



The poor are twice cursed: Wealth inequality and inefficient credit market [☆]



Giuseppe Coco ^a, Giuseppe Pignataro ^{b,*}

^a Dipartimento di Scienze Economiche e dell'Impresa, University of Florence, Florence, Italy

^b Department of Economics, University of Bologna, Bologna, Italy

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ABSTRACT

This paper investigates the role of unobservable wealth differences on credit market equilibrium, given there is also asymmetric information concerning effort preferences and choices. In equilibrium, poor but able entrepreneurs may subsidise the rich and incompetent or be excluded. As a result, investment may exceed or fall short of the optimal level. Low inequality may deliver conditions for perfect screening and an efficient level of investment. The equilibrium with cross subsidisation is consistent with otherwise puzzling empirical observations.

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1. Introduction

What is the impact of wealth inequality on credit allocation? A host of empirical studies (for example, see [Evans and Jovanovic, 1989](#); [Blanchflower and Oswald, 1998](#); [Matsuyama, 2011](#)) has shown that the decision to become an entrepreneur is heavily wealth dependent. Most of the theoretical literature focuses on imperfect information. The lack of collateral, in particular, prevents some would-be entrepreneurs from realising their projects, either because they cannot screen themselves from worse entrepreneurs, or because they are not incentive-compatible due to insufficient

participation. An alternative theory points to the possibility that, because of decreasing absolute risk aversion (*DARA*, hereafter), wealthy individuals are more willing to take on risk and therefore more likely to become entrepreneurs, all other things being equal.¹ We bring together these two views in a model with heterogeneity both in wealth and in an entrepreneurial quality parameter, effort aversion, influencing effort choice. We also introduce the relatively novel assumption that wealth is not observable by the bank. In this context, we find that insufficient wealth is not a problem for moral hazard because poor entrepreneurs exert more effort due to *DARA* ([Newman, 2007](#)). However, it may still preclude them from getting credit due to their inability to screen themselves from rich, bad-quality entrepreneurs. More interestingly, when poor borrowers obtain access to credit, they must subsidise rich, bad-quality entrepreneurs. A market inefficiency arises in both cases. In the first case, it appears in the form of insufficient credit and investment, while in the second case it emerges in the form of excess credit as rich, bad-quality entrepreneurs realise their projects only due to the subsidy.

Apparently the source of the market inefficiency is inadequate collateral, but contrary to previous studies it is intimately related

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* Corresponding author.

E-mail addresses: giuseppe.coco@unifi.it (G. Coco), giuseppe.pignataro@unibo.it (G. Pignataro).

¹ The hypothesis that wealth dependence is the product of *DARA* has also been tested. The direct effect of wealth has generally proven to be robust ([Kan and Tsai, 2006](#) and [Berg, 2012](#)).

to wealth inequality. Collateral posted by poor, good-quality entrepreneurs is indeed sufficient to screen out poor, bad-quality entrepreneurs, but not rich entrepreneurs. As a consequence, we show that an optimal allocation of credit may occur if wealth differences are not large and that an egalitarian redistribution may deliver the social optimum composition of investment under relatively weak conditions.²

Our model is characterised by the hypotheses that an entrepreneur's wealth and personal features are unobservable and that agents exhibit DARA. With the exceptions of [Stiglitz and Weiss \(1992\)](#) and [Coco and Pignataro \(2013a\)](#), previous research assumes that wealth is observable, while entrepreneurial ability is not.³ The assumption of common knowledge of wealth would not be considered suitable in other fields of economic analysis (for example, tax evasion). When the public authorities are not able to observe freely the extent of an individual's wealth, the possibility that a bank official can do so without a cost is not feasible. Moreover, even if the property of some asset classes is relatively transparent, an entrepreneur may still hide the size of his wealth by transferring formal property to relatives. In most papers, the assumption of common knowledge of wealth possibly reflects the belief that there is no reason for concealing it. In our setting, this is not the case because decreasing risk aversion may turn wealth into a bad signal.

Much evidence has emerged over time in favour of the DARA assumption. [Friend and Blume \(1975\)](#) estimate the Arrow–Pratt risk aversion measure and conclude that agents invest more in risky assets as they get wealthier. Similar conclusions have been derived from experimental studies. The subjects in [Levy \(1994\)](#), for instance, were willing to take on more risk as they became wealthier. [Guiso and Paiella \(2008\)](#) apply a measure of absolute risk aversion to endowments looking at the Bank of Italy's Survey of Household, Income and Wealth confirming the validity of DARA. Regarding entrepreneurial choice, [Kan and Tsai \(2006\)](#) use data from the Panel Study on Income Dynamics (PSID) to calculate a relative risk aversion index and measure its correlation with wealth. Their results support the hypothesis of decreasing absolute risk aversion.⁴

Our set of assumptions allows us to discuss the equilibria also in terms of the equality of opportunity paradigm (EOP, hereafter). This principle requires that an individual's position in society be determined by the variables under his control (the responsibility parameter in the EOP terminology), typically the effort and the commitment he puts in building up abilities and his willingness to work hard ([Roemer, 1998](#); for a survey see [Pignataro, 2012](#)). In our setting, wealth is the un-chosen variable that should not influence one's ability to become an entrepreneur. In our interpretation, the willingness to work hard, i.e., the inverse of our effort aversion parameter, is what should determine an individual's position in society. EOP is verified when reward is ex-post proportional to the average productivity of different wealth classes. We find that reward is clearly smaller than productivity for poor entrepreneurs, due to the implicit subsidy paid to rich entrepreneurs.

