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# Effects of direct pricing of retail payment methods in Norway ☆

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ABSTRACT

In this paper we develop a model where agents can acquire goods using cash and two non-cash alternatives. We use it to study the effects of the pricing policy of payment methods implemented in Norway, carried out by individual banks and promoted by the authorities. We show that this policy induces a relative increase in the prices of checks with respect to the other means of payments (cash and cards) and leads to a fast switch towards cheaper electronic transactions. Our analysis shows that due to this policy welfare has diminished in the short run.



## 1. Introduction

In this paper we study the effects of the pricing policy of payment methods implemented in Norway. We show that a relative increase in the prices of checks, with respect to the other means of payments, cash and cards, leads to a faster switch towards electronic transactions but not to welfare gains.

The cost of a payment system is clearly affected by agents' choice since the price of each payment instrument may differ (Humphrey et al., 1996, 2000).[3] Payment choice could influence the functioning of the financial system and facilitate trade in the real economy.[4] In fact these decisions may have important economic consequences since a relevant part of the GDP comes from consumer transactions and these are completed with some methods of payment (Schreft, 2006).

The continuous evolution of information technology has led to a significant transformation of payment industry (Evans and Schmalensee, 2009). Humphrey et al. (1996) examine the payment systems of 14 developed countries and find that the use of electronic means of payment is clearly increasing in all countries. Besides, they try to explain the possible factors behind the different structures across countries. Among these they find, as the most important, the degree of payment availability (number of users, terminals, etc.) and institutional and cultural differences (income, new payment instruments, etc.). Hancock and Humphrey (1998) provide evidence on how electronic means of payment (credit and debit cards) gain importance with respect to checks and cash in many developed countries between 1987 and 1993. Humphrey et al. (2001) using data from Norway find empirical evidence that technology development and relative prices, together with the relationship between cost and technology, could explain observed differences in consumer behavior. Accordingly, although not empirically analyzed, differences in technology adoption and diffusion may affect consumer choices as well.

We will look at consumer choices regarding different payment instruments in Norway. Norwegian payment structure changed very rapidly between 1991 and 2011. We link the rapid change in the payment dynamics in Norway to the policy of direct pricing of payment methods, similarly to Bolt et al. (2008).

Despite the relevance of payment systems and the empirical interest on the matter, there is a lack of theoretical literature concerning wider choice of payment instruments, see Schreft (2006) or Crowe et al. (2006). Many theoretical models which consider two payment

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[3] Humphrey et al. (1996) claim that the cost of electronic payments ranges from 1/2 to 1/3 to that of paper-based ones. Humphrey et al. (2001) estimate this proportion to be 28.77% in 1994 in Norway (bank cost).

[4] Stojanovic (2001) argues that the adoption of new payment instruments, and e-money in particular, contributes to cash substitution and the development of more efficient payment and banking systems.

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instruments were developed. For example, Schreft (1992), Gillman (1993), and Aiyagari et al. (1998) show that the choice between cash and non-cash depends on the mix of the cost of the alternative mean of payment and the monetary policy. Ireland (1994a) points out that the decrease in the use of cash and its substitution by cards is caused by an increase in income. Markose and Loke (2003) show that this substitution is also due to the availability of payment terminals at the point of sale. Ireland (1994b), Marquis and Reffett (1994), English (1999) and Hromcová (2008) relate the choice of payment instruments also to the technological progress.

We perform our analysis in a theoretical setup using the approach of Ireland (1994a) and Hromcová (2008). We extend the existing model by increasing the number of available payment instruments. Agents in our economy are allowed to choose between cash, paper-based or electronic transactions. Endogenously, over time, a new payment method may emerge, some of the old ones may disappear. It will be a result of the consumer's decision that takes into account the relative cost of each payment instrument.

Similarly to the above mentioned related literature with two payment instruments, the resources that the economy devotes to the usage of alternative payment to cash represent a social cost. Having more (costly) alternatives to cash means that consumers switch towards the cheapest one. In case the relative prices of alternative means of payments change significantly, there will exist a trade-off between the benefit from not using any longer a more expensive alternative, and the cost of employing a new payment method in more markets. At the early stage of electronic era, as in the analyzed case, the cost may overcome the gain. In the long run this trade-off will disappear.

The remainder of the paper is organized as follows. In Section 2 we use data of payment patterns in Norway and describe the recent evolution of payment instrument choice. The model and its main properties are stated in Section 3. In Section 4 we describe the asymptotic balanced growth path behavior. In Section 5 we discuss the behavior in the transition. Welfare effects of undergone changes in payment choice are studied in Section 6. Final conclusions are summarized in Section 7.

