

ON THE PRIVATE AND SOCIAL BENEFITS OF ECONOMIC LITERACY

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ABSTRACT

Carlo Dell’Aringa was highly respected both as a professor of economics and as an expert involved in the policy debate and in direct policy decisions. Inspired by these traits of his figure, we focus on the link between economic knowledge and policy. In particular, by means of a theoretical model and a simple empirical analysis, we argue that the conduct of fiscal policy is more tuned on social welfare in countries where citizens have a better understanding of economics and financial concepts.

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1. INTRODUCTION

Most contributors of this volume met Carlo Dell’Aringa for the first time as students. In fact, he thought economics for forty years while holding an important position as a public servant and, later on, a seat in the Parliament and in the Government. He was highly respected both as a professor of economics and as an expert involved in the policy debate and in direct policy decisions.

Inspired by these traits of his figure, in this paper we focus on policy and on economic knowledge. In particular, in the paper we argue that countries are governed more efficiently if citizens have a good understanding of economic and financial concepts. This happens because, facing knowledgeable voters, politicians are less tempted to use the policy to pursue objectives that are in conflict with social welfare.

The virtues of economic and financial knowledge are by now undisputed in the economics profession. These virtues, however, have so far been exclusively referred to individual decisions and individual wellbeing while completely neglecting any impact on collective decisions and social welfare. This neglect, however, appears peculiar face to the policy distortions arising from voters asymmetric infor-

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mation and to the nexus – which lies at the core of this paper – between asymmetric information and economic knowledge¹.

In the applied literature, the extent of voters imperfect information has traditionally been measured by looking at the access to informative sources. Along this perspective, a costless access to a large number of sources has been regarded as a proxy for perfect information. By contrast, the lack of sources has been taken as a signal of informational disadvantages for voters². Against this landscape, our argument is that looking only at whether voters may access informative sources is misleading. In our view, more than the access what really counts is whether voters are able to select relevant and reliable sources and to elaborate correctly the information conveyed through them. In other words, we believe that knowledge and competence are essential, especially in the era of internet and social media. In this era, sources are everywhere abundant but they are not equally reliable and unbiased.

Throughout the paper, we hold that being financially and economically illiterate does not mean being irrational. In this respect, we share the conceptual approach – but not the formal details – that characterises the rational inattention literature (Sims, 2003). In this literature, individuals are rational but their endowment of attention is limited. Thus, to save on attention they rationally choose to disregard some sources and to end up with an informative set coarser than that potentially attainable. From this perspective, one may convincingly argue that more literate individuals are more efficient in processing information and, therefore, more likely to end up with detailed information.

The content of the paper is the following. In Section 2, we present a survey of a selection of studies concerned with the economic and financial literacy of individuals. As discussed, all these studies neglect policy issues while focusing on the links between literacy and individual behaviour and between literacy and individual wellbeing. In Section 3, we present a simple theoretical model featuring an electoral competition between two parties, some voters are fully informed on the administrative abilities of contenders while some others are not. We show that parties try to induce uninformed voters to over-assess their own ability. To do so, they set up a fiscal platform which is excessively profligate. In equilibrium, the public budget exhibits a balance that worsens with the fraction of uninformed voters. In Section 4, we conduct a simple empirical analysis to check whether theoretical predictions are consistent with the evidence arising from a panel of 23 advanced economies. As discussed in this introduction, throughout the section we proxy the fraction of uninformed voters by resorting to a country-level measure of financial and economic literacy. In Section 5, we make some concluding remarks.

Throughout the paper, we borrow ideas that have already been put forward in works conducted with some co-authors. In particular, Section 2 draws from Baglio-

¹ For the relationship between asymmetric information and policy distortions see, in particular, Siebert and Rogoff (1988) and Rogoff (1990).

² See, for instance, Alt and Lassen (2006) and Shy and Svensson (2006).

ni, Colombo and Piccirilli (2017), while Section 3 and 4 from Murtinu, Piccirilli and Sacchi (2019).

2. ECONOMIC AND FINANCIAL LITERACY: A BIRD-EYE REVIEW OF THE LITERATURE

Since the outbreak of the great recession, economists have been increasingly interested on the ability of common people to make correct decisions in a complex financial environment. At the time of the subprime crises, the number of over-indebted households was simply too large to dismiss the issue as minor. Certainly, the regulation and the practices of banks and financial intermediaries were too lax. However, as many observers pointed out, the lack of an adequate literacy in economic and financial matters also played a key role in causing the crises. These are the words contained in the year 2008 report of the U.S. Advisory Council on Financial Literacy “While the crisis has many causes, it is undeniable that financial illiteracy is one of the root causes... far too many Americans do not have the basic financial skills necessary to develop and maintain a budget, to understand credit, to understand investment vehicles, or to take advantage of our banking system”.

Facing to the crucial role of economic and financial literacy, one is left with a number of question regarding the nature of the notion. What do the economists exactly intend for economic and financial literacy? How do they measure it? What are the antecedents and the effects of an insufficient literacy? Using these questions as a guidance, in this section we review some findings that stand up in the received literature.

