UNIVERSITÀ DEGLI STUDI FIRENZE

UNIVERSITÀ DEGLI STUDI DI PERUGIA

Università di Firenze, Università di Perugia, INdAM consorziate nel CIAFM

DOTTORATO DI RICERCA
IN MATEMATICA, INFORMATICA, STATISTICA

CURRICULUM IN STATISTICA
CICLO XXXV

Sede amministrativa Università degli Studi di Firenze
Coordinatore Prof. Matteo Focardi

Media Narratives of the Economy and Fertility

Settore Scientifico Disciplinare SECS-S/04

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ACKNOWLEDGEMENTS

First and foremost, I would like to express my gratitude to my supervisors. I am deeply grateful to Prof. Daniele Vignoli for guiding me throughout the writing of this thesis. The dedication and passion that I witnessed him put into his work have been greatly inspiring. What I have learned from him goes far beyond the content of this PhD thesis. A heartfelt thank you to Prof. Raffaele Guetto, whose critical thinking and analytical skills are sources of admiration and stimulating discourse for me. His patience and humor have been fundamental in writing this dissertation in its "best shape."

A special thanks goes to Prof. Michaela Kreyenfeld for welcoming me and involving me in her research group. I thank her and all the researchers from the DYNAMICS group at Humboldt University in Berlin for the exchange of ideas and the wonderful experiences shared during that period.

I would like to thank the reviewers, Prof. Francesca Fiori and Prof. Ester Rizzi, whose comments have provided me with the opportunity to improve this PhD thesis and have given relevant insights for future research.

Thanks to all (past and present) members of the Population and Society Unit for their valuable advice and comments regarding this dissertation, as well as for the moments of discussion and sharing. A special thank you to Giammarco, for his availability, kindness, and the example he has provided me.

It is necessary to thank the key companions of this journey. There are no words to express my gratitude towards Cecilia; I can only write that she has been simply crucial, both on a human and academic level. Her friendship is a gift. I thank Veronica, Alessio, and Lorenzo who have enriched these years and without whom everything would have been incredibly difficult. I thank Carla, Silvia, Claudio, and Giulio. It has been wonderful and formative to have them by my

side at every step of this journey. I thank all the fellow PhD students who have passed through 65 Viale Morgagni: they have enhanced and supported my days.

Last but certainly not least, I want to express my gratitude to my family. I am often unable to fully reciprocate all the love I receive from them. Not even all the pages of this thesis would be enough to express the admiration and gratitude I feel for my mother: there is too much of her in me to externalize what she represents in my life. I express my gratitude to my father (something I do far too rarely) for always supporting me and showing me how exciting work can be. Thanks to my brother, who is my personal model of tenacity and strength.

Florence, June 13th, 2023

RINGRAZIAMENTI

Desidero innanzitutto esprimere la mia gratitudine ai miei supervisori. Sono molto grata al Prof. Daniele Vignoli per avermi guidato nella stesura di questa tesi. La dedizione e la passione che ho visto profondere nel suo lavoro sono state di grande ispirazione. Quello che ho imparato da lui va ben oltre il contenuto di questa tesi. Un sentito grazie al Prof. Raffaele Guetto, il cui pensiero critico e la cui capacità di analisi sono per me motivo di ammirazione e stimolante confronto, la cui pazienza ed ironia sono state per me fondamentali per scrivere questa tesi nella sua "best shape".

Un grazie speciale va alla Prof.ssa Michaela Kreyenfeld, per avermi accolto e coinvolto nel suo gruppo di ricerca. Ringrazio lei e tutti i ricercatori del gruppo DYNAMICS dell'Humboldt University di Berlino per gli scambi di idee e le belle esperienze condivise in quel periodo.

Vorrei ringraziare i revisori, la Prof.ssa Francesca Fiori e la Prof.ssa Ester Rizzi, i cui commenti mi hanno dato la possibilità di migliorare questo lavoro, oltre che fornirmi stimolanti spunti per la ricerca futura.

Grazie a tutti i membri (passati e presenti) del gruppo dell'Unità Popolazione e Società per i preziosi consigli e commenti ricevuti su questa tesi, ma anche per i momenti di confronto e condivisione. Un grazie speciale a Giammarco, per la disponibilità, la gentilezza e l'esempio che ha rappresentato.

È necessario ringraziare i compagni principali di questa avventura. Non ci sono parole per esprimere la mia gratitudine per Cecilia, devo limitarmi a scrivere che è stata semplicemente indispensabile in questi anni, umanamente e accademicamente. La sua amicizia è un dono (e un punto fermo). Ringrazio Veronica, Alessio e Lorenzo che hanno riempito il mio dottorato e senza i quali sarebbe stato tutto incredibilmente difficile. Ringrazio Carla, Silvia, Claudio e Giulio. È stato bellissimo e formativo averli vicino ad ogni passo di questo

percorso. Un grazie va a tutti i dottorandi che sono passati dal 65 di Viale Morgagni e che hanno arricchito e sostenuto le mie giornate.

Per ultima ma prima per importanza, ringrazio la mia famiglia. Spesso non sono brava a restituire tutto l'amore che ricevo da loro. Non basterebbero tutte le pagine di questa tesi per esprimere l'ammirazione e la gratitudine che provo per mia madre: c'è troppo di lei in me per esternare quello che rappresenta nella mia vita. Ringrazio mio padre (cosa che faccio troppo raramente) per supportarmi sempre ed avermi mostrato quanto appassionante può essere il lavoro. Grazie a mio fratello che è il mio personale modello di tenacia e forza.

Firenze, 13 Giugno 2023

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ABSTRACT

This PhD thesis presents an in-depth study of the relationship between the coverage of the economy in media news and individual fertility behaviors. Our key argumentation is that narratives of the economy conveyed by the media are crucial for understanding contemporary fertility dynamics, over and above the role of objective economic constraints. Individuals use these narratives to project themselves into an actionable imagined future and make decisions that may be relatively independent of their actual situation and structural constraints. We also posit that the media-conveyed narratives/fertility nexus is likely to be channeled by changes in the individual perception of the economy. Under conditions of economic uncertainty, the need for orientation of individuals increases. As a results, in Western countries the influence of media-conveyed narratives of the economy may be reinforced. We present the empirical investigation of two European country-cases: Italy and Germany. The economic conjuncture and fertility dynamics of the past decades set the two countries apart. Also, the welfare systems of Italy and Germany differ significantly: while Italy is a "familialistic" state wherein the family is the main welfare provider, Germany's system is conservative and emphasizes individual responsibility. The stark contrast between Italy and Germany is the main reason why these cases are particularly interesting to examine and compare. To address the Italian case, we combine individual-level data from the 2009 and 2016 releases of the nationally-representative *Family and Social Subjects Survey* with data on the coverage of the economy in the evening edition of the most-viewed newscast of Italian TV (*TG1*). As for Germany, we merge micro-data stemming from the *German Socio-Economic Panel* (18 waves from 2001 to 2018) with measures of the economic news coverage in German press and television programs with large audience. By means of linear probability panel regressions with individual fixed effects, our

analysis reveals that both the incidence and tone of news on the state of the economy are associated with fertility behavior. An increase in the incidence of economic news out of all news is negatively correlated with the probability of conception. In the case of Germany, the association is stronger when considering the coverage of the economy in weekly magazines compared to other media sources. When the tone of economic news worsens, the probability of conception decreases, while its improvements are positively associated with the probability of conception. Interestingly, a positive media narrative of the economy is more important than a negative one in Italy, a country characterized by strong economic hardship. The opposite emerges for Germany, where the economic fabric is prosperous. Finally, our findings suggest that individual economic perceptions explain a small albeit not negligible part of the economic news/fertility nexus. These associations are statistically significant and substantially relevant net of traditional individual and contextual socio-economic correlates of fertility. The robustness of our results is ensured via several checks (e.g., removing correlates from the models or augmenting them with further controls) and different model specifications (e.g., event-history parity-specific analysis, random effects models, and logistic regressions). Overall, the study presented in this dissertation bolsters the claim that media-conveyed narratives of the economy influence fertility behavior of individuals in contemporary Western societies also by affecting their perceptions of the economy.

Introduction

In the late 2000s, Goldstein and colleagues (2009) argued that the lowest-low fertility regime—i.e., Total Fertility Rates (TFRs) at or below 1.3 (Kohler et al. 2002a)—had come to an end. Nonetheless, in the aftermath of the Great Recession, most European countries have witnessed a widespread fertility decline. This observed trend stood in stark contrast to several arguments within the demographic literature that foresaw a rebound of European fertility as one consequence of the "second half of the gender revolution" (Goldscheider et al. 2015:208) and gains in gender equality (Esping-Andersen and Billari 2015). In the (dramatic) case of Italy—a country that was already at fertility levels among the lowest in Europe—this downward spiral has caused fertility to fall (again) below the lowest-low threshold in 2019. Fertility levels have surprisingly plummeted also in Northern European countries. In Finland, for example, the TFR decreased by about 27% between 2010 and 2020. This happened despite Scandinavian societies represent the European benchmark in terms of gender equality (EIGE 2022) and their economy did not suffer severe consequences from the Great Recession.

Enduring low fertility rates set the ground for declining fertility in the future by leading the contingent of future potential parents to reduce—the so-called *low-fertility trap* (Lutz et al. 2006). Experiencing fewer births irreversibly shapes the amount and the age structure of the future population. Besides leading to population decline, it causes population to age over time, especially when accompanied with a rise in life expectancy. A few positive consequences of population decline can be identified in environmental benefits (Ehrlich 2008) and the possibility of growing more the country's human capital through investments in the education and health of children (Lee and Mason 2010). Notwithstanding this, falling fertility has several triggering effects on both economic developments and the sustainability of the social security system (Sous-Poza and Bloom 2010). Population ageing increases old-age dependency ratio (i.e., the ratio between retired people and those in working age) with detrimental consequences for the

pension system as there is a growing number of beneficiaries laying on fewer contributors (Bujard 2015). The shrinking in labor force also results in reduced productivity, wage inflation, and slower economic growth (McDonald 2008). The lack of young skilled workers, who are those bringing new technology in the markets, causes a country to be less competitive in the global economy (McDonald 2008). The *National Science Council Committee on the Long-Run Macroeconomic Effects of the Aging U.S. Population* predicted a reduction in the growth of income per capita of 0.55 percentage points per year between 2010 and 2030 that was mainly driven by the decreasing quote of working citizens (Boyd 2019). On the contrary, Bloom and Williamson (1998) found that one-third of the economic growth of East Asia in 1965–1990 can be explained by the large share of working-age citizens. Even considering that old workers may remain longer in the labor market, their productivity would be much lower than that of younger ones (Maestas et al. 2016). People in working-age tend to save more and thus invest more which promotes economic growth (Bloom and Sousa-Poza 2010). Finally, an old population results in great demand for elders' services (e.g., for health care) generating pressure on governments spending (Boyd 2019).

In developed countries, the intended family size usually outnumbers childbirths (Bongaarts 2001; Goldstein et al. 2003; Harknett and Hartnett 2014)—the so-called *fertility gap*. Beaujouan and Berghammer (2019) compared completed fertility at age 40 with mean intended number of children at ages 20–24 of European and U.S.'s women mostly born in early 1970s. The authors found great heterogeneity among countries that indicates that economic and institutional factors crucially intervene in the realization of intended fertility. It emerges that the aggregate fertility gap was large in Italy, as already noted at micro-level by Régnier-Loilier and Vignoli (2011). According to Beaujouan and Berghammer (2019), the intended number of children of Italian women aged 20–24 was over 2, while the completed cohort fertility rate at 40-42 was less than 1.5. In Germany the fertility gap was considerably smaller (around 0.3). This contrast

arises from the Italian tradition of having large families and the longstanding history of low fertility in Germany. More generally, Southern countries exhibited larger gaps, followed by Central and Eastern area facing adverse economic conditions. In Western countries, the level of fertility intentions, when particularly above or below the average, played a greater role in determining wide (such as in the Netherlands, Norway, and Switzerland) or narrow (Austria) gaps than the actual fertility level. However, in both Italy and Germany the excess childlessness (i.e., the difference between the share of childless women at age 40–42 and that of those intending not to have children at age 20–24) was limited but increases when considering only women with high educational level—who are likely to be more devote to their career. This suggests that difficulties in the reconciliation between work and family are fundamental inhibitors in realizing intended fertility. Although the aggregate approach adopted by Beaujouan and Berghammer (2019) has certain limitations, the existence of a gap between intended and realized fertility is crucial as it indicates that the current low birth rates are partially influenced by external constraints. In this context, policy interventions to foster fertility are not only justified but required to enable people to fulfill their family aspirations by removing these constraints.