In addition to wealth dependence, our results are also consistent with some other evidence. Unobservable wealth and risk aversion imply equilibria coherent with only partial participation, contrary to most theoretical studies. The evidence on this point is against the hypothesis of full collateralisation (see [Gentry and Hubbard, 2001](#)), confirming, in our opinion, the validity of our basic assumptions. [Evans and Jovanovic \(1989\)](#) find that the

correlation between entrepreneurial ability and assets is negative and statistically significant. In our equilibria, poor entrepreneurs, when they participate, are on average of better 'quality' than rich ones. The analysis is also compatible with some puzzling results on developing countries reported by [Banerjee and Duflo \(2010\)](#). They report that poor entrepreneurs borrow unambiguously less. When they get credit, they pay much higher interest rates (even 20–30% more). This is true, although default rates tend to be low for any wealth class of borrowers. In our equilibrium, poor entrepreneurs pay a higher interest rate. This occurs partly because they post less collateral but also due to the subsidisation of rich, low-quality entrepreneurs. In fact, poor participating entrepreneurs could, in principle, be those with the lowest default rates in equilibrium due to DARA.

The structure of the paper is as follows. The related literature and the contribution of our paper within the literature are discussed in Section 2. Section 3 introduces the baseline model, while Section 4 discusses the characterisation of loan contracts and the violation of the single crossing property. Section 5 presents the main results in a discrete effort-choice model. Concluding remarks follow in Section 6.

2. Related literature

Our framework relies on the literature regarding the use of collateral as a screening device ([Bester, 1985](#); [Besanko and Thakor, 1987](#); [Coco, 2000](#); [Menkhoffa et al., 2012](#)). [Coco \(1999\)](#) and [Stiglitz and Weiss \(1992\)](#) demonstrate that screening by collateral may prove impossible in realistic cases. [de Meza and Webb \(1999\)](#) authored the first paper to study the role of wealth in the credit market, and found that insufficient wealth can lead to exclusion, when a minimum level of participation is necessary to screen out low-quality entrepreneurs. [Stiglitz and Weiss \(1992\)](#) and [Coco and Pignataro \(2013a\)](#) are the only papers to assume wealth as unobservable. Our model differs from both contributions because we consider the effects of heterogeneity and asymmetric information also on effort aversion, the quality parameter. This allows us to explore the efficiency performance of the credit market and to get a novel result regarding the relationship between equity and efficiency performance. In [Coco and Pignataro \(2013a\)](#), subsidisation does not imply an inefficient level of investment, as in this paper. As a consequence, we can link the extent of inequality to the possibility of achieving the first best investment. [Stiglitz and Weiss \(1992\)](#) focus exclusively on the possibility of rationing and its macro effects. We are not interested in rationing, and we deliberately exclude it by assuming that the supply of deposits is infinitely elastic. Inefficiency here does not depend necessarily on insufficient investment because this may well exceed the first best, but on an inefficient composition of investments financed in equilibrium.

The possibility that a potential signal, such as collateral in the credit market, is not informative because of two-dimensional asymmetric information has emerged also in the literature on insurance (for example [de Meza and Webb, 2001](#)). The contribution most similar to ours is [Smart \(2000\)](#), where a deductible that could, in principle, be used to screen high and low risk types, may deliver a jammed signal as agents differ also in their risk aversion (similarly to [Coco, 1999](#)). This may lead to a Riley equilibrium with cross subsidisation between high and low risk types, analogous to our subsidisation between rich and poor types. However, our model is more complex as, besides the two dimensions of asymmetric information, we consider also moral hazard (though in a simplified form) and our results are more general (we use a standard Rothschild–Stiglitz equilibrium). Moreover, in our setting, cross subsidisation occurs from poor to rich with an inequitable

² We define as social optimum the allocation of credit that allows for the realisation of the maximum output. Accordingly, in the spirit of [Bardhan et al. \(2000\)](#), we define a policy as efficiency-enhancing if the gainers could compensate the losers and still remain better off.

³ A more complete analysis of this assumption can be found in [Coco and Pignataro \(2013a\)](#).

⁴ For similar evidence on different data, see also [Blake \(1996\)](#), [Ogaki and Zhang \(2001\)](#), [Elston and Audretsch \(2011\)](#).

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