2.1. *Measuring Financial and Economic Literacy*

There are two basic definitions of financial and economic literacy in the literature. The first definition is the one advocated by A. Lusardi and her co-authors in a number of influent studies. According to this definition, the economic and financial literacy of an individual coincides with her knowledge of economic and financial concepts. Hence, literacy ought to be measured by eliciting the individual understanding of concepts such as inflation, interest compounding or risk diversification³.

In contrast with the *knowledge approach* of Lusardi, other scholars advocate a more comprehensive *cognitive and behavioural approach*. According to them, focusing on knowledge is not sufficient as correct decisions require also cognitive and applicative abilities. More precisely, literacy coincides with the “ability of an individual to obtain, understand and evaluate the relevant information to make decisions” (Mason and Wilson, 2000). Hence, beyond measuring knowledge one

³ See Lusardi and Mitchell (2014) for a detailed survey of the literature inspired by this definition of literacy.

also needs to measure whether individuals make correct decisions such as spreading investment risk over many assets or engaging in prudent mortgage commitments. Implicitly, the cognitive and behavioural approach is also supported by the OECD in the guidelines addressed to investigators⁴.

In our view, the second definition is more in line with the foundations of economics. After all, economists are interested in the literacy of individuals because real world behaviour is often at odds with respect to the textbook behaviour. Yet, despite being more coherent with the approach of economists, this definition of literacy is less popular than the one advocated by Lusardi and co-authors.

Arguably, the reason for such a popularity lies in the simplicity of the method of measurement, which is based upon three simple questions aiming at eliciting the knowledge of the respondent. The first question concerns inflation, the second the interest composition and the third the diversification of risk⁵. Lusardi and Mitchell (2007) pioneered this method, then a large number of studies followed suit. Notably, since the method is robust to differences in the institutional and cultural environment, it was also used in the first worldwide survey, the Global FinLit survey by Klapper, Lusardi and van Oudheusden (2015).

In the Global FinLit survey, the three original questions were integrated by a fourth numeracy question⁶. Respondents who answered correctly to at least three questions were labelled as literate. The main results from the survey are essentially four. The first is that, at world level, only a third of adults are literate. This fraction increases to 55% in the subset of advanced countries while decreasing to 28% in the group of the main emerging economies (Brazil, Russia, India, China, South Africa). Among the advanced countries, however, the picture is far from being uniform as the fraction of literate individuals ranges from 37% in Italy to 68% in Canada. The second result is that the performance of women is consistently worse than that of men in all countries. At the global level, the fraction of literate males is 35% while that of females is 30%. The third result concerns the incidence of literacy in the different age groups. In advanced countries, this incidence exhibits an inverted-U shape. The fraction of literate individuals is very large in the 35-50 age

⁴ See the online document *OECD/Infee toolkit for measuring financial literacy and financial inclusion* (OECD/INFE, 2011).

⁵ Here is how these questions are formulated in a recent study based on the knowledge approach of Lusardi and coauthors (Klapper, Lusardi and van Oudheusden, 2015). Inflation: Suppose over the next 10 years the prices of the things you buy double. If your income also doubles, will you be able to buy less than you can buy today, the same as you can buy today, or more than you can buy today?

Interest composition: Suppose you put money in the bank for two years and the bank agrees to add 15 percent per year to your account. Will the bank add more money to your account the second year than it did the first year, or will it add the same amount of money both years?

Risk diversification: Suppose you have some money. Is it safer to put your money into one business or investment, or to put your money into multiple businesses or investments?

⁶ The numeracy question is the following: Suppose you need to borrow 100 US dollars. Which is the lower amount to pay back: 105 US dollars or 100 US dollars plus three percent?

group (63%) but substantially lower for the young (18-34) and the old (51-). By contrast, in emerging economies, the incidence declines consistently with age. Finally, the fourth result is the strong correlation, in all countries, between the literacy and the education of individuals.

Notice that most of these findings are “stylized” in the sense that they are quite robust to the coverage of the sample and to the methods used to measure the literacy. For instance, in a recent study conducted on a sample of Italian individuals, Baglioni, Colombo and Piccirilli (2017) find that the gender gap and the inverted-U age effect arise even if knowledge is measured by using the more comprehensive method suggested in the Oecd guidelines.

2.2. Financial Literacy and Financial Behaviour

In the previous section, we have described how financial literacy is associated with individual traits. In this section, we focus on how it correlates with variables that capture elements of the individual behaviour in financial markets.

Quite expectedly, a good level of financial and economic literacy is associated to behaviour that is close to the textbook behaviour of the rational agent. Compared to less literate individuals, those with more literacy spread the risk over a wider range of assets (Van Rooij, Lusardi and Alessie, 2011; Guiso and Jappelli, 2009), borrow at better conditions (Lusardi and Tufano, 2009), are less likely to go bankrupt (Gerardi, Goette and Meier, 2010; Perry, 2008) and plan more in advance for their retirement (Lusardi and Mitchell, 2011; Fornero and Monticone, 2011).