Explaining the current fertility decline is thus of crucial importance and previous literature has widely investigated its core antecedents. Along the lines drawn by Balbo et al. (2013), fertility's correlates may be located at micro-level (when concerning individuals/couples), meso-level (if regarding their social relationships and networks), or macro-level (which refer to the broader context in which they live). In the following, we provide a summary of well-known predictors of fertility concerning the economic and labor market sphere at the three analytical levels. At the micro-level, the financial situation of individuals/couples has a pivotal role in the decision to have children. The level of income has a negative association with fertility according to the idea of a *quality-quantity tradeoff* (Becker and Lewis 1973). It posits that as the income

increases, parents have higher aspirations for their children and, in turn, the cost of parenting grow, thus reducing the risk of having a(nother) child (Kravdal 1992). Unemployment and precarious conditions in the labor market (i.e., employment uncertainty) have been largely addressed as (generally hindering) determinants of fertility (Adserà 2011; Kreyenfeld 2010; Mills and Blossfeld 2005). Yet a meta-analysis of European findings conclusively showed that the personal employment situation is not of crucial relevance although by no means negligible (Alderotti et al. 2021). Converging evidence suggests also that fertility postponement has accelerated irrespective of person-specific economic circumstances (Comolli and Vignoli 2021). At the meso-level, previous studies demonstrated the role of social interactions in influencing fertility behavior (Bernardi et al. 2007; Keim et al. 2009; Rossier and Bernardi 2009). However, this research avenue focuses on the social pressure from relevant others (Balbo and Mills 2011; Billari et al. 2009) and on the "contagion effect" which increases the risk of individuals to have children if their peers become parents (Hensvik and Nilsson 2010; Lyngstad and Prskawetz 2010). Data to test such effects, decoupling them from the contextual ones, are rare, and evidence on this is therefore limited. Finally, macro-level economic indicators are established fertility correlates (Kohler et al. 2002a, 2002b; Mills and Blossfeld 2005; Sobotka et al. 2011). Aggregate fertility is usually pro-cyclical to economic trends (Comolli 2017; Schneider 2015; Sobotka et al. 2011): periods of economic recession result in postponement of fertility that is instead fostered when economy is flourished. While results on the effect of GDP are often mixed, the detrimental role of unemployment level is widely demonstrated (Adserà 2011; Örsal and Goldstein 2010).

Besides traditional indicators, increasing attention was recently devoted to the role of the economic uncertainty characterizing contemporary societies, especially in the Western world. It is usually operationalized at micro-level via indicators of objective employment situation (among others, Busetta et al. 2019;

Mills and Blossfeld 2013; Vignoli et al. 2012; Vignoli et a. 2020c) and subjective perceptions and expectations concerning the state of the economy (Bhaumik and Nugent 2011; Busetta et al. 2019; Fahlén and Oláh 2018; Hofmann and Hohmeyer 2013; Kreyenfeld 2010, 2015). Indeed, fertility choices are always taken under conditions of fundamental uncertainty—i.e., a child's birth leads to a wide range of consequences in the parental life course that cannot be foreseen in advance with any confidence. In the last decades economic uncertainty expanded and social observers have noted that a "harsh new world of economic insecurity" (Hacker 2019:xvi) appeared starting from the 1980s. The uncertainty induced by macro-level labor market conditions has also been found to influence family dynamics (Harknett and Kuperberg 2011), including those related to fertility (Cherlin et al. 2013). However, once the Great Recession ended, the decline in European birth rates has persisted. Economic and labor market fertility predictors are unable to fully explain this downward spiral (Comolli et al. 2021; Goldstein et al. 2013; Matysiak et al. 2021).

The conundrum of recent fertility trends is thus posing serious challenges to demographic knowledge. Demographers are then wondering if there are other forces influencing fertility decisions that have so far not been explored. The research presented in this PhD thesis stems from the demand to explain fertility behavior in a novel perspective, beyond the role factors usually considered in demographic literature. Here we argue that actors are influenced in their fertility choices also by *personal narratives of the future* (Vignoli et al. 2020a, 2020b). These narratives originate at the micro-level, but factors at the meso-level (such as social networks) and macro-level (e.g., the media) also intervene. The formation of these narratives is not purely deterministic as it incorporates the role of human agency and the future-oriented nature of the decision to have a(nother) child. Most fertility predictors considered so far do not have these properties. Personal narratives lead individuals to project themselves into a potential future scenario (Beckert 2016; Mische 2009) and make choices that may be (partially) unrelated

to current economic circumstances. Future-related narratives may therefore produce real effects on individuals' decision-making processes, irrespective of their level of truth, rationality, or plausibility (Beckert 2016; Beckert and Bronk 2018). A relevant component of these narratives is represented by "shared narratives", namely the narratives of the future that parents, peers and relevant others adopt (and transmit). The media play a key-role in their shaping as they define the "hot topics" of the daily conversations. Indeed, for a significant proportion of citizens, the media—which evaluate, filter, and simplify information—are an essential source of economic information (Boomgaarden et al. 2011; Joris et al. 2014, 2018). The selection of facts to report, the definition of time allocated for each content, and the tone and perspectives provided to the public (Entman 1991; Goffman 1974) influence the individuals' perceptions of reported issues (Lippman 1922; Noelle-Neumann 1980). The increasing level of economic uncertainty burdening today's societies represents the contextual factor under which this influence is enhanced by fueling the individuals' need for orientation and their economic information-seeking behavior. At these premises, we posit that media-conveyed narratives on the economy may become increasingly important for shaping individuals' fertility behavior, and that this influence is likely to pass through variations in the individuals' perception of the economy. Once a given media narrative is established, it may change perceptions and expectations (Robins and Mayer 2000; Thibodeau and Boroditsky 2011) and, in turn, inhibit individual fertility behavior, also of those who are not directly exposed to such a narrative through a "diffusion process" (Rogers 1962:17). Casterline (2001) pioneered that, similar to face-to-face interactions, mass media play a role in such processes "at a distance" (Casterline 2001:3). Behavioral changes derived from these dynamics are often independent of (objective) structural changes in the society (Bongaarts and Watkins 1996). We empirically investigate the role of media-narratives of the economy by addressing (for the first time, to the best of our knowledge) the association between the economy's

coverage in media news and individuals' fertility behavior. In a nutshell, **Figure 0.1** graphically shows the system of economic and labor market predictors consolidated in fertility literature in which the novel element of narratives conveyed in media news is embedded.

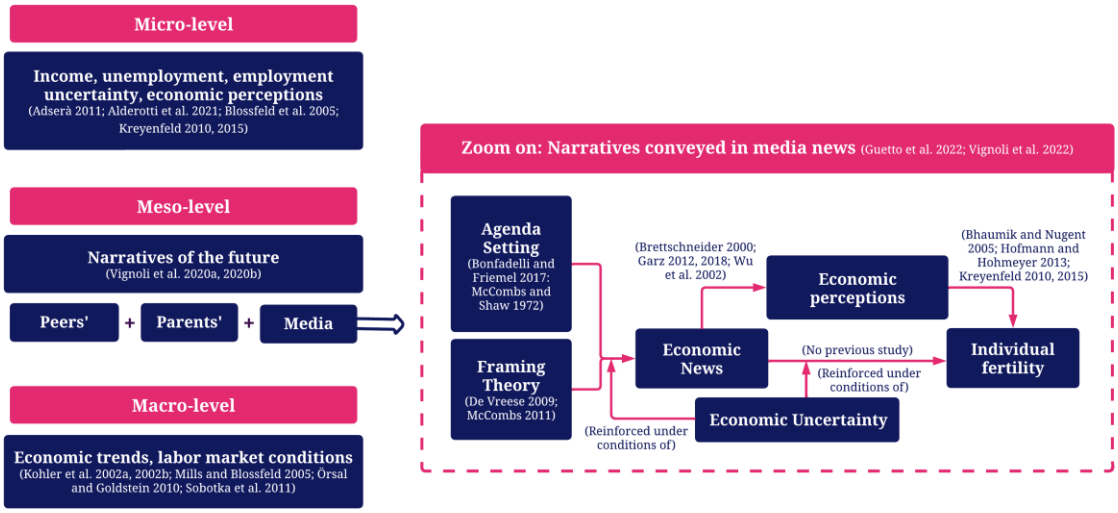

Figure 0.1 Economic and labor market fertility predictors at micro-, meso- and macro-level with a zoom on narratives conveyed in media news.

We firstly focus on Italy, by combining individual-level data from the 2009 and 2016 releases of the nationally-representative *Family and Social Subjects Survey* collected by the Italian Institute of Statistics (ISTAT) with measures on the economic news coverage in the evening newscast (*TG1*) of Italy's most-viewed TV channel (*Rai 1*). Second, we consider the case of Germany, by merging longitudinal data stemming from *the German Socio-Economic Panel* with indicators of economic news coverage in weeklies of great circulation, TV newscasts with a large audience, and the most popular German tabloid. At a glance, the contribution of this PhD thesis is twofold. First, we provide micro-level evidence of the statistically significant and substantially relevant association between media news on the economy and fertility behavior in two countries of Western Europe, net of micro- and macro-level indicators of objective economic conditions. Second, we find that economic perceptions of individuals have a small albeit not

negligible role in channeling the economic news/fertility nexus. By advancing and verifying the crucial role of media narratives of the economy, this thesis proposes a renewal of the state-of-the-art on fertility antecedents and lays the groundwork for future studies on the topic. The remainder of this dissertation is organized as follows.[1] The literature background, the research questions, and a brief presentation of the case-studies we deal with are provided in Chapter 1. Chapter 2 offers a detailed overview of the macro- and micro-level data used in the analyses and the methodological strategies we adopt. Each of Chapters 3 and 4 is devoted to the empirical analysis of the total association between economic news coverage and individual fertility in the two country-cases. Chapter 5 provides a deeper understanding of the mechanisms that may be hidden in the economic news/fertility nexus by dealing not only with the mediating role of economic perceptions, but also with the moderating role of demographic and socio-economic factors. In the Conclusions, we summarize the key findings and derive the main take-home messages of the study without failing to report its limitations.

[1] Part of the work presented in this dissertation, including findings reported in Chapter 3, has been published in Demography as "Fertility and Media Narratives of the Economy: Evidence From Italian News Coverage" (Guetto et al. 2023). Part of the work presented in Chapter 4 is an updated version of that published in the conference proceedings *Book of short paper SIS 2022* as "The relationship between economic news and fertility: the case of Germany" (Morabito et al. 2022).

1

State-of-the-Art

1.1 ECONOMIC UNCERTAINTY AND NARRATIVES OF THE FUTURE

In the last decades, the increasing speed of technological changes and the constant flows of financial capital across the globe have amplified the degree of economic uncertainty (Mills and Blossfeld 2013). Also, the labor market deregulation experienced in many European countries has led to increasing employment uncertainty. The impact of economic uncertainty does not only concern personal income and individual employment conditions, but it also influences the individual perception about the future states of the economy, even among those who are not personally affected by economic constraints (Vignoli et al. 2020a, 2020b). Economic uncertainty has thus been advanced as one of the factors explaining the fertility decline observed in Western Europe in recent years. In the empirical literature, it is usually measured using objective indicators of the individuals' labor market situation (Kreyenfeld et al. 2012; Mills and Blossfeld 2013). A wide stream of studies successfully accounted for its subjective dimension, namely the *perceived* economic uncertainty (Bhaumik and Nugent 2011; Fahlén and Oláh 2018; Hofmann and Hohmeyer 2013; Kreyenfeld 2010, 2015), and personal traits that intervene in dealing with it, such as resilience to job loss and subjective well-being (Gatta et al. 2022). However, economic uncertainty mainly refers to future outcomes (that cannot be foreseen in advance) and has therefore a forward-looking nature that the factors mentioned above elude (Vignoli 2020b).

The future-oriented notion of economic uncertainty represents the foundation of the Narrative Framework proposed by Vignoli et al. (2020a). Fertility dynamics are usually explained through a "driven-by-the-past framework" (Seligman et al. 2013:127). Classical antecedents of fertility choices are the level of education, previous employment conditions and union histories

(Barbieri et al. 2015; Busetta et al. 2019). Personal traits like the risk aversion and time discounting preferences have also been considered in fertility studies (Bellani et al. 2021; Schmidt 2008). These blocks of determinants and the contextual and personal socio-economic status represent the set of correlates on which studies aiming to model fertility behavior are usually based (Dantis and Rizzi 2020; Mills and Blossfeld 2013; Vignoli et al. 2012). Over time, the paradigms shifted from the rational approach of the Home Economics (Becker 1964, 1993), according to which the decision of having a(nother) child depends on the trade-off between benefits and costs deriving from parenting, to models that incorporate the perceptions of personal contingencies and subjective norms—the Theory of Planned Behavior (Ajzen 1991; Ajzen and Klobas 2013) and the Traits-Desires-Intentions-Behavior approach (Miller 1994, 2011). However, these frameworks are deterministic and fail to account for the human capacity to deviate from the expected course of actions which is instead encompassed in the Narrative Framework (Vignoli et al. 2020b). The latter poses that the fertility decision-making process does not just depend on past experiences, current economic conditions, and contingent perceptions (the "shadow of the past," Davidson (2010:17)) but it is also influenced by the "shadow of the future" (Bernardi et al. 2019:4). The key future-oriented elements included in the framework are the expectations, the imaginaries, and *personal narratives of the future*. They represent three levels of the framework and add up to past and present factors in influencing the decision-making process of individuals (Dewey 1930) when dealing with uncertainty about future consequences of their choices. Expectations are the combination of future outcomes associated to different possible decisions (Beckert 2016). They derive from past experiences and present structural constraints, albeit their formation is not deterministically determined by them. For instance, when robust economic growth is expected, uncertainty in labor conditions may not have an inhibiting role in the decision to have a child. The opposite may happen when economic decline is expected.

Imaginaries consist of the human capacity of imagine alternative futures (Bronk 2009). They are not only related to present and past conditions but also to normative values. For example, the desire to have a large family can have a positive impact on the decision to have children even when the household income is low, and the expected economic conditions are unfavorable. When imaginaries are structured in an actionable manner by defining possible courses of action, they represent personal narratives of the future. Each of these three levels entails the next but does not completely determine it. Nowadays, narratives of the future are even more crucial as represent an anti-uncertainty device (Boyer 2018).

