rate of increase of price levels over time. This cannot be modeled in our one-period economy. So by inflation we mean the comparative statics exercise in which price levels rise.

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