Compared to less literate individuals, those with more literacy also exhibit a better economic performance in terms of wealth accumulation. A rather stark evidence on the correlation between literacy and wealth arises in the Global FinLit survey by comparing the incidence of literacy for those that lie below and above the 60-th percentile of the within-country wealth distribution. In all countries, crossing such a threshold from below entails a notable increase in the incidence. The increase, however, is not homogeneous across different countries. In emerging economies, crossing the 60% threshold entails a shift in the incidence equal to 31 percentage points. By contrast, in advanced economies the shift is only 9 points suggesting a much lower disadvantage of the poor in comparison to the emerging economies. A notable exception within the group of advanced countries is Italy where the increase in incidence upon crossing the 60% threshold is equal to 17 percentage points.

The correlation between literacy and wealth opens the issue of detecting the underlying causal mechanism. It may be the case that literacy is beneficial for wealth accumulation because it improves the quality of decisions. However, it may also be the case that individuals with a larger wealth find it more profitable to invest in literacy, or that literacy and wealth are both determined by some unobserved personal trait such as the propensity to save. The picture may complicate even further

if one considers the role of education. Economic and financial literacy may be a by-product of education while the causal link between education and wealth may take both directions.

There are only a handful of studies that have tried to disentangle the direction of causality between wealth and literacy. The overall picture arising from these studies seems to be supportive of the idea that literacy improves the quality of decisions and, as a consequence, the accumulation of wealth. Behrman et al. (2010) and van Rooij, Lusardi and Alessie (2012) both use an instrumental variable regression and show that literacy has a positive causal impact on wealth. Similarly, Fort, Manaresi and Trucchi (2016) find that bank information policies are effective in increasing financial literacy, which in turn is shown to determine a significant increase in household financial assets. However, by means of a theoretical model, Jappelli and Padula (2013), argue that literacy and wealth are jointly determined along the life-cycle of individuals, a prediction that is consistent with the evidence they produce.

3. A SIMPLE MODEL OF VOTER MANIPULATION

Up to this point, we have focused on the concept of economic and financial literacy and have explored the idea that literacy enhances the quality of individual decision-making and improves individual welfare. In the remainder of the paper we shift our attention from the individual to the social wellbeing. In particular, we put forth the argument that countries populated with financially literate citizens are governed more efficiently than countries with non-literate citizens.

We base this argument on a theoretical model – which is the object of this section – and on some simple empirics – which we present in the following section. The model focuses on the behaviour of two political parties that compete in a general election. The desire to win the election induces a fiscal policy distorted towards excessive deficit. Parties engage in profligate policies with the purpose of manipulating voters and gaining more electoral support. In this environment, we show that the size of the deficit distortion depends on the extent of voters information regarding the administrative ability of politicians.

3.1. *Assumptions*

We assume that two parties - A and B - compete for a general election. Before the election, each party proposes a fiscal policy platform and commits to it in case of electoral success. Let s_j represents the stance of the platform proposed by party j ($j = A, B$). We assume that party j is free to choose s_j along the real axis. A positive s_j means that the policy chosen by party j is expansionary, with low taxes and a large provision of public goods. By contrast, a negative s_j means that the policy is contractionary.

We assume that there is a unit mass of voters. Let U_j^i represent the *economic plus political* utility of the representative voter i under the rule of party j . This utility is as follows:

$$U_A^i = U_A + \varepsilon_i + \pi \quad U_B^i = U_B \quad U_j = y + s_j - \frac{1}{2}(d_j - D)^2 \quad (1)$$

$U_j(j = A, B)$ stands for the economic component of the utility under the rule of party j . The absence of the index that identifies the voter implies that this component is the same for all voters. More in detail, the voter derives her economic welfare from an exogenous endowment y and from the fiscal policy stance decided by ruling party. By contrast, the voter is harmed if the public deficit d_j is distant from some exogenous target D .

The deficit d_j is given by

$$d_j = s_j - a_j \quad j = A, B \quad (2)$$

In this expression, a_j stands for the administrative competence of party j . Thus, equation (2) states that the fiscal balance worsens with the stance of the fiscal policy and improves with the administrative competence of the party.

In addition to the economic preferences, equation (1) also describes the political preferences of the representative voter. These preferences are conveyed by the sum $\varepsilon_i + \pi$, which can be interpreted as the inclination of the voter for party A *vis-à-vis* party B. The component ε_i represents the subjective inclination of the voter, that is her ideological proximity to the values of party A as opposed to those of party B. By contrast, the component π is common to all voters and can be interpreted as the appeal of candidates of party A as opposed to those of party B.

We assume that the voter extracts ε_i from a symmetric distribution centred around $\bar{\varepsilon} = 0$ meaning that the median voter is ideologically equidistant from the two parties. Further, we assume that π is extracted from a symmetric uniform distribution over the support $[-0.5\bar{\pi}, 0.5\bar{\pi}]$.

While voters are interested in voting for the party that guarantees the largest economic plus political welfare, each party is interested in maximising a combination of selfish and social objectives:

$$\chi P_j + U_j \quad j = A, B \quad (3)$$

In this expression, χ is a non-negative parameter while P_j represents the probability of party j of winning the elections as of the time the platform is announced. Thus, the party is interested in winning the election but it is also interested in the social welfare following the win. The relative weight of these two objectives is given by χ . If $\chi \rightarrow 0$, the party is only concerned with social welfare. By contrast, if $\chi \rightarrow \infty$, the party is only concerned with the electoral success.