Zooming in on the concept of *personal narratives of the future*, they are defined as "the less abstract level of the decision-making process, in which the shadow of the past, expectations and imaginaries find their proper places" (Guetto et al. 2022:230). Personal narratives are imagined futures that intervene in planning individuals' choices according to or despite uncertainty. Far from being an exclusively internal process, the formation of such narratives involves also contextual factors. The "shared narratives" (Vignoli et al. 2020b:3), or rather narratives of the future adopted by parents, peers, and conveyed by the media represent a crucial block composing personal narratives. These narratives are deep-rooted in the broader cultural and social environment. On the one hand, it has already been proved that parents and peers' behaviors matter in planning family formation (Di Giulio and Rosina 2007; Guetto et al. 2016; Nazio and Blossfeld 2003). On the other hand, the diffusion of technology is likely to increase the impact of media narratives on the public by allowing an easy and immediate access to television, press, and social media content. Nowadays, the media have an increasing relevance given the high coverage of economic topics in U.S. and European media after the economic crisis (Baker et al. 2016) and the start of the pandemic (Altig et al. 2020).

1.2 AGENDA-SETTING IN CONTEMPORARY WESTERN SOCIETIES

Communications scholars have long investigated the media's impact on the public in terms of the levels of awareness of certain issues and the formation of the "pictures in our heads" as the perceived reality (Lippman 1922: chap. 1; Noelle-Neumann 1980). Over the past century, the paradigm has shifted from the "almighty media" to the "powerless media" to "moderate effects" (Bonfadelli and Friemel 2017:18). The agenda-setting theory (McCombs and Shaw 1972) is widely considered the most important theoretical concept in modern media impact research (Bonfadelli and Friemel 2017). It proposes that the media's selection of which issues to report and the salience of their coverage significantly impact their perceived relevance to the public. Several studies using this approach show a significant correlation between issues' coverage in media news and their perceived relevance—namely .53, according to Wanta and Ghanem's (2007:45) meta-analysis of 90 studies. The framing theory (or second-level agenda setting) adds the role of the attributes and perspectives conveyed in media news in influencing the public's understanding of the topics (McCombs 2011). In fact, individuals' judgments are differently affected by news items that are positively and negatively framed (de Vreese 2009).

It could well be that the news coverage may reflect the public's perceptions rather than shape them. Whether media coverage reflects or forms perceptions of reality is at the heart of media impact analysis. In his review, de Vreese (2005) assessed that, in addition to journalists' beliefs, the dynamic interaction with society has a role in shaping the framing proposed in media news. However, after an extensive analysis of news reported by American media (*CBS Evening News*, *NBC Nightly News*, *Newsweek*, and *Time*), Gans ([1979] 2004) discussed the power of the audience in influencing the news selection mechanism by journalists. He

outlined that, while being potentially relevant, the audience's power was less important than the sources' power, at least in the U.S. of the 1960s and 1970s.

Finally, the presence—or absence—of agenda-setting effects can be explained by the individuals' need for orientation (McCombs 2011), which is a basic psychological trait that depends on relevance and uncertainty. Media effects are typically reinforced under uncertain conditions as high levels of uncertainty lead individuals to seek more information (Berger and Calabrese 1975). In periods of increasing economic uncertainty, individuals may thus intensify their economic information-seeking behaviors, and, in turn, the economic news coverage may become increasingly important in influencing their choices.

1.3 THE ROLE OF MEDIA NEWS IN SHAPING PERCEPTIONS AND EXPECTATIONS ABOUT THE ECONOMY

It is nothing new that emotional factors drive economic changes, according to the Keynesian economic theory of "animal spirits" (Keynes 1936). Carroll and colleagues (1994) have found that improvements in the consumer sentiment foster the level of consumption and, therefore, macroeconomic trends. Further studies confirmed such findings albeit downplaying the size of these effects (Bryant and Macri 2005; Ludvigson 2004). Over time, individual perceptions of the state of the economy, and the way they are formed, have become of key interest for economists. For most people, the media are the main source of information about the economy (Joris et al. 2014, 2018). As economic coverage in newspaper articles grows, so does individuals' reliance on it to update their economic expectations due to the lower cost of information access (Carroll 2003; Doms and Morin 2004). The Great Recession and the Euro crisis saw the public discourse prominently focused on the state of the economy. Newspapers and

weekly magazines described the crisis as the "evil" looming over European countries, thus providing a simplified narrative of economic conjuncture and a pessimistic image of the European economy (Cepernich 2012). The public's perceptions of the state of the economy are influenced by these negative headlines, thereby allowing these opinions to become self-fulling prophecies as individuals tend to behave according to their beliefs (McCombs 2011).

Some (successful) attempts have been done to empirically relate the economic news coverage with individual (or household) perceptions about the economy by exploiting the increasing availability of media data. Uhl (2012) revealed the association between the sentiment conveyed in economic television news and the consumption habits of U.S. citizens. Boydstun et al. (2018) claimed there to be a direct and independent effect of the tone of the economic coverage in U.S. newspapers on economic attitudes. This effect can be attributed to the portion of news coverage of the economy that deviates from economic reality (defined as "extra-economic media coverage"). We can rely on a prominent portion of studies focusing on the German case. The causal impact of economic news on expectations of people living in Germany has been proved among others by Kholodilin et al. (2015). According to their results, more the tone of economic news coverage is positive, more the consumers' confidence improves and experts' forecasts are optimistic. Also, the self-state willingness to take risk has been proved to decrease when the negative coverage of economic news increases, while the opposite happens when there is an increase in positive economic news (Tausch and Zumbuehl 2016). Garz (2018) showed that households' economic perceptions worsen in line with the increase in the number of words related to unemployment reported by 35 German newspapers. The news coverage of unemployment is also strongly correlated with the proportion of individuals living in Germany who believe that unemployment is the biggest problem of the country (Brettschneider 2000). Lamla and colleagues reported that more news items about inflation in print media and television lead to align consumers'

expectations with those of professionals. However, such expectations tend to become exaggeratedly negative, and thus deviate from those of professionals, when more negative news items are reported (Lamla and Lein 2014; Lamla and Sarferaz 2012). As the coverage of labor market issues in press and television grows, the perceived jobs' insecurity of people living in Germany increases (Garz 2012). Associations between news coverage and perceptions were also found beyond economic topics, the news coverage on migration flows has been proved to foster worries about immigration among people living in Germany (Benesch et al. 2019). Ragnedda and Muschert (2010) assessed that a high coverage devoted to crime and violence in Italian television news feeds the fear of crime in the public. Finally, Rovetta (2021) found that the circulation of fake news on the internet bolsters perceptions of risk concerning COVID-19 vaccines among web users in Italy. The abovementioned studies have emphasized the effects of media news on (economic) perceptions of individuals. However, the idea of a reversed causal pathway from citizens' perceptions to the news coverage of the economy has been advanced and tested by Soroka et al. (2015) and Wu et al. (2002) considering the most important U.S. newspapers. Indeed, during an economic recession, pessimistic individuals' beliefs about the economy were reflected in the *New York Times*'s more negative economic coverage (Wu et al. 2002).

Scholars have also studied the responsiveness of economic news coverage to the economic events themselves (for a review, see Damstra et al. 2018). Goidel and Langley (1995) showed that actual economic conditions in the U.S. only account for a quarter of the variance in the number of negative economic articles in the *New York Times*, and even less in the case of positive items. Kholodilin et al. (2015) noted that the tone of German news is not caused by the opinion of consumers and experts. Despite few studies documented a certain correspondence between U.S. economic reality and its portrayal by television and print news (Behr and Iyengar 1985; Casey and Owen 2013), the majority agreed that economic news coverage in print and television media is affected by a

negativity bias (Damstra et al. 2018). News reporting typically foregrounds negative economic events and deemphasizes positive ones. This emerged from the analysis of newspapers in both the U.K. (Soroka 2006) and the U.S. (Fogarty 2005; Soroka 2012; Van Dalen et al. 2015). This concise review suggests that narratives of the economy conveyed by media news do not overlap with the macroeconomic reality. The volume and tone of economic news items influence consumer perception and sentiment beyond the specific information reported (Doms and Morin 2004). The reality of the state of the economy and its narrative provided by media news may thus have distinct effects on individuals' perceptions. As reported by Boydstun and colleagues "the tone of economic news coverage has an independent, direct connection with economic attitudes" (Boydstun et al. 2018:993). Importantly, economic news coverage tends to overwhelmingly discuss future economic trends (Soroka et al. 2015), and thus especially impacts people's forward-looking judgments (Damstra and Boukes 2018; Soroka et al. 2015), which have been argued to influence fertility decision-making processes (Vignoli et al. 2020a, 2020b).

1.4 ECONOMIC PERCEPTIONS AS DRIVERS OF FERTILITY BEHAVIOR

A recent body of literature has emphasized economic perceptions as key factors influencing fertility behavior. Between 2020 and 2021, U.S. citizens indicated the economic stress related to the pandemic as a reason for limiting fertility intentions in the coming year (Manning et al. 2021). Some other subjective measures (e.g., the fear of COVID-19 and the feeling of uncertainty about partnership) have proved to matter even more than economic circumstances in influencing individuals' fertility motivations during the pandemic (Manning et al. 2022). At the European level, perceived job and income insecurities have been

proved to be detrimental for fertility intentions even though such relationships vary according to welfare regime, age, and gender (Fahlén and Oláh 2018).

Focusing on our first case-study, Vignoli et al. (2012) advanced the (detrimental) role of the housing insecurity in affecting fertility intentions in Italy. The authors noted that such a measure is a potential indicator of other present and future economic concerns. Using unique data from an online survey conducted during the Italian lockdown, Guetto et al. (2022) revealed that when people are more concerned about various life domains (including employment and general economy) their fertility intentions contract, over and above actual employment conditions. Also, the perception of resilience to job loss has a positive impact on fertility intentions of people living in Italy (Gatta et al. 2022). Research on the second country-case addressed in this PhD thesis was made possible by the availability of rich data on both fertility histories and economic perceptions collected in the *German Socio-Economic Panel* (hereafter, GSOEP). It has been used in all studies mentioned in the following. Witte and Wagner (1995) documented that a high concern about the own economic situation inhibits fertility. The studies by Kreyenfeld (2010) and Bhaumik and Nugent (2011) were pioneering in laying the groundwork for further research on the role of individuals' economic perceptions as drivers of fertility behavior. Kreyenfeld (2010, 2015) found traces that women with high economic worries tend to postpone parenthood. Bhaumik and Nugent (2011) considered only unemployed respondents looking for a job at the time of interview. They documented a U-shaped relationship between subjective employment uncertainty and the probability of childbirth, especially in East Germany. Finally, Hofmann and Hohmeyer (2013) used the exogeneous shock of the announcement of the German reform regarding unemployment benefit in December 2003 to assess the detrimental impact of economic concerns on fertility.

1.5 MEDIA AND FERTILITY

The above literature review covers two strands of studies: the first concerns the association between the news coverage of the economy and individual economic perceptions; the second focuses on the role of individual economic perceptions in shaping fertility behavior. Despite the effects widely documented in these contributions, the direct and/or total association of economic news coverage with fertility has not yet been considered. Few fertility studies addressed instead the effects of the diffusion of mass media (e.g., Hornik and McAnany 2001), public health messages (e.g., Agha and Van Rossem 2002 analyzed the effects of radio and newspapers campaigns on female condom use in Tanzania), and the presentation of "modern" family ideas through television (e.g., La Ferrara et al. 2012). Hornik and McAnany (2001) reported that the number of televisions per capita in 1997 explains 74% of the TFR variance across 140 countries, allowing for a more accurate prediction of fertility rates than those obtained using other aggregate measures of the state of the economy (e.g., the Gross National Product). Jensen and Oster (2009) found that the introduction of cable TV in India positively affects subjective measures of female autonomy and school enrollment while negatively impacting fertility. Billari et al. (2020) related the diffusion of digital technologies with fertility dynamics in sub-Saharan Africa, showing that mobile phone ownership is associated with smaller family ideals. In Brazil, La Ferrara et al. (2012) noted a negative relationship between the presence of the Globo channel—the main broadcaster of soap operas whose protagonists tend to have small families—and fertility.

Most of the fertility studies about media effects have thus involved non-European developing areas. Basten (2010) evidenced that previous literature has been silent about media effects in low-fertility countries. Indeed, even a decade after the Basten's review, we find a limited number of studies addressing them. A rare example was provided by Kearney and Levine (2015) who claimed that

the broadcasting of the MTV show *16 and Pregnant* caused a substantial reduction in teen births in the U.S. The validity of their findings is, however, shaky, according to Jaeger et al. (2020) and Kahn-Lang and Lang (2020). Bönisch and Hyll (2015) used the exogenous variation in the signal strength of the separated Germany after the WWII to assess the negative effect of watching West German TV on fertility in East Germany. The impact of COVID-19-induced uncertainty in Italy was assessed through an experiment in which participants were exposed to a (mock) news bulletin on the expected duration of the pandemic. The authors demonstrated a causal impact of narratives concerning the future of the pandemic on union (Guetto et al. 2021) and fertility (Guetto et al. 2022) intentions. Vignoli et al. (2022)—by means of a controlled laboratory experiment conducted in Italy (Florence) and Norway (Oslo) in which they manipulated mock news bulletins on the economic prospects of the country—showed a clear causal impact of economic uncertainty narratives on fertility intentions. Finally, Comolli and Vignoli (2021) estimated a reduction of between 1.5% and 5% in Italian birth rates due to the increase in perceived economic uncertainty through a regression discontinuity design centered at the peak of the Google searches for "spread"—i.e., in November 2012 the "thermometer of the crisis" both in the media and in everyday conversations. This effect is comparable to that of rising unemployment rates on the TFR (3%) in Europe and the U.S. (Comolli 2017).