## 2. Payment patterns in Norway

The relative cost of alternative means of payment is relevant when making payment decisions, and therefore, it could affect country's economic outcome.

The most common practice is that banks do not price directly payment services but cover their costs by other means, such as float revenue. One of the peculiarities of Norway is that this is not possible since float is prevented by law (Financial Contracts Act, Section 27). Other important feature is that, from 1960 on, a wage account service was established. Along the 60's, this new service meant an increase in the payment of wages into bank accounts and the use of banking services. Finally in 1969, the Basic Agreement between trade unions and employers' associations agreed to pay salaries via bank accounts. This agreement was based on the assumption that employees could access their wage account free of charge by means of checks. With respect to financial authorities, their interests in the cost of payment services and the possibility of pricing them date back to the 70's. In 1973, Knutz Getz Wold, then chairman of the Norges Bank, criticized banks for supplying free payment services. In the same year the Payment Services Committee was established by the ministry of finance with specific mention to costs and efficiency in its mandate. Together with this public interest, banks were also concerned with the cost of payment services. They started an information campaign in order to reduce the use of checks related to the wage accounts and the Basic Agreement, in particular checks of less than 100 Norwegian Kroner (NOK). In 1979 the first price was established for checks lower than 150 NOK by the Norwegian Banking Association. Later on, in 1985, the board of directors of the Norwegian Banking Association decided that commercial banks should introduce an arrangement with four free checks per month

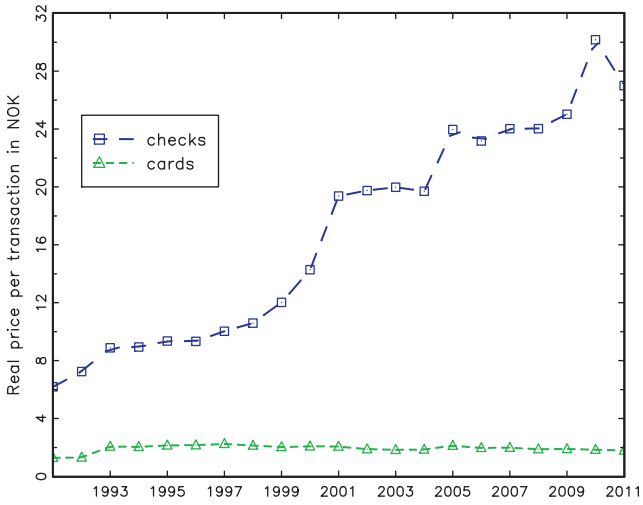


**Fig. 1.** Real prices in Norwegian Kroner (NOK) for payment transactions. Weighted averages for all banks.

and pricing of giro payments (minimum of 3 NOK). This last measure was largely discussed and negatively valued by press, trade unions and public opinion. Although this coordinated proposal to introduce charges to payment services was rejected by the Directorate of Prices, following the recommendation of the Ministry for Consumer and Administrative Affairs (March 1985), the largest commercial banks individually decided to do so. This introduction received little attention from the government, press and trade unions. After that, the smaller commercial banks did the same. By the end of the 80's pricing of payment services was in place in Norway. In 1992, together with an increase in the price of payment services, the government included Post Office payment services within the practice of charging payments. For more details on the introduction of prices for payment services in Norway see Enge and Owre (2006). Fig. 1 shows the evolution of real prices of alternative payment instruments to cash in Norway between 1991 and 2011.[5]

Following the changes in Norwegian pricing, prices of alternatives to cash exhibit growing tendency. Over the analyzed period the real price of checks increased five times, whereas the one of electronic transactions not even doubled. Accordingly, these prices have impacted consumers' behavior very rapidly. Norway switched radically towards electronic payments, mostly after 1995. In 20 years Norway transformed from an economy that practically did not use electronic payments at all to a one where electronic transactions represent a large majority of all payments, see Fig. 2.

## 3. Model

### 3.1. The household problem

We follow closely the specification of the economy in Hromcová (2008). The economy consists of a large number of infinitely lived households. All households have identical preferences, production and trade opportunities.

Households inhabit the following environment: they face continuum of spatially separated markets, which are indexed by $i \in [0,1]$. All households live in market 0, and the index $i$ indicates the distance from home. In each market $i$ a distinct perishable good is produced and sold in every period. Goods are thus indexed by $i$, which corresponds to the market of both production and trade. The economy

[5] There was a change in the measurement in 2009. The data for 2009–2011 are adjusted to match the previous methodology.