3.2. *Information*

The electoral game starts with the two parties extracting their competence a_j from some (undefined) distribution. The two extractions are independent and private information for each party. Immediately after the extraction of a_j , party j announces the policy platform that will be implemented in case of electoral success. The platform is therefore conditional on the extracted competence and may thus be used to infer some information on the latter.

Following the platform announcement of the two parties, voters extract their type ε_i while Nature extracts the relative appeal of candidates π . Then, the election follows suit.

Being rational, voters cast their vote in favour of the party that guarantees the highest economic plus political return. An element of this return is the deficit d_j , which depends on the policy stance proposed by party j as well as on the party administrative competence a_j . Crucially, we assume that at the time of the election only a fraction $1 - \mu$ of the voters is able to directly observe a_j . The complementary fraction μ is made of voters that do not observe a_j but that can infer it from the announced platform stance s_j .

3.3. *Discussion*

The model outlined in the two previous sections falls within the class the electoral competition models (Persson and Tabellini, 2000). The key message of these models is that due to the electoral motive ($\chi > 0$) parties adopt policies that are suboptimal from the perspective of social welfare. A peculiarity of these models is that post-electoral deviations from the announced policies are ruled out by assumption, which appears to be rather stringent as voters tend to forget the electoral promises in the real world.

A possible replay to this observation is the following. It does not matter that promises will be forgot in time. For the electoral motive to distort policies it is sufficient that promises are binding at least in the immediate aftermath of the election. A second more subtle replay is put forward by Bisin, Lizzeri and Yariv (2015), who argue that the timing of this class of models should be interpreted as referring to events that occur at a frequency higher than that of the general elections. Local elections that overlap with general elections are the most obvious example. To the extreme, politicians may be concerned with their popularity even in continuous time – think, for instance, of the timing of opinion polls – so that their decisions are bound to be distorted even if a general election is far to come.

A second critical assumption of the model relates to the concern of voters for the public budget deficit. Admittedly, the assumption is a shortcut to embed the intertemporal public budget constraint in a model which is essentially static. From this perspective, the deficit target D represents some ideal reference set forth by financial markets and/or rating agencies. Voters express aversion towards a deficit

that exceeds this reference because in the future they will bear the costs of a fiscal consolidation. The quadratic form also suggests that the marginal cost of consolidations is increasing. This may be due, for instance, to higher marginal costs of debt financing associated to larger off-target deficits or to higher marginal macroeconomic costs following larger fiscal consolidations. Incidentally, notice that the quadratic form also implies that voters are averse to deficits that fall short of the target D . However, this occurrence is ruled out in equilibrium.

3.4. Perfect Information

It is instructive to preliminary solve the model under perfect information, i.e. by holding that all voters directly observe the administrative competence of the two parties ($\mu = 0$). For the sake of clarity, in this section we focus only on the behaviour of party A. The symmetry of the model implies that results for party B are similar.

By looking at the preferences of the median voter ($\varepsilon_i = 0$), one may easily conclude that party A wins the election if the economic and political welfare under A is larger than that under B:

$$\underbrace{s_A - \frac{1}{2}[s_A - a_A - D]^2}_{U_{A-y}} + \pi \geq \underbrace{s_B - \frac{1}{2}[s_B - a_B - D]^2}_{U_{B-y}} \quad (4)$$

At the time party A sets its policy, however, the realization of π and the platform that party B is about to announce are still unknown. Thus, party A may only compute the probability of winning the elections:

$$P_A = \frac{1}{2} + \frac{1}{\pi} [U_A - E(U_B)] \quad (5)$$

For party A, the probability of winning the elections is 0.5 if the expected welfare of the median voter under its own rule is equal to the expected welfare under the rule of party B. The expected welfare under its own rule is U_A as $E(\pi) = 0$. By contrast, the expected welfare under the rule of B is given by $E(U_B)$ since party A is unaware of the administrative competence and of the platform of B. Intuitively, if the median voter is indifferent between the economic welfare under the two parties, the outcome of the election depends uniquely on the sign of π . The probability of winning is 0.5 because π is distributed symmetrically around zero.

Clearly, the probability of winning increases beyond 0.5 if U_A exceeds $E(U_B)$. Notice that the impact of the utility differential over the probability depends negatively on the width of the support of π . This happens because the differential becomes less relevant for the probability of winning if the random elements of political preference become more volatile.

The problem of party A is to maximise $\chi P_A + U_A$. By looking at eq. (5), it is

straightforward to observe that the platform that solves this problem coincides with the platform that maximises U_A or, equivalently, coincides with the socially optimal platform. Intuitively, in full information there is no conflict between social welfare and the selfish electoral objective of the party. The party maximises the chances of winning the election by setting the platform that is the most beneficial for voters:

$$s_A^{so} = 1 + D + a_A \quad (6)$$

Eq. (6) describes the socially optimal platform for party A (so: socially optimal), the one for party B is analogous. Notice that the platform stance depends on the “budget constraint” imposed by financial markets. The stance becomes more expansive if financial markets allow to do so, that is if the target D increases. Notice also that the party uses its administrative competence to expand the stance of its platform. This depends on the fact that a more competent party is able to meet a given deficit target with a more expansive platform.