While these studies are suggestive of the media's potential power for shaping family behaviors, they have not directly addressed the influence of economic news coverage. In their influential review on the effects of financial recessions on fertility, Sobotka et al. (2011) suggested that the media coverage of the economy may expand the effects of rising economic uncertainty on fertility. Evidence for this was found by the stand-alone study by Schneider (2015). The results show that the press coverage of the economic recession accounts for part of the U.S.'s reduction in state-level fertility rates in the years before and during the Great Recession, net of traditional economic measures. This is the only study

we located wherein the association between economic news coverage and fertility has been considered, even if as an ecological macro-level association.

1.6 THE RESEARCH QUESTIONS AND THE CASE-STUDIES

Interpretating the findings that follow in this dissertation cannot disregard the context in which they emerge. Here we focus on two country-cases: Italy, a country that, after a rebound of fertility in the first decade of the new millennium, is now facing a continuous decline, and Germany which is witnessing a positive fertility trend during the last decade (**Figure 1.1**). The economic conjuncture puts the two countries far apart: while the Italian unemployment suddenly spiked in the early 2010s, the German labor market faced better conditions (**Figure 1.2**). Also, Italy and Germany differ from an institutional point of view representing "the prototypes of a conservative and a familialistic welfare state" (Kreyenfeld et al. 2012:848). These antipodal features are among the reasons why we find these case-studies exceptionally interesting to deal with and compare.

In the wake of all outlined above, and building upon the argument that in contemporary societies narratives of the economy conveyed by media news influence fertility choices, our first (and key) research question is:

- *Q1a: Is the incidence of economic news items associated with individual fertility behavior, controlling for individuals' employment conditions and aggregate measures of economic conjuncture?*

Westoff and Bankole (1997), focusing on sub-Saharan African countries, documented that the more women are exposed to mass media content, the more careful they are about using contraceptives and the fewer children they desire. This is the only study that, to the best of our knowledge, compares the influence of different media sources, showing that the most consistent impact on fertility

is related to radio exposure, followed by print media exposure, and, thirdly, by television exposure. We thus address the potential difference in the economic news/fertility relationship by questioning the following:

- *Q1b: News coverage from which media source is most associated with fertility?*

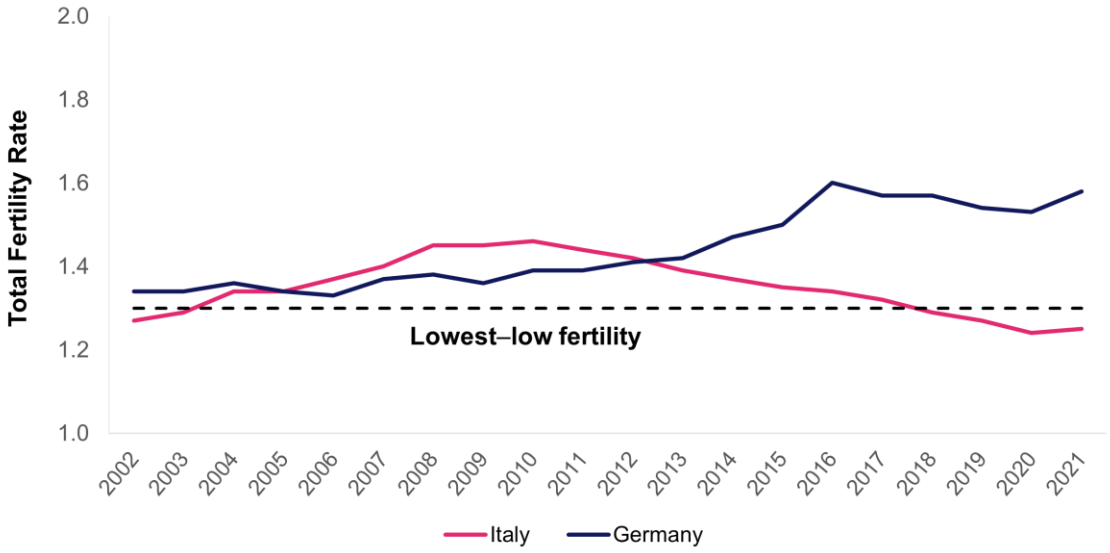

Figure 1.1 Total fertility rate in the period 2002 – 2021, Italy and Germany.

Source: Eurostat.

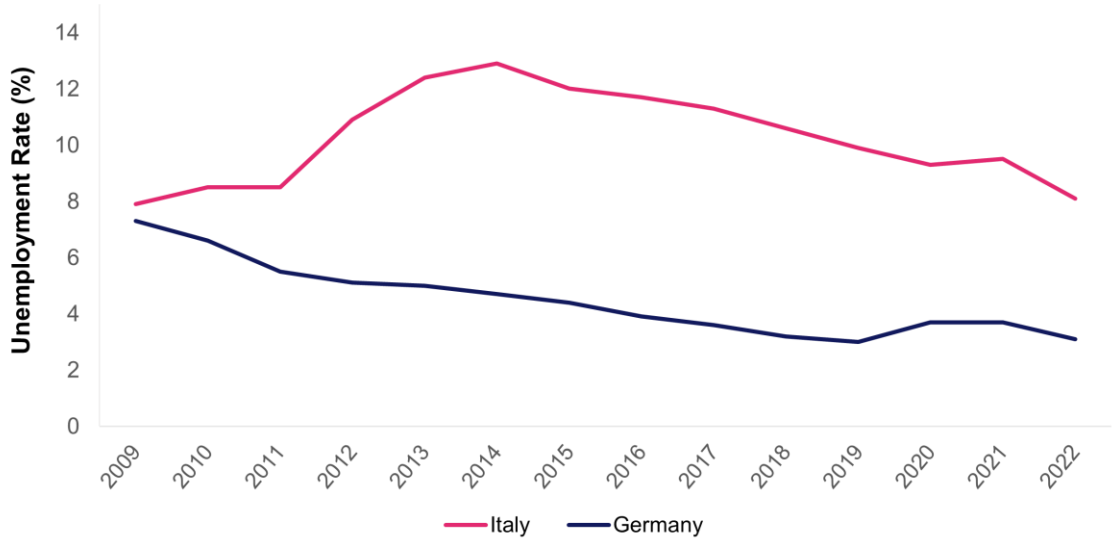

Figure 1.2 Unemployment rate in the period 2009 – 2022, Italy and Germany.

Source: Eurostat.

As noted above, a broad stream of studies in the field of communication has shown that journalists tend to over-report news about negative economic events (Damstra et al 2018; Goidel and Langley 1995; Soroka 2006, 2012). Therefore, a higher coverage of the economy usually results in more negative economic news. Consequently, it has been found that as economic news coverage increases economic worries are boosted (Doms and Morin 2004) and fertility is inhibited (Schneider 2015). The impact of the news coverage may change according to its tone (McCombs 2011). By applying an experimental approach, de Vreese (2009) found that negatively framed items on the economic consequences of the 2004 EU enlargement depressed economic expectations, whereas the opposite was the case for those which were positively framed. In Germany and Norway, increases in the negative news coverage of the economy deteriorate individual economic perceptions more than how much positive news items enhance them (Dräger 2015; Garz 2018; Lamla and Lein 2012). Furthermore, the positive effect of good economic reports has been proved to disappear fast over time in Germany (Tausch and Zumbuehl 2016). Regarding fertility intentions, Vignoli et al. (2022) found that negative narratives of the economy have a strong impact in Norway, while positive narratives have weaker and smaller effects. On the contrary, positive narratives are more impactful than negative in Italy (Vignoli et al. 2022). Therefore, we formulate a research question on the role of the news:.

- *Q2: Does the association between economic news and fertility outcomes change based on the tone of the news?*

As discussed above, the relationship that goes from economic news coverage to economic perceptions, and that from economic perceptions to fertility, have been largely proved, and are graphically represented in **Figure 1.3** by the solid lines A e B. In this study, we firstly address the *total association* between the news coverage of the economy and individual fertility as per *Q1–Q2* (dashed line C). In a further step, we wonder whether it is mediated by economic perceptions of individuals, thus unravelling the *direct association* of the news coverage of the

economy with individual fertility (dotted line C'). Hence, the next research question is:

- *Q3: Is the economic news/fertility relationship channeled by individuals' economic perceptions?*

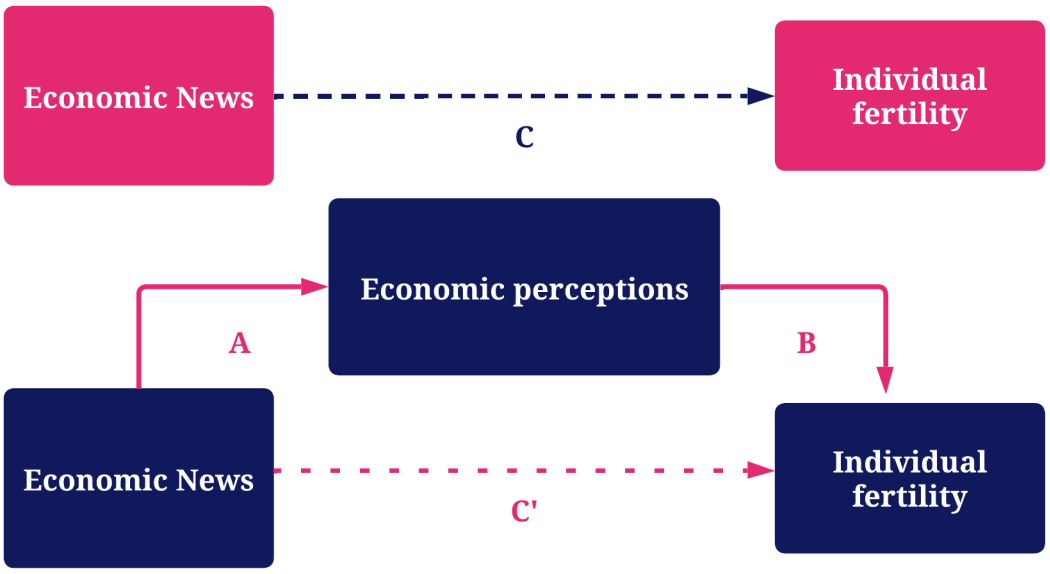

Figure 1.3 The hypothesized mediation mechanism.

Note: Solid lines: well documented relationships; dashed line: first major contribution of this thesis; dotted line: second major contribution of this thesis.

While we do not have previous evidence on the heterogeneity in the news coverage/fertility nexus, the economic perceptions/fertility nexus varies considerably among population groups (Kreyenfeld 2010, 2015). For instance, more highly educated women postpone parenthood when worried about their employment situation, those with low levels of education accelerate it (Kreyenfeld 2010). Worries on the own economic situation foster first birth transitions at younger ages, while they have a negative impact at older ages (Kreyenfeld 2015). According to Hofmann and Hohmeyer (2013), economic perceptions impact on fertility behavior only in couples with medium income, and that have already one child (*vulnerable groups* that have more to lose). We thus

pay special attention on the potential moderation role played by demographic and socio-economic factors by wondering:

- *Q4: Do individuals react differently to changes in the news coverage of the economy according to their age, education, union or employment status?*

By virtue of the richness of the GSOEP data, for the German case we can also address the moderating role of individuals' labor earning, the region where they live and their migration background. Unfortunately, data limitations prevent us from addressing all the research questions on Italy: we cannot address *Q1b* and *Q3* since we have data on a single media source, and we do not have information on economic perceptions of individuals. However, Germany is well-suited for assessing the mediating role of perceptions in the association between economic news and fertility (*Q3*) due to its economic stability. This may reduce endogeneity problems arising from the influence of economic trends on all three terms involved in the relationship. In other words, such problems would be more severe if other countries, more affected by economic turmoil, were considered. In the following, we report an overview of fertility trends in the two countries in the last decades and an examination of the key factors influencing them. We provide a description of the cultural and institutional contexts characterizing Italy and Germany that are crucial in determining the (different) fertility behaviors of their inhabitants.

1.6.1 THE ITALIAN CONTEXT

Over the last half century, Italian fertility has fluctuated between rises and falls (Mencarini et al. 2021). Following a diachronic perspective, after the *baby boom* started in 1950s, the country witnessed a dramatic drop in birth rates during the *baby bust* (1970–1995). It led Italy among the countries with lowest-low fertility in the early 1990s (Kohler et al. 2002a). Such a dynamic was due to both the postponement of first births and the quantum effect (Sobotka et al. 2005). A (modest) reversal in fertility trend interested Italy at the dawn of the new

millennium. Such reprise was mainly driven by the recovery of fertility postponed during the previous decades and the relevant contribution of foreigners (Giannantoni e Strozza 2015; Strozza et al. 2007). Gabrielli et al. (2007) noted that migrants' fertility accounted for a relevant part of the increase in the Italian TFR between 1996 and 2004. At that time, Goldstein and colleagues (2009) suggested that the lowest-low fertility regime could be considered over. Expectations (albeit cautious) of fertility recovery emerged also from the study by Caltabiano et al. (2009). In spite of this, research was unanimously far from predicting the return of Italian fertility up to the replacement level (Rosina and Caltabiano 2012). By contrast, a new dramatic and steady decline started when the Great Recession hit the European economy (2009–2013). The economic consequences of the recession have been particularly severe for Italy (Matysiak et al. 2021). Fiori et al. (2018) assessed that, after the onset of the recession, economic constraints were reported as the main motivation to not have a second child by a larger quote of Italian mothers than a decade earlier (it passed from 16.7% in 2002 to 25.08% in 2012). During these years it has been observed a concurrent fall in immigrants' fertility (Sobotka 2017). Afterwards, all Western societies entered the present times of uncertainty (Mencarini et al. 2021), during which fertility is further burdened. The increasing economic and employment uncertainty leads individuals to postponing parenthood (Mills and Blossfeld 2013).

The Great Recession and the rising economic uncertainty have, however, added to long-standing features of the societal Italian context that inhibit fertility. The transition to adulthood of Italians is typically among the latest-late in Europe (Billari and Rosina 2004; Stranges 2007)—the *postponement syndrome* (Livi Bacci 2001). They lag behind their European counterparts at all stages of life course preceding parenthood: end of education, first job, exit from the parental house, and union formation (De Rose et al. 2008). Nowadays, the mother's average age at childbearing in Italy is among the highest in Europe standing at over 32. This

results in a reduced number of children, or even in childlessness, for many women due to time constraints. Billari and Rosina (2004) argued that intervening on the timing of the first union is essential to shrink the fertility delay among Italians. Moreover, nowadays, the potential Italian parents are the (few) born during the *baby bust*, slightly augmented by young immigrants. Fertility levels at a time determine the number of births from future levels of fertility. The fact that there were few births during the 1980s and 1990s implies that there are few potential parents today—the *demographic trap* (Mencarini e Vignoli 2018). All these factors have contributed to pushing Italian fertility in a downward spiral that has led the country down to an average of 1.25 children per woman in 2021. For the sake of completeness, it is also crucial to note that Italy suffers a considerable economic gap between wealthier North regions and more disadvantages Southern ones. Fertility dynamics differ as well: in Northern and Central regions fertility rates grow more rapidly during economic expansions than in the South and witness even a faster drop during economic crisis (Caltabiano et al. 2009; Salvati et al. 2020; Zambon et al. 2020).

From the institutional perspective, Italy is traditionally characterized by a "familialistic" regime (Saraceno e Keck 2010), in which the family is the primary welfare provider. The Italian welfare system, that is particularly slow in adapting to economic and socio-demographic changes (De Rose et al. 2008), combined with the labor market deregulation reforms (Barbieri et al. 2015), has amplified the consequences of economic recession and uncertainty. Indeed, in Southern European countries the labor market deregulation has particularly affected the target population of potential parents, i.e., young adults (Esping-Andersen and Regini 2000). Therefore, the rising employment instability emerged to be particularly detrimental for Italian (and Spanish) fertility, while this was not the case of Germany and the U.S. (Barbieri et al. 2015). The causal approach adopted by Vignoli et al. (2020c) showed that having a temporary job position instead of a permanent one accounts, on average, for 5–7% of first-birth postponements,

until a maximum of 16% for highly educated Italian women. This compounds gender issues burdening the Italian labor market and society such as the low gender equity (Italy has an index of 65 vs. the European average of 68.6 (EIGE 2022)) and the heavily gendered division of the household labor that does not favor the decision of Italian women to have a(nother) child. Indeed, the comparative study by Mills et al. (2008) found that Italian women's fertility intentions were more lowered by an unequal division of household work compared to Dutch women. According to Del Boca et al. (2005), Italy is also characterized by low female participation in the labor market (41% in 2022 vs. 56% of Germany and 52% of European Union).[2] However, the relationship between female occupation and fertility has started to reverse from negative to positive also in Italy and especially in the North (Alderotti 2022). Furthermore, inadequate availability of childcare services and limited parental leave further exacerbate the work-family incompatibility. Italian female workers are obliged to 5 months of maternity leave. They are entitled to a maternal indemnity of up to the 100% of their wage during this period. Paternal leave is also mandatory, but it only consists of 10 days off. Only employed men who are members of the social security system have access to paternal leave, and it is paid at 100% of their earnings. Additionally, family allowance can be provided as subsidy. Following the mandatory leave, parents have the option to take up to 10 months of parental leave within the first 12 years of the child's life. However, if the father takes at least 3 months of parental leave, the total duration can be extended to 11 months. During parental leave, the parent receives a reduced allowance equivalent to 30% of their wage until the child reaches 6 years of age. If the child is older than 6, the parental leave is unpaid (Duvander and Koslowski 2023). The public childcare services are scarce and with limited availability in hours, they are mainly used for children older than 3 years old (Mills et al. 2008). The quote of children

[2] https://data.worldbank.org/indicator/SL.TLF.CACT.FE.ZS

under 3 years old attending childcare facilities, albeit increased from 15.4% in 2008–2010 to 28.2% in 2018–2020 (ISTAT 2021b), falls short of the European goal of 33% set in 2010. Indeed, the share of GDP allocated to public spending in family and care policies is lower than the European average and consists only of 2% (Mencarini et al. 2021). The supply for public childcare is lower than its demand, especially in the South. This is partially compensated by the widespread practice of grandparents providing caregiving support (Aassve et al. 2012).

Finally, the COVID-19 pandemic further undermined Italian fertility (Aassve et al. 2021; Guetto et al. 2022; Luppi et al. 2020, 2022). Although the period covered by our data ends before the spread of the pandemic, we do not miss to mention the recent fertility literature on this subject. Luppi et al. (2020) used data from a survey conducted in the aftermath of the COVID-19 outbreak. They showed that the pandemic led to a larger reduction in fertility intentions of young Italians than, for example, young Germans and French. Self-employed and temporary workers are those whose intentions have been revised downwards the most after the (first wave of) COVID-19 (Luppi et al. 2022). By contrast, Micelli and colleagues (2020) reported that Italians' fertility intentions have not been drastically abandoned after the outbreak of the pandemic. During the COVID-19, some individuals have experienced a renewed desire for having children. In fact, other circumstances induced by the pandemic, such as more time to devote to the family, a more equal division of domestic work within the couple and the improved quality of the couple's relationship may have fostered fertility intentions of Italians (Micelli et al. 2020). The negative effect of pandemic has been, however, dramatic in terms of births drop in the short run (Aassve et al. 2021; Mencarini et al. 2021). In fact, we have observed only 404,104 new births in Italy in 2020 with a reduction of 4% compared to 2019 (ISTAT 2021a).

1.6.2 THE GERMAN CONTEXT

For almost half a century (from mid-1970s to mid-2010s), Germany has been characterized by very low fertility, i.e., fertility level was long-lasting below the threshold of 1.5 children per women (McDonald 2008). The description of demographic dynamics observed in Germany in the last decades cannot disregard the process of unification between the former GDR (German Democratic Republic) and the FRG (Federal Republic of Germany), started with the fall of the Berlin Wall in 1989. Many economic, political, and societal changes have occurred since then, with consequences also on fertility. At that time, fertility behaviors in the two German states were markedly different mainly due to the profound contrast between the two regimes (Bernardi and Keim 2017). Despite the economic disadvantages, the East Germany presented more modern family models and higher levels of gender equality (Trappe and Sørensen 2006). Eastern mothers were also strongly supported in pursuing their careers through an easy access to childcare services, in line with the typical "pro-natalistic" policy system of the communist regime (Kreyenfeld and Konietzka 2017). By contrast, in West Germany, the breadwinner model was prevalent, and the incompatibility between motherhood and work was a marked trait (Kreyenfeld and Konietzka 2017). Consequently, while in East Germany was a quite common practice for mothers to work (Treas and Widmer 2000), in the West it was so deprecated that working mothers were called "Raven Mother" (Goldstein and Kreyenfeld 2011). According to Witte and Wagner (1995), the reunification of Germany led to a social revolution by which German society was fundamentally reorganized. Before 1989, fertility in East German was slightly higher than that of the West. While the fertility level remained virtually unchanged in West Germany, that of East Germany was more than halved in the beginning of 1990s by reaching the severely low value of 0.8 children per woman. This short-term decline was considered by Eberstadt (1994) as part of the "demographic shock" witnessed by East Germany after the reunification (accompanied by, among others,

extremely high mortality). A reason beyond the drop in births was identified in the individualization process occurred in German society according to which people tend to focus on their careers and thus postponing parenthood (Beck-Gernsheim 1997). The economic concerns raised in virtue of the reunification have a further role in such a descending spiral (Witte and Wagner 1995).

Afterwards, the trend reversed, and in 2008 there was the same number of children per women in the East and in the West (1.4). The convergence of East Germany fertility rates up to level of West Germany, in years of economic downturns (like in the end of 1990s), was unexpected also because economic conditions were more favorable in the West compared to those in the East (Goldstein and Kreyenfeld 2011). Even after the institutional, economic, and political unification, there were still traces of the legacy of the divided Germany. For example, in the East of Germany, there continued to be a greater availability of childcare services (Kreyenfeld 2003). Bernardi and Keim (2017) discussed and analyzed the inertial effect of socialization, according to which, although the current conditions of German women were similar throughout the country, they continued to behave differently depending on the regime in which they had lived before. As a result, childless rates were still higher in West Germany, Eastern women entered motherhood before Western ones, and non-marital fertility was more widespread in the East (Huinink et al. 2012). A complete picture of German fertility dynamics in the 2000s and early 2010s is provided by Kreyenfeld (2015). She found higher first-order births intensity in East Germany, while the risk to have a second and a third child was higher in the West. Women with higher levels of education tend to have children at a faster pace, likely due to the desire to minimize interruptions to their careers and make up for the time invested in their education.

While in the past Germany has been in the front line of childlessness rise in European countries (Kreyenfeld and Konietzka 2017; Sobotka 2017), nowadays, in a context of generalized drop of European births, it surprisingly stands out for

its rebounding fertility. Between 2010 and 2020, German TFR passed from a value of 1.39 to 1.53 (up to a maximum of 1.60 in 2016). Indeed, the improvements in parental leave benefits introduced by the 2007 reform (Spiess and Wrohlich 2008) have created propitious conditions for family formation (Kreyenfeld 2015). Schober (2014) found that the reform has resulted in increased participation of fathers in child-rearing (albeit not in housework), thus encouraging fertility. However, the childcare under three years mainly consists of private nursery or in-home cares. Today, the German welfare entitled working mothers to 14 weeks of maternal leave during which they are protected from being fired (the job protection—*Kündigungsschutz*). During maternal leave, salary should not be affected, and parents may request for subsidies as parental allowance (*Elterngeld*) and child allowance (*Kindergeld*). After that, parental leave of 14 months can be used by both parents with a significant higher allowance compared to Italy. Employed parents are eligible for a minimum of 65% of their earnings (as opposed to 30% in Italy), while non-employed or unemployed individuals receive a minimum rate of €300. Extension of leave and the availability of part-time options are feasible (Duvander and Koslowski 2023). Notwithstanding the recent recovery (that has slightly slowed recently), German fertility is far from reaching the replacement level due to the demographic trap caused by decades of low fertility.

As for Italy, the period covered by our analysis does not include the pandemic. However, to conclude the summary on German fertility, we must not that the impact of the COVID-19 pandemic on birth rates in Germany was relatively negligible, especially in the short term (Pötzsch 2021). Germany did not experience severe mortality rates in the first phase of the pandemic compared to other countries. People living in Germany were largely protected from the social and economic point of view by virtue of policies and programs implemented during the pandemic (Bujard and Andersson 2022). Luppi et al. (2020) empirically assessed that changes in fertility intentions were only moderate in Germany: most

people planning to have a child in the next year postponed their decision, while only a small part of them abandoned their fertility plans. This occurred disregarding the rise in unemployment during the first (of three) wave of COVID-19. Only in 2022, we observe a considerable reduction in the number of births in Germany (Bujard and Andersson 2022).

2

Data and Methods

2.1 ECONOMIC COVERAGE IN MEDIA NEWS AND OTHER MACRO-ECONOMIC INDICATORS

Information on the news coverage of the economy is provided by *Media Tenor International*, a Swiss-based research institute which analyzes print and broadcasted news, distinguished by protagonist, topic, date, location, time reference, source, and tone (http://us.mediatenor.com/en). Our data consist of the monthly number of economic news reported by Italian and German media, i.e., items in which the state of the economy in general, or in relation to such indicators as unemployment, economic growth, and the labor market, is discussed. We receive data on media news already coded by *Media Tenor* analysts. The high quality of *Media Tenor* data makes them ideal for several scientific studies (e.g., Beckmann et al. 2017; Berlemann and Thomas 2019; Dräger 2015; Garz 2012; Guadecker and Wogrolly 2022; Lamla and Lein 2008; Lamla and Maag 2012; Lamla and Sarferaz 2012; Püttmann 2018; Tausch and Zumbuehl 2016; Uhl 2012). For Italian news, we have at our disposal data on the news coverage of only one media source: the evening edition of *TG1* (h. 20:00) —the *Rai 1*'s newscast program. *TG1* has an average daily viewership of almost 7 million Italians, and the program's share—i.e., the proportion of its viewership relative to television's total audience—is 35% (https://www.auditel.it). Instead, data on the German news coverage are available for several media. The news reporting by *ARD Tagesschau*, *ARD Tagesthemen*, *ZDF Heute* and *ZDF Heute Journal* (the leading daily television news programs) represents the coverage in German television. We rely also on economic news from *BILD-Zeitung* (the most popular German tabloid with 1.5 million copies sold per day in 2022).[3] Also, we employ data on the economic news coverage in German weeklies. They consist of news reported by weekly magazines of great circulation such as *Der Spiegel* (which sold

[3] https://www.statista.com/statistics/304799/bild-circulation/

an average of almost one million copies in per week the period 2001–2018),[4] *Focus*, and *Bild am Sonntag*. In the case of Germany, besides news on the economy, we have at disposal the coverage of economy-related issues as companies and social policy. Italian data cover the period from January 2006 to August 2015, while German data cover from January 2001 to April 2018.