As a result of the platform in eq. (6), in equilibrium the deficit is

$$d^{so} = D + 1 \quad (7)$$

Notice that the socially optimal deficit is independent on the competence of the party that wins the election. This is due to the fact that, on the one hand, more competent parties exhibit smaller deficits for any given platform but, on the other hand, eq. (6) suggests that more competent parties adopt more expansive platforms.

3.5. *Asymmetric Information*

In this section we solve the model under asymmetric information. We label as uninformed the fraction μ of voters who do not observe the administrative ability of parties. The others are labelled as informed.

As we explain more diffusely in the next section, the presence of uninformed voters is intended to capture the fact that some voters simply lack the background knowledge that is necessary to assess whether party candidates are capable of managing public finances efficiently.

Let $s(a)$ represent the platform stance chosen by a party endowed with competence a and let $\tilde{a}(s)$ represent the inference of uninformed voters regarding the competence of a party that chooses a platform stance s . We define a Bayesian equilibrium of the electoral game as a couple of functions $s(a)$ and $\tilde{a}(s)$ such that

- 1) given $\tilde{a}(s)$, $s(a_j)$ is the best reply of party j to the platform adopted by party j'
- 2) the inference $\tilde{a}(s)$ is consistent with the strategy $s(a)$, i.e. $\tilde{a}(s(a_j)) = a_j$.

In any such equilibrium, party A wins the election if

$$s_A - \frac{1}{2} [s_A - (1 - \mu)a_A - \mu\tilde{a}(s_A) - D]^2 + \pi \geq U_B - y \quad (8)$$

Equation (8) is the counterpart of equation (4) under imperfect information, the two equations coincide if voters are all informed ($\mu = 0$). Party A wins if for median voters the welfare under A is larger than that under B. The novelty here is that a fraction $1 - \mu$ of median voters – and, more in general, of all voters – observe directly the competence of parties while a fraction μ infers the competence from the announced platform. In analogy with the full information case, from eq. (8) we may compute the probability for party A to win the election as of the time of setting its platform:

$$P_A = \frac{1}{2} + \frac{1}{\pi} \left\{ s_A - \frac{1}{2} [s_A - (1 - \mu)a_A - \mu\tilde{a}(s_A) - D]^2 - E(U_B) + y \right\} \quad (9)$$

In the remainder of this section we focus on an equilibrium where, in line with eq. (6), the strategy of each party is linear with respect to its own competence. Hence, we conjecture

$$s(a_j) = \alpha + \beta a_j \quad j = A, B \quad (10)$$

where α and β are two unknown coefficients which will be pinned down by imposing consistency between the conjecture (10) and agents optimal behaviour.

To compute these coefficients notice first that the uninformed use the policy (10) to infer the competence of parties. As to the competence of party A, this inference is

$$\tilde{a}(s_A) = \frac{s_A - \alpha}{\beta} \quad (11)$$

Second, substitute the inference (11) in eq. (9) and use the resulting probability in the party A objective $\chi P_A + U_A$. Third, maximise this objective and find the optimal strategy in terms of the unknown coefficients:

$$s_A = \frac{\chi + \bar{\pi}}{\chi + \bar{\pi} - \chi\mu/\beta} + D + a_A \quad (12)$$

By comparing equations (10) and (12), we find that the two unknown coefficients are $\beta = 1$ and $\alpha = \frac{\chi + \bar{\pi}}{\chi(1 - \mu) + \bar{\pi}} + D$. Thus, as in full information, the stance of fiscal policy increases one-to-one with respect to the administrative competence of the party. With respect to full information, however, the fact that $\alpha > 1 + D$ implies that the stance of fiscal policy is more expansive. Thus, the deficit is larger than the socially optimal level:

$$d = d^{so} + \frac{\mu}{1 - \mu + \bar{\pi}/\chi} \quad (13)$$

To understand the reasons behind such an expansionary distortion, recall that

the uninformed use the announced platform to infer the unobserved competence of the party. A more expansive platform is thus associated to a higher inferred competence. In turn, pursuing an electoral objective, parties have an incentive to announce overly expansive platforms to induce the belief of being highly competent. In other terms, with uninformed voters a conflict arises between the electoral objective of parties and their concern for social welfare. Platforms deviate from the social optimum to pursue a manipulative intent.

Notice that, in equilibrium, uninformed parties correctly anticipate the manipulative use of fiscal policy. Hence, the attempt of parties to manipulate their beliefs is vain. From this perspective, the distortion that affects the deficit operates as a device to make policies incentive compatibles. The optimal stance in eq. (6) is not incentive compatible as parties are tempted to deviate towards a more expansive stance. This happens because deviations entail a second-order welfare loss but a first-order electoral gain. By contrast, if the stance is already distorted, further deviations entail first-order electoral gain but also first-order welfare losses. In equilibrium, the distortion is such that the electoral gain and the welfare loss are in balance.

The upshot of this discussion is that the size of the electoral distortion increases with the temptation to deviate from the socially optimal policies. In turn, this temptation increases with respect to the intensity of the electoral concern (χ) and to the fraction of voters that can be potentially manipulated (μ). By contrast, the temptation decreases if random events gain momentum for the outcome of the elections ($\bar{\pi}$). This explains why, in eq. (13), the deficit increases with respect to χ and μ but decreases with respect to $\bar{\pi}$.

4. LOOKING AT THE DATA: ECONOMIC KNOWLEDGE AND FISCAL POLICY

4.1. *Asymmetric Information and Economic Knowledge*

The theoretical analysis suggests that the conduct of fiscal policy tends to be more disciplined in countries where voters are more informed.

The relationship between voters information and the stance of fiscal policy has already been put under scrutiny in the empirical literature. Notably, by using a large dataset covering advanced as well as developing countries, Shy and Svensson (2006) document that fiscal discipline is more pronounced in countries where voters have a better access to information. The proxy for the access is the diffusion of radio receivers, which were abundant in the advanced countries but scarce in developing countries within the time span covered by the study. Alt and Lassen (2006) take a different avenue and argue that voters are informed only if the budget process is sufficiently transparent. Accordingly, they build an index of fiscal transparency and show that, across countries, larger deficits are associated to more opaque budget processes.

A common trait of these two studies is that the data used for the empirical in-

vestigation refer essentially to the pre-internet era. At least in advanced countries, internet is by now accessible to almost all individuals. In addition, internet represents the main channel through which authorities convey information to citizens and the main place where citizens engage in policy discussion. Thus, what does really mean being poorly informed in the era of internet? Can public budgets be opaque if anyone can freely and quickly access all relevant data?

In the last few years, many economists appear increasingly more persuaded that the scarcity of information does not lie any longer in the scarcity of sources of information but in the limited capacity of human brains to properly locate and process these sources. The expansion of the rational inattention literature points exactly in this direction (Sims, 2003). The basic idea underlying this literature is that the sources of information are abundant, cheap, and reliable. Yet, individuals possess only a limited amount of attention so that they rationally decide to pay attention only to some sources while neglecting some others.

The limits of human brains, however, are not similar across individuals. It is almost a truism that more knowledgeable individuals are able to process more information and to do so in a more effective way. This may be due to the fact that knowledge itself equip individuals with better processing capabilities or, in reverse, that individuals with more innate capabilities end up with accumulating more knowledge. For the argument we make in this paper, however, it doesn't really matter which is the causal mechanism that links knowledge and processing capabilities. What matters instead is the fact that these capabilities and knowledge are connected so that the second can be taken as a proxy for the first.

More in detail, we argue that only those with a good amount of economic knowledge are capable of properly processing the information on the conduct of fiscal policy. Hence, referring to the model, the fraction of informed voters should be proxied with the fraction of those voters who are endowed with good economic knowledge. Relatedly, we also argue that measures of media diffusion (Shy and Svensson, 2006) or of transparency (Alt and Lasso, 2006) are not longer good measures for the extent of asymmetric information in fiscal policymaking. Or, at least, they do not appear to be so across contexts with high density of informative sources such as the set of advanced countries.

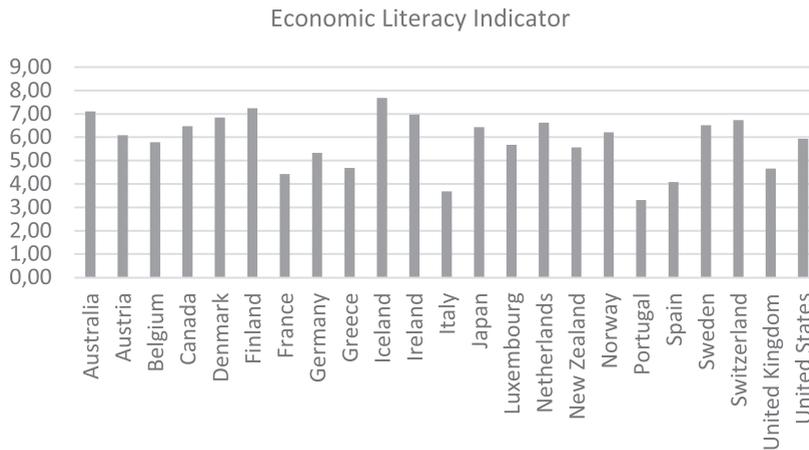
4.2. Fiscal Policy and Economic Knowledge

By taking the road outlined in the previous paragraph, the key prediction of the model is that fiscal policy tends to be more disciplined in countries where economic knowledge is more diffuse. To assess whether the evidence is consistent with this prediction we borrow from Murtinu, Piccirilli and Sacchi (2019) and build a panel of data covering 22 advanced countries over the decade 1999-2008.

The information on the economic literacy of voters is retrieved from an annual survey realised by the International Institute for Management Development (IMD). The survey is based on interviews conducted on country panels composed of ex-

perts and business insiders. Panelists are asked to express along a 0-10 scale their agreement with the sentence “Economic literacy among the population is generally high”. Table 1 illustrates the country means of such a measure over the years under scrutiny. Notice that economic literacy varies widely across countries. The index is larger than 7 in Australia, Finland and Iceland while in Italy and Portugal the index is half this size.