The fact that these sources are followed by a large quote of the populations makes them particularly suitable for analyzing media-conveyed narratives and public discourse on the state of the economy. This is true even in absence of data on individual exposure and notwithstanding the increasing use of social media. Indeed, it would be tricky to analyze online news trend in our time windows because of the rapid evolution that has affected online markets since the early 2000s to the present day (Garz 2018). However, it could be argued that the increasingly relevant media segment is missing from our study. Media analysis on the European debt crisis coverage has shown a high level of consonance between different types of media in Italy (Arrese and Vara-Miguel 2015). Likewise, German media markets are concentrated (KEK 2015) and their offer is quite aligned among sources (Roessler 2007). The economic coverage of online news is therefore probably close to that of the sources we consider in the analysis. Moreover, in the period covered by our data, the number of Italian women aged 15–44 who used the internet on a daily basis—while growing rapidly—did not exceed the percentage of television users.[5] In a 2016 survey conducted in Italy by ISTAT, 69.7% of respondents declared that they updated their knowledge by watching television newscasts—often, but not always, combined with other online sources. While the search for information exclusively through the internet and social networking sites was more common among young people, the use of both channels was shared by all age groups (ISTAT 2016). In a nutshell, watching television was still defined as an established habit in Italy for all age groups in

[4] https://www.statista.com/statistics/411183/der-spiegel-paid-circulation-germany/
[5] Data retrieved from https://www.istat.it/it/cultura-comunicazione-viaggi?dati.

2019, albeit with heterogeneous frequency (ISTAT 2020). As regards Germany, the *German Commission on Concentration in the Media* (Kommission zur Ermittlung der Konzentration im Medienbereich, KEK) noted that the weight of relevance of internet content in shaping public opinion is half that of television content (KEK 2015). The *Time use surveys* conducted by Eurostat report that watching TV was among the most popular secondary activities among Germans: between 2008 and 2015 a German citizen has spent an average of more than 1 hour per day watching television (Eurostat 2019). Finally, each of the media we consider has a website and their content circulates online. For example, *Spiegel Online* is one of the most widely read websites in German language.[6]

Media Tenor analysts assign a tone (positive, negative, or unclear/neutral) to each economic news item based on both explicit judgmental language (e.g., "good," "bad," "ominous," "ridiculous," "brilliant") and implicit evaluations reported in the news text to the extent that they may influence the perception of its content. For example, the statement "unemployment goes down" is coded as a positive news item, while "female unemployment rate grows by 0.2% in comparison with February" is classified as negative coverage. An unclear or neutral tone is assigned to such statements as "(Pension reform) topics on the table are payout flexibility." Our main measures of the economy's coverage are set as: # *Negative News*, # *Positive News*, and # *Unclear News*, which represent the absolute monthly numbers of economic news stories according to their tone. The total number of news items varies over time. As such, it is also important to establish a relative indicator of the economic news coverage (Garz 2018; Lamla and Maag 2012). Indeed, an increase in the number of economic news items can have a weaker effect on fertility if this rise is concurrent with a proportionally greater increase in the number of other types of news. In this case, the public's attention can well be diverted from the economy to other prominent topics.

[6] Statistics on the use of digital tools in Germany are available at https://ausweisung.ivw-online.de/

Consequently, we derive the relative measure *Percentage*, which represents the incidence of economic items out of all news reports. Likewise, the influence of positive (negative) news reports may vary according to the amount of negative (positive) news reports appearing at the same time: e.g., the negative effects of bad (good) news may be stronger if fewer positive (negative) facts are reported. Thus, the effect of news tone may be assessed by jointly considering the amount of positive and negative news items with a unique relative indicator (Lamla and Maag 2012; Tausch and Zumbuehl 2016). We use the following measure: *Pos* / *pos* + *neg*, i.e., the percentage of positive news stories over positive and negative economic news stories (excluding those with unclear tones), as proposed by Tausch and Zumbuehl (2016). A table presenting in details the media news variables, both those provided by Media Tenor and those we build from them, is provided in the Appendix (**Table A1**).

Figure 2.1 shows the *Percentage* of economic (and economy-related in the case of Germany) news out of all news reported by each media group. The economy was a "hot topic" in the media schedule during the Great Recession and the Euro crisis. According to news value theory (Eilders 1997, 2016; Galtung and Ruge 1965; Kepplinger 2011; Maier et al. 2018), the news selection process also depends on the journalists' opinions on their newsworthiness (Kepplinger 2011). Journalists commonly consider negative stories as more attractive than positive or neutral ones. The high level of the coverage of the economy in 2009–2012 could thus be attributed to the negativity of the economic events occurred during this period. Once the debt crisis ended, declining woes over the stability of the Euro system may explain its significant subsequent decline. Furthermore, TV newscasts and print press have a limited amount of time/space at their disposal and must decide on which topics to focus their coverage. The drop in the economic news coverage that began in 2013 may have been due to a "replacement effect" in favor of other prominent topics. According to *Media Tenor* data, in 2014 the Crimea's invasion by Russia, the Brexit referendum, the

escalation of the civil war in Syria and the resulting refugee crisis gained strong visibility in the media agenda. The refugee crisis became a core topic in both scientific and public discourse across Europe (Eberl et al. 2018; Garz 2018), and especially in Italy (Impicciatore et al. 2021).

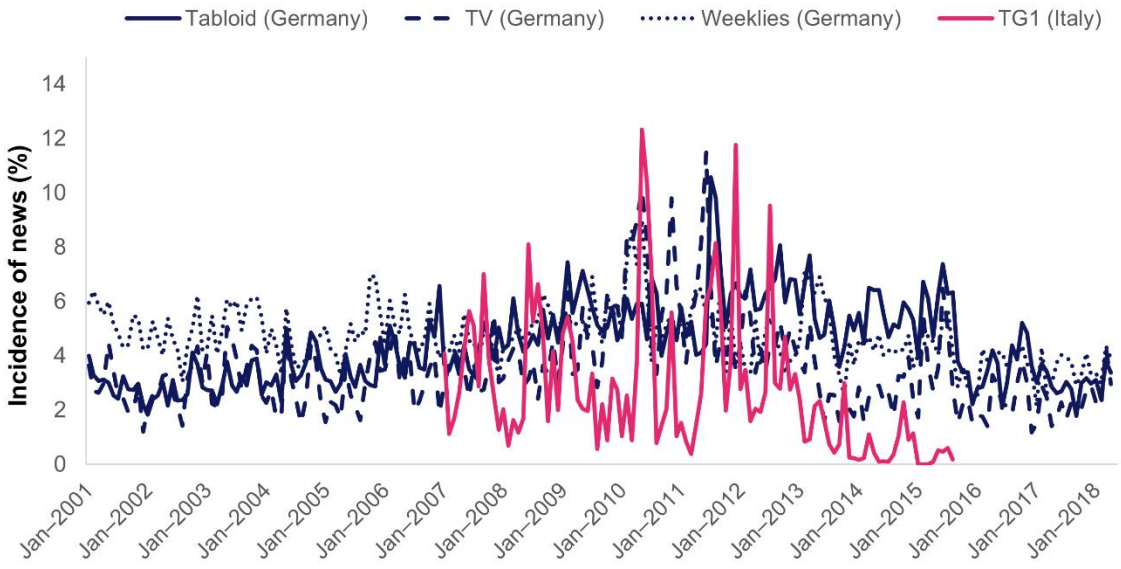

Figure 2.1 Monthly incidence of news on economy (companies, and social policy for Germany) out of all news by media source in Italy and Germany, Jan 2001 – Apr 2018.

As regards German media, the highest incidence of news on the economy and the economy-related topics is observed, on average over the whole period, in weekly magazines. Instead, in absolute terms, the media group that deals more with these topics is the television, with an absolute number of more than 300 items per month, followed by weeklies that reported around 100 items on average, and the tabloid with slightly fewer news items. However, the trends are quite aligned among sources. **Figure A1** (in the Appendix) provides a picture of the trend of each topic in the German (multi-)media news coverage. We preliminarily run a Principal Component Analysis (PCA) on the *Percentage* of news reported about economy, companies, and social policy in weeklies, television, and the tabloid to ensure that the aggregation of news from different media groups

makes sense (**Figure 2.2**). The monthly incidence of social policy news is, on average, the lowest (1.44%), followed by that of economy (4.67%), and companies (5.49%). Coming to the news tone, the number of negative items is significantly higher than that of positive items albeit the gap between them narrows from 2014 onwards. This asymmetry is less pronounced but still present in the Italian newscast coverage (**Figure 2.3**), and larger in the weeklies' news coverage on economy, companies, and social policy in Germany (**Figure 2.4**).

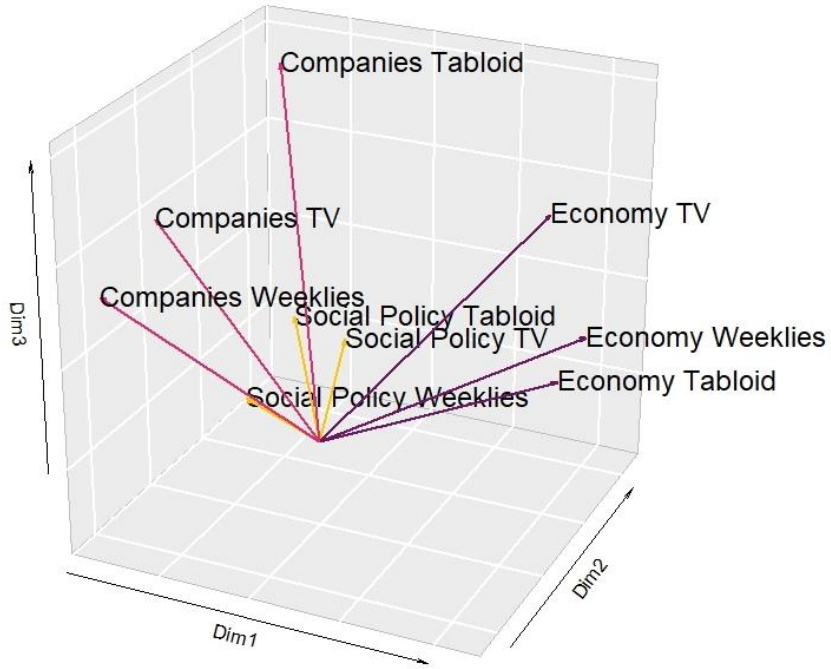

Figure 2.2 Loadings plots of the three Principal Components from PCA on the incidence of each topic in the news coverage of German weekly magazines, television, and the tabloid.

Notes: the figure refers to the news coverage in the previous semester. However, similar results are obtained considering different periods.

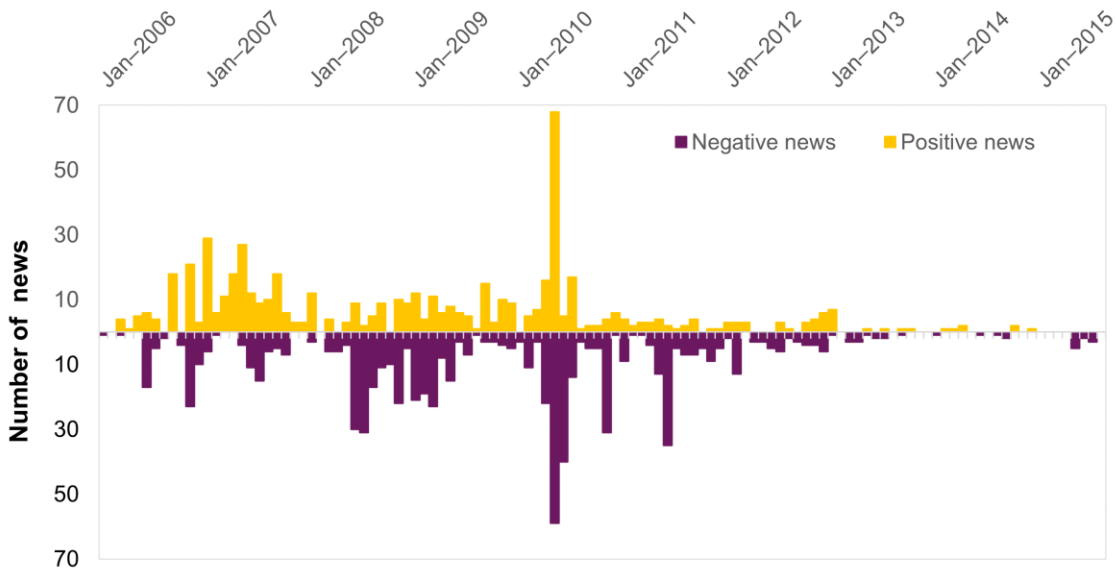

Figure 2.3 Monthly number of news on economy in the Italian *TG1* by tone, Jan 2006 – Aug 2015.

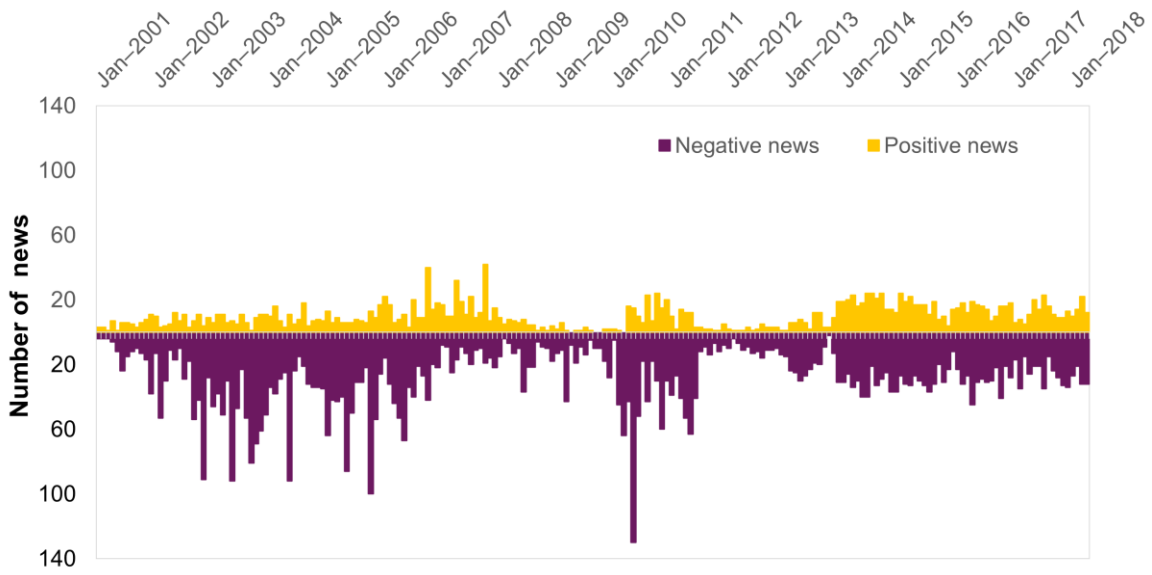

Figure 2.4 Monthly number of news on economy, companies, and social policy in German weekly magazines by tone, Jan 2001 – Apr 2018.