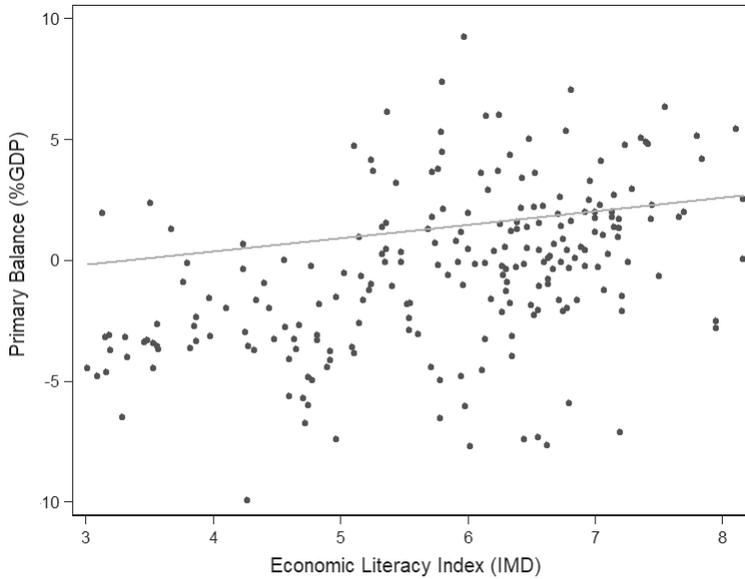
TABLE 1 – *Economic Literacy in Advanced Countries*



The means depicted in the figure hide a fair amount of within-country time variation, which is quite surprising as knowledge changes only slowly from time to time. Notable cases are Spain (standard deviation = 19% of the mean) and a group containing France, Australia and Luxembourg (standard deviation = 10% of the mean). The reason for the time-variability lies upon the perceived nature of the variable. The index does not measure economic knowledge *per se* but the perception of economic knowledge from the perspective of panelists. The perception may change from time to time even if the underlying variable is stable. Far to be a nuisance, the subjective nature of the measure accords finely with the hints of the model. Loosely speaking, the mechanism put forth in the model does not require the existence of some uninformed voters. Instead, it requires that politicians *perceive* that some voters are uninformed, i.e. *believe* that there is some scope for manipulation.

As to the conduct of fiscal policy, the information is retrieved from the OECD online database. The key indicator used for analysis is the primary balance as a percentage of the GDP.

Figure 1 plots all sample observations on the literacy and the primary balance together with the fitted values of the latter from a simple OLS regression. The estimated slope of the regression is equal to 0.953 and turns out to be statistically significant at the 1% level.

FIGURE 1 – *Economic Literacy and Fiscal Balance*

Albeit very basic, this evidence is consistent with the theoretical mechanism. A one-point increase in the index of economic literacy is associated to an improvement in the primary balance equal to 1% of the GDP. This variation is remarkable as it explains 25% of the standard deviation exhibited by the primary balance within the sample.

4.3. *Political Polarization*

Going back to the model, the distortion that inflates the deficit under asymmetric information is given by $\mu/[1 - \mu + \bar{\pi}/\chi]$. This suggests that μ , the fraction of uninformed voters, impacts on the deficit with an intensity that depends on the ratio $\bar{\pi}/\chi$. As the ratio enlarges, the impact of μ become less intense. At the limit, the impact disappears if the ratio increases unboundedly.

We interpret the *inverse ratio* $\chi/\bar{\pi}$ as capturing the *incentive* of politicians to manipulate voters. Clearly, the incentive is large if politicians are very concerned with winning the elections (χ). By contrast, the incentive is small if the outcome of the election depends to a large extent on random events that fall outside the control of parties ($\bar{\pi}$). By adopting this interpretation, the cross-effect between μ and $\bar{\pi}/\chi$ is intuitive. The presence of manipulable (uninformed) voters distorts the fiscal policy only in those contexts where politicians have a fairly strong incentive to manipulate. By contrast, if politicians have no incentive, then they do not undertake any manipulation irrespective of the number of uninformed voters.

Building on this cross-effect, we may thus formulate a further empirical prediction: the positive relationship between the balance and economic literacy is expected to be stronger in those countries where $\chi/\bar{\pi}$ is larger.

To investigate whether this finer prediction is consistent with the evidence, we need preliminarily to find the empirical counterparts of the two parameters χ and $\bar{\pi}$. Admittedly, searching for a proxy of $\bar{\pi}$ appears to be a rather difficult task. The appeal of candidates, for instance, is a mixture of empathy, leadership and vision. Everyone recognises that these are important traits of successful political leaders but how can we measure these traits? How can we measure the parameters of the distribution that governs the assignment of these traits to competing politicians?

In contrast with the difficulties associated to the measurement of $\bar{\pi}$, the task of gauging the size of χ appears to be somehow simpler. In fact, the political economic literature offers a firm guidance for the search of a good measure of χ .

A popular view within this literature is that politicians are concerned with the outcome of the elections because they earn rents from being in power (Shy and Svensson, 2006; Acemoglu, Egorov and Sonin, 2013). According to this view, χ can be proxied with the efficiency of the law enforcement system or with the effectiveness of media control on the political system. Shy and Svensson (2006), for instance, conjecture that law enforcement and media control are weaker in developing countries. Hence, they hold that belonging to the group of advanced *vis-à-vis* developing countries represents *per se* a proxy for the size of χ .

A second hint from the political economy literature is that politicians are more concerned with the outcome of the elections in those countries where the political system is more polarised. This happens because in polarised systems parties have markedly different preferences on expenditure and tax policies (Alesina and Tabellini, 1990). Hence, winning the election allows the adoption of the preferred policies and avoids the cost of bearing policies that are very distant from the preferred ones. Therefore, according to this view, χ ought to be proxied with measures of party polarization.

Facing these indications from the literature, the nature of the data used in the current analysis leads quite naturally to dismiss the rent-seeking option in favour of the polarisation hypothesis. In contrast with the panel of Shy and Svensson (2006), our panel is composed of advanced countries only. Arguably, these countries are all endowed with an efficient and impartial judiciary and with a sharp-eyed media system that leave little discretion to rent-seeking politicians. By contrast, these countries differ markedly in terms of political polarization. Hence, for the purpose of our investigation, the polarization option seems to provide more empirical leverage in comparison to the rent-seeking option.

We derive the information on polarization by using the data from the CPDS⁷ dataset. More in detail, we use an index that was firstly conceived by Schmidt (1992) and that measures the ideological homogeneity of the cabinet. The underlying assumption is that a polarized political system generates a polarized cabinet,

⁷ Comparative Politica Data Set 1960-2013 (Armigeon et al., 2015).

i.e. a cabinet where members are all very close along the ideological spectrum. According to this index, an ideology is *hegemonic* within a cabinet if all cabinet members belong to the same party or to parties that are ideologically very close. Instead, an ideology is *dominant* if it at least two thirds of cabinet members belong to the same party or to parties that are ideologically very close. In all other cases, a cabinet is termed as ideologically *balanced*.

Using this index, we define a country as being characterized by a polarized political system if an ideology is hegemonic in the cabinet for at least half of the years covered by the panel. According to this definition, 16 countries turn out to be polarized while the remaining 6 are non polarized⁸. To check whether the predicted cross-effect between literacy and polarization is consistent with the evidence. We run separate OLS regressions for the group of polarized and non-polarised countries respectively. The results are summarised in Table 2.

TABLE 2 – *Balance, Polarization and Literacy (OLS Regressions)*

	<i>All Countries</i>	<i>Polarised Countries</i>	<i>Non-Polarised Countries</i>
	Dependent: <i>Primary Balance</i>		
<i>Constant</i>	-2.813** (.026)	-3.413*** (1.072)	1.624 (3.372)
<i>Economic Literacy Index</i>	.953*** (.210)	.905*** (.182)	.602 (.547)
Observations	219	159	60
R-squared	.087	.14	.02
Number of countries	23	16	7

** $p < 0.05$; *** $p < 0.01$.

The picture arising from the table is rather stark. Consistently with the prediction, economic literacy does not appear to have any bearing on the conduct of fiscal policy in those countries where the political system is non-polarised. By contrast, economic literacy improves the conduct of fiscal policy in countries that are politically polarised. These findings accord quite well with the hints from the model. The presence of manipulable voters matters only in contexts where the incentive to manipulate is sufficiently strong.

⁸ Polarised countries: Australia, Austria, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Japan, New Zealand, Portugal, Spain, Sweden, UK and USA. Non-polarised countries: Belgium, Finland, Italy, Netherlands, Norway and Switzerland.

5. CONCLUDING REMARKS

The message of this paper is that financial and economic literacy improves the quality of individual as well as collective decisions.

The literature has so far focused only on individual decisions while neglecting altogether the impact of literacy for public policies. This is rather peculiar, however, once one thinks of the hints arising from two distinctive fields of studies. First, studies in the political economy literature suggest that the conduct of policy and, notably, of fiscal policy is more virtuous in countries where voters are more informed. Second, studies in the rational inattention literature suggest that voters are more informed if they are more knowledgeable.

In the paper, we have combined these hints in a simple theoretical model and have checked whether the predictions are consistent with the evidence arising from a panel of 22 advanced countries. The basic intuition of the model is that politicians attempt to manipulate uninformed voters by announcing and implementing excessively profligate fiscal platforms. In particular, proposing low taxes may induce uninformed voters to over-estimate the unobserved administrative ability of the proponent. In this environment, a larger fraction of informed (economically literate) voters reduces the scope for adopting manipulative platforms and dampens the fiscal distortion.

Clearly, economic literacy could be a by-product of some other observable or unobservable traits of voters that correlates with the conduct of fiscal policy. A more detailed empirical investigation conducted in Murtinu, Piccirilli and Sacchi (2019), however, tends to rule out any spurious correlation induced by such traits. Notably, the effect of literacy is robust to the inclusion of the level of education of voters as an additional determinant of the fiscal policy.

Holding as genuine the impact of literacy, it may also be the case that the mechanism that induces such an impact is different from the one outlined in the model. Literate voters, for instance, may discipline fiscal policy by complementing the judiciary and the media in monitoring rent-seeking politicians. In other words, a mechanism based on monitoring could deliver predictions that are similar to the one based on manipulation. Similar, however, does not mean the *same predictions*. In particular, the evidence on the cross-effect between literacy and polarization squares finely with the manipulation hypothesis but not so much with the monitoring hypothesis.

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