As parenthood is a long-term commitment, our assumption is that temporary changes in the news' coverage of the economy (companies or social policy) may not influence the decision of having a(nother) child, just as news reported in the distant past tends not to impact on individuals' fertility decisions. Furthermore, information reported in news takes time to circulate (Carroll 2003) before any

effects on individuals' perceptions and expectations—and subsequently on their behaviors—can be observed. Hence, we relate the probability of conception at each month with the average monthly number of negative, positive, and neutral (or unclear) economic news items reported over preceding intervals (e.g., the previous trimester, semester, year). We calculate the relative measures of economic news coverage for each month, based on these moving averages. This approach is followed also to ensure that our results would not be affected by random fluctuations in media news. In the following, except where specified, we report estimates based on the news coverage in the previous year for Italy and the previous semester for Germany. Therefore, the final time windows of the analysis are January 2007–August 2015 for Italy, and July 2001–April 2018 for Germany (i.e., the time frames start at the first month for which moving averages can be calculated). These choices follow several tests we have conducted on news coverage indicators accounting for different previous periods. Nonetheless, in the following we provide information on findings from indicators of shorter and longer periods of coverage.

Finally, we aim to consider two complementary dimensions that could separately influence reproductive behaviors: what happened to the national economy, and the relevance and framing of economic news coverage. By taking the Italian example, **Figure 2.5** shows that the relevance of a topic in media news may not overlap with its actual bearing: the level of unemployment has almost doubled since 2012, whereas the *TG1*'s coverage of the economy has drastically declined. Another example, unrelated to the economy (but indicative of media news trends), is the refugee crisis and related political debate: international migration inflows toward Italy were stronger before the 2015 refugee crisis, but

the news coverage of migration became pervasive from 2015 onward (Impicciatore et al. 2021).

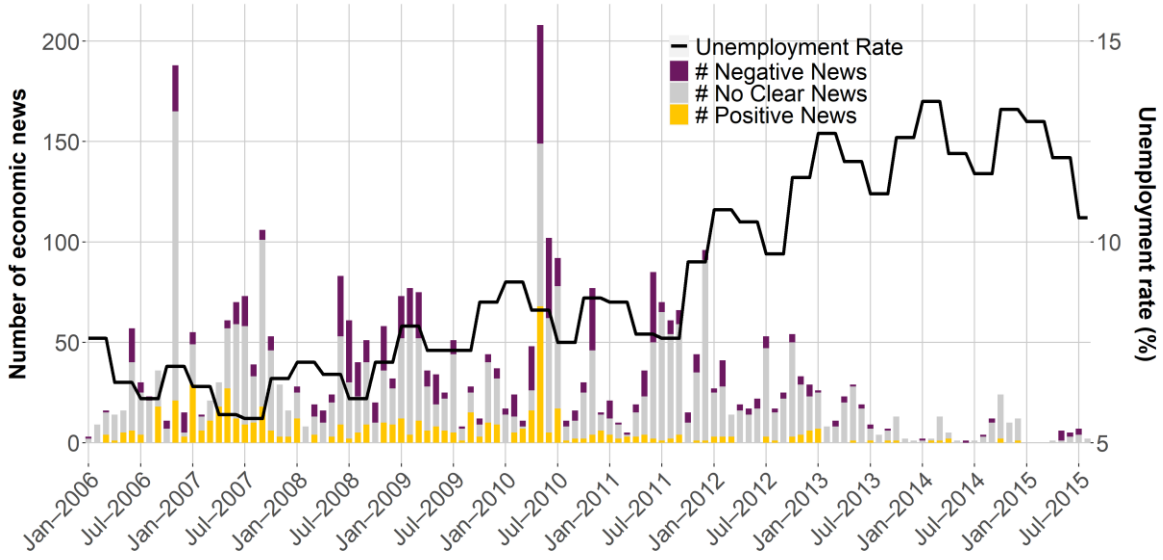

Figure 2.5 Monthly number of economic news items reported by TG1 and the quarterly unemployment rate in Italy, Jan 2006–Aug 2015.

Albeit the alignment between economic events and news coverage is usually not high (Goidel and Langley 1995) due to the multitude of factors involved in the news selection process (de Vreese 2005), we acknowledge that the relevance of a topic in the news has a certain level of correlation with the facts. In our models, we thus control for crucial macroeconomic factors traditionally employed in fertility research (Comolli 2017; Matysiak et al. 2021; see Sobotka et al. 2011 for a review): the *Female Unemployment Rate* (by 10-year age classes beginning from the age of 15, ISTAT), the *GDP per capita* at current market price (Eurostat), and the *Inflation Rate* (the Harmonized Index of Consumer Prices,[7] Eurostat) for Italy the *Growth rate of the real GDP* (OECD) and the *Female Unemployment Rate* (Eurostat) for Germany. Macroeconomic factors refer to the resident population, except for

[7] HICP measures the consumer price inflation. It is a Laspeyres-type index of consumer goods and services classified in line with the European Classification of Individual Consumption According to Purpose (ECOICOP). For the complete ECOICOP classification, see: https://ec.europa.eu/eurostat/web/products-datasets/-/teicp000.

the *Inflation Rate* that covers purchases by both resident and non-resident households. Similar to the news coverage variables, we use macroeconomic indicators as moving averages of the previous period based on quarterly or monthly values, depending on data availability.

2.2 THE ITALIAN SAMPLE

To conduct our analysis on the Italian case-study, we employ micro-data from the 2009 and 2016 releases of the *Family and Social Subjects Survey* (hereafter, FSS),[8] which include 43,850 and 24,753 individuals, respectively, resident in Italy and aged 18 and above. FSS is a multipurpose survey conducted by ISTAT. The overall response rate of the survey was 80% in 2009 and 77% in 2016. FSS data contain detailed information on individuals' histories recorded on a monthly basis. First, we transpose retrospective information on the careers, unions, and childbearing histories into a panel with monthly observations for female respondents aged 15–40 during January 2007–August 2015. We merge micro- and macro-level variables (presented in 2.1) into a unique dataset according to the month of occurrence. The monthly panel dataset includes 12,521 women having 2,987 conceptions (**Table 2.1**).

[8] In 2016, the survey was named "Family, Social Subjects and Life Cycle." Here we refer to the two releases as "FSS."

Table 2.1 Descriptive statistics of the Italian sample, Jan 2007-Aug 2015.

Variable	Mean/Freq (%)	Monthly Risk of Conception (%)
Conception	0.46	–
Age	29.45	–
Age class		
15–24	28.37	0.23
25–34	40.55	0.72
35–40	31.08	0.35
Student		
No	80.56	0.55
Yes	19.44	0.10
Employment		
Not employed	49.55	0.40
Permanent employed	32.72	0.55
Temporary employed	10.07	0.44
Self employed	7.66	0.56
Level of education		
Lower secondary or less	25.17	0.52
Upper secondary	49.17	0.43
Tertiary education	25.66	0.47
Union		
Not in union	50.04	0.11
Cohabitation	9.21	0.86
Marriage	40.75	0.80
Person-months	644,038	
Individuals	12,521	

The response variable (*Conception*) is a dummy indicating each child's month of conception. It is built by subtracting nine months from the recorded date of birth. The monthly risk of conceiving a(nother) child is on average 0.46% and is substantially stable over the selected period. We consider well-established micro-level fertility antecedents. *Age* is included in its linear and quadratic form. *Employment* has four differentiating levels, namely joblessness, permanent

employment, temporary employment, and self-employment. Unfortunately, the employment variable does not distinguish between months in which women are unemployed from those in which they are inactive. Regarding education, we use *Student* as a dummy variable, and a three-category variable for the *Level of Education* (lower-secondary education or less, upper-secondary education, and tertiary education). We also consider a potential mediator of the economic news/fertility relationship, namely *Union*, which distinguishes women not in coresidential union from those in cohabitation or marriage. All variables are time-varying, except for the *Level of Education*. Time-varying information on income is not available in the survey.

2.3 THE GERMAN SAMPLE

As for the Italian panel, we merge macro-level indicators of the economic news and national economy with a monthly panel dataset on individual fertility histories, economic perceptions, and socio-demographic characteristics of people living in Germany (resident and non-resident, in this case). We gather micro-data from the GSOEP that is the richest and longest running panel in Europe and collects information of an (household-)representative German sample since 1984 (Schupp and Wagner 2002; Wagner et al. 2007). The version here used (IAB-SOEP Migration Samples 2019; Socio-Economic Panel 2021) is composed by 36 waves (1984–2019) in which individuals are re-interviewed each year after their first interview. At its launch (1984), the GSOEP encompassed the samples A ("Residents of the Federal Republic of Germany") and B ("Foreigners in the Federal Republic of Germany"). Over time, several samples have been added. For this analysis, we exclude samples in which fertility behavior may remarkably differ from that of the average population: M3–M5 (Refugees samples), sample G (composed by household with total income higher than 3,835 EUR until 2002, and 4,500 EUR from 2003 onwards), and samples L1, L2 and

L3 (which cover private households that meet specific requirement as, for example, being single parent family, being large family, or being family with children born in specific period).

We select female respondents who took part in the survey for at least 2 consecutive years (Kreyenfeld 2015) and aged 17–40 from July 2001 to April 2018. To account for all conceptions, we also include the years in which they were not interviewed.[9] Finally, we make other exclusions—i.e., a few individuals for who information on the date of birth or gender is missing, a few cases of women for who at least one childbirth date is missing, and those who reported implausible fertility histories. We also drop out records of women who have not been interviewed for more than 30% of their permanence in the panel (that is 1.05% of all observations). Eventually, to ensure the stability of the trend of the risk of conception, we delete those individuals who are in the sample for less than 12 months. The final panel dataset consists of 734,640 monthly-observations of 11,105 women (**Table 2.2**), among them we observe 3,150 conceptions.

Table 2.2 Descriptive statistics of the German sample, Jul 2001–Apr 2018.

Variable	Mean/Freq (%)	Monthly Risk of Conception (%)
Conception	0.43	–
Age (continuous)	29.48	–
Age (in classes)		
17–24	28.68	0.24
25–34	40.75	0.69
35–40	30.57	0.26
Employment		
Full-time	29.05	0.58
Part-time/Training	31.25	0.40
Unemployed	5.69	0.55
Not employed	18.06	0.35

[9] These observations represent only 2.11% of the total amount of monthly-observations we have. During these months we observe 2.45% of the total number of conceptions.

Other	6.11	0.54
Missing	9.84	0.09
Individual Labor Earning (continuous)	13,357.84 €	–
Individual Labor Earning (in classes)		
<=1,200 €	25.03	0.45
<=9,120 €	24.97	0.34
<=20,340 €	25.09	0.37
<=312,000 €	24.91	0.56
Level of education		
Low	19.93	0.26
Medium	56.98	0.42
High	16.42	0.67
Missing	6.67	0.43
Student		
No	74.19	0.52
Yes	25.81	0.17
Citizenship		
German	84.38	0.41
Migrant	11.07	0.48
Missing	4.55	0.57
Region		
East Germany	69.71	0.42
West Germany	19.48	0.46
Missing	10.80	0.42
Union		
Not in union	22.34	0.09
In couple – No cohabitation	15.77	0.24
Cohabitation	16.41	0.61
Marriage	41.37	0.64
Missing	4.11	0.17
Person-months	734,640	
Individuals	11,105	

As for Italy, fertility histories are included as a dummy that assumes value 1 in the month of conception of each child and 0 otherwise (we backdate the date of each childbirth by nine months). The monthly risk of conceiving a(nother) child in the panel is on average 0.43%. We consider established individual predictors of fertility behavior: the *Age* (included as both linear and quadratic trend), the *Level of education* (distinguishing those who have neither a vocational diploma nor university degree (*Low*), from those who earned a vocational diploma (*Medium*), or a higher educational certification (*High*)); the *Student* status (*Yes, No*), the *Citizenship* (*German, Migrant*), the *Region* where the respondent lives (*East Germany*, *West Germany*), the *Employment* status (*Full-time, Part-time/Training, Unemployed, Not employed, Other*),[10] the *Individual Labor Earning* (included as log-transformation), and the status of the *Union* (*Not in union*, *In couple – No cohabitation*, *Cohabitation*, *Marriage*). All variables are time-varying. More precisely, most of them are collected on a monthly basis with the exception of C*itizenship*, that is available only at the date of interview and we assume it to be constant up to the next interview, and *Individual Labor Earning*, that represents the annual earnings from job and is thus constant over each year.

At each interview, GSOEP respondents are asked to declare to what extend they are worried about a set of issues ("How concerned are you about the following issues?"). We employ the answer regarding the items "The economy in general" and "Your own economic situation" as proxies of individuals' perceptions of the general and the own economic conditions. The response categories are "Very concerned," "Somehow concerned," and "Not concerned

[10] Note that employment status is self-assessed by the interviewer and is therefore not in line with any formal classification of full-time employment, part-time employment, and so on. Employment information is provided as monthly spells. However, such spells present overlaps. To impute one condition to each respondent at each month we have drawn up an arbitrary ranking according to which a condition prevails over others: Full-time employment, Short-time employment, Part-time employment, Mini job, Retraining, Apprenticeship, Vocational Training, Retired, Registered Unemployment, School, Housewife/Husband, Military, Maternity, Other, Gap. This means that, for example, if a woman is full- time employed and has also a secondary mini-job in the meanwhile, we impute the full-time employment status.

at all." Monthly-varying information on economic perceptions is not available, which is a major limitation for our analysis. To test if economic perceptions channel the news coverage/fertility nexus, we must ensure the temporal order of the hypothesized mechanism, namely the coverage of economic news must refer to a period before the date at which economic perceptions are collected, which, in turn, must be contemporaneous with or precede the fertility outcome. Hence, only for the mediation analysis, we use a different panel of the German sample keeping only individuals' observations at interview (consisting of 58,268 interviews/observations of 10,159 women, **Table 2.3**), so virtually passing from a monthly to a "quasi-annual" perspective (interviews are not always carried out exactly one year apart).

Table 2.3 Descriptive statistics of indicators of perceptions collected at the date of interview, Germany, Jul 2001–Apr 2018.

Variable	Mean/Freq (%)	Monthly Risk of Conception (%)
Worried about the general economy		
Very concerned	26.10	0.36
Somewhat concerned	55.33	0.39
Not concerned at all	14.69	0.49
Missing	3.87	0.58
Worries about the own economic situation		
Very concerned	23.89	0.35
Somewhat concerned	53.49	0.37
Not concerned at all	21.50	0.56
Missing	1.12	0.15
Interviews	58,268	
Individuals	10,159	

2.4 METHODS

Our first aim is verifying if changes in the economic news coverage are correlated with variations in within-individual fertility over time. The time window available for the analysis is relatively short. In this setting, the separate modeling of each parity transition is complicated by the limited number of higher order conceptions. The main empirical analyses thus relies on a panel approach as a suitable design to maximize the number of conceptions considered. We control for the unobserved characteristics of individuals by applying fixed effects.[11] Since the monthly risk of conception varies within ranges where the relationship between log-odds and probabilities is close to linear,[12] we deem the use of Linear Probability Models (LPMs) as a valid alternative to logistic models (von Hippel 2015). Additionally, by applying logistic models with fixed effects, the estimates would only rely on women who had conceived at least one child in the panel's time frame. Such a modelling strategy would lead to a dramatic reduction of the samples' size, especially if the response variable concerns a relatively rare event as conception (Beck 2020). Running logistic models instead of LPMs to our data would drop from 12,251 to 2,425 women living in Italy, and from 11,105 to 2,395 women living in Germany.

The model looks as follows:

$$P(Y_{it} = 1) = \delta + \alpha_i + cC_t + \beta X_{it} + \gamma Z_t + T_t + \varepsilon_{it} \qquad (1)$$

in which i represents the individuals, t the months and ε_{it} the residual errors. The dummy variable Y_{it} is the outcome and indicates the month of conception

[11] The Hausman test leads to reject the hypothesis that errors are correlated with the regressors, thus supporting the choice to include fixed rather than random effects.
[12] The monthly risk ranges from a minimum of 0.24% to a maximum of 0.73% in the Italian panel, and from 0.17% to 0.80% in the German one.

of each child, regardless the birth-order.[13] The main independent variables are measures of the economic news coverage (C_t, whose related coefficients are indicated by c) which will be presented step by step in the empirical sections that follow. The model includes a common intercept δ, individual fixed effects α_i, the linear time trend in months T_t,[14] the micro-level controls X_{it}, the related coefficients β, the macroeconomic indicators Z_t and the related coefficients γ. All variables are presented in the sections 2.1, 2.2 and 2.3.

2.4.1 PARITY-SPECIFIC MODELLING

The panel approach we adopt has the drawback of not distinguishing between conceptions of different parity (Kreyenfeld 2021). To address this limitation, we also conduct a discrete-time event-history analysis on parity-specific fertility. We thus estimate the conditional probability of transition to first and second childbirth by means of discrete-time event-history models including the same controls. We rely on 365,119 monthly observations of childless women in the Italian sample and 360,134 in the German one. The primiparous mothers are 110,310 and 138,356 respectively for Italy and Germany. We follow respondents from their entry in the sample (or from the month after the birth of their first child) up to the conception of the first (or second) child, or until the end of their permanence in the sample. We observe 1,486 first-order conceptions and 1,119 second-order conceptions in the Italian sample, and 1,397 first-order conceptions and 1,167 second-order conceptions in the German sample.

[13] The outcome assumes a value of 0 in the pregnancy months, despite the impossibility of conceiving another child between the month of conception and that of birth. The results from the main models remain virtually unchanged when we run them excluding observations in the pregnancy months.

[14] Controlling for the seasonality of births with monthly fixed effects in addition to the linear time trend does not considerably change our findings.

2.5 MEDIATION ANALYSIS

In the first part of the analysis, we aim to address the economic news coverage/fertility *total association,* so we do not account for individual perceptions of the economy. The second core aim of this thesis is disentangling the *direct association* of the independent variable (in our case, a news coverage indicator) with the *dependent variable* (the probability of conception), and the *indirect association* channeled by the mediator (a measure of individuals' economic perceptions), as presented in **Figure 1.3**. We do not rely on information on perceptions of Italians, while in Germany data are only collected at the date of interview. Thus, we conduct the mediation analysis on a panel of the German sample in which each data point consists of the individuals' observation at the month of interview. The model in equation **(1)** is thus modified with the inclusion of the annual time trend in lieu of the monthly time trend. The response variable does not longer indicate the month of conception of each child. Instead, it is a dummy that assumes value 1 if the respondent conceives a(nother) child in the 6 months after the interview. We assume (and verify) that the news coverage of the economy is not associated with fertility behavior in a more distant future. Finally, we drop out few interviews if they are conducted within 6 months of the next interview and a conception occurred in the meanwhile to avoid counting the same conception twice.

Following Baron and Kenny (1986), a variable is a mediator if the following conditions are satisfied:

i. Variations in the independent variable significantly account for changes in the mediator.

ii. Variations in the mediator significantly account for changes in the dependent variable.

iii. There must be a statistically significant association between the independent and the dependent variable. It reduces when controlling for the mediator.

We run the PLMs reported below to test all three above conditions:

$$P(Y_{it} = 1) = cC_t + Controls + e_{it} \quad (2)$$

$$P(P_{it} = 1) = aC_t + Controls + e_{it} \quad (3)$$

$$P(Y_{it} = 1) = bP_{it} + c'C_t + Controls + e_{it} \quad (4)$$

For the sake of simplicity, the linear combination of all control variables, including the linear time trend, and the fixed effects are referred to as $Controls$. The economic perceptions are now included in the analysis and indicated by the term P_{it}. The probability of conception is still indicated by $P(Y_{it} = 1)$, and the news coverage variables by C_t, while e_{it}-s are the residual errors. The coefficient c in equation **(2)** represents the *total association* of the economic news coverage with the probability of conception. The coefficient a in equation **(3)** indicates the association between economic news coverage and economic perceptions. Finally, the coefficient b in equation **(4)** refers to the association between economic perceptions and fertility, while c' represents the *direct association* between the economic news coverage and the probability of conception. Some scholars noted that the statistical power of this approach is low (McKinnon et al. 2002). Preacher and Hayes (2004) assessed that the third condition is sufficient to verify the presence of mediation. We also use the Sobel-Goodman test (Sobel 1982) to verify the significance of the *indirect association*. According to the test, the coefficient indicating the *indirect association* is quantified as the product of the coefficients *a* and *b* (Alwin and Hauser 1975).

3

Evidence From the Italian News Coverage

3.1 ECONOMIC COVERAGE IN MEDIA NEWS VS. OBJECTIVE ECONOMIC INDICATORS

The first case-study on which we address our research questions is that of Italy. We consider the absolute numbers of negative, positive, and neutral (or unclear) economic news items reported by *TG1* (# *Negative News*, # *Positive News*, and # *Unclear News*) as main independent variables. The results are shown in **Table 3.1**, where all continuous variables are standardized so as to more easily compare the magnitude of their coefficients. Model A includes all controls,[15] except for the indicator of union status. We find that changes in the moving average of negative economic news items are negatively associated with the probability of conception. On the contrary, an increase in the moving average of positive news reports is positively associated with fertility. The number of economic news items with an unclear tone is found to be negatively associated with fertility, despite the estimate being statistically imprecise. This suggests that the volume of economic news items is associated with fertility behavior net of objective economic constraints (*Q1a*). Variations in the news coverage determine reductions or increases in the probability of conception depending on tone. We further note that the association of positive news stories with fertility is stronger than that of negative news stories, which itself is stronger than that of neutral (or unclear) news stories (*Q2*).

[15] The variable concerning the (final) level of education is constant over time and could enter the models only through interactions. When estimating the models without interactions, results are virtually unchanged.

Table 3.1 Linear Probability Models predicting the probability of conception, Italy.

Variable	Coefficient	
	Model A	*Model B*
Constant	0.00394***	−0.00172***
	(0.00023)	(0.00039)
Individual specific controls		
Age	0.01696***	0.00988**
	(0.00413)	(0.00411)
Age^2	−0.01616***	−0.00901***
	(0.00312)	(0.00310)
Employment (ref: Not employed)		
Permanent employed	0.00165***	0.00208***
	(0.00047)	(0.00047)
Temporary employed	0.00130***	0.00188***
	(0.00044)	(0.00044)
Self employed	0.00224***	0.00210***
	(0.00083)	(0.00080)
Student	−0.00020	−0.00013
	(0.00043)	(0.00041)
Level of education × Age (ref: Lower secondary or less)		
Upper secondary	0.00280	0.00638*
	(0.00380)	(0.00374)
Tertiary education	0.00116	0.00637
	(0.00403)	(0.00394)
Level of education × Age^2 (ref: Lower secondary or less)		
Upper secondary	−0.00161	−0.00522
	(0.00343)	(0.00340)
Tertiary education	0.00211	−0.00388
	(0.00380)	(0.00373)
Union (ref: Not in coresidential union)		
Cohabitation		0.00698***

		(0.00069)
Marriage		0.01176*** (0.00071)
Macroeconomic controls		
Female Unemployment Rate	−0.00088*** (0.00024)	−0.00048** (0.00024)
GDP per capita	0.00019* (0.00011)	0.00022** (0.00011)
Inflation Rate	0.00110 (0.00075)	0.00096 (0.00075)
Time trend control		
Month	−0.00182* (0.00104)	−0.00243** (0.00103)
News coverage of the economy		
# Negative News	−0.00023** (0.00010)	−0.00025*** (0.00010)
# Positive News	0.00039** (0.00018)	0.00040** (0.00018)
# Unclear News	−0.00016 (0.00012)	−0.00017 (0.00012)
Observations	644,038	
Individuals	12,521	

Notes: Robust standard errors are in parenthesis. Estimates refer to standardized variables.

**p<.10; **p<.05; ***p<.01*

Union status is a crucial predictor of fertility, especially in Italy where in 2015 more than 70% of births occurred within marriages (Pirani et al. 2021) and the decision to marry typically anticipates childbearing. Both events are usually accelerated or postponed according to common socio-economic antecedents (e.g., the level of education, the employment situation, and so on). Therefore, albeit being beyond the scopes of this PhD thesis, we wonder whether the association between economic news coverage and conceptions passes (at least in part) through changes in union status. We would suspect that union status

mediates our main association if, for example, the negative association between negative items and fertility passed through a lower probability of union formation associated with an increasing number of negative economic news items. In Model B, we add a control for *Union*. The coefficients associated to the numbers of economic news items remain quite unchanged from Model A. To provide more rigorous evidence on this (lack of) mediation by partnerships, we apply the Sobel-Goodman test (Sobel 1982) on the indirect association between news coverage and fertility. We find that the news coverage of the economy is not significantly associated with the probability of marrying or cohabiting, that are, instead, strongly associated with the probability of conception. The indirect association of the news coverage with fertility, passing through union status, is therefore null.

The associations between economic news and fertility are substantially relevant and statistically significant net of the macroeconomic indicators. Increases in the *Female Unemployment Rate* are associated with decreasing fertility, while rises in the *GDP per capita* are positively correlated with the probability of conceiving a child. The *Inflation Rate* is not significantly associated with fertility. Interestingly, the size of coefficients associated to the macroeconomic controls and economic coverage in television news are of similar magnitude. **Figure 3.1** (based on Model B in **Table 3.1**) shows a comparison between the variations in the monthly probability of conception induced, *ceteris paribus*, by comparable changes in the moving averages of the number of economic news items and macroeconomic indicators. A one-standard-deviation increase in the number of positive items (+5) is associated with an increase of 9.95% in the monthly probability of conception, compared to the mean risk observed in the sample (0.46%), whereas the same increase in negative items (+5) is connected to a decrease of 5.97%. Our estimates imply that we would have observed 10% more births in, for example, March 2014, if *TG1* had reported an average of 5 more positive news items in each month between June 2012 and May 2013 (i.e., the year before the related conceptions of June 2013). Likewise, 6% fewer births

would have been observed in the case of a comparable increase in the number of negative items. A one-standard-deviation increase in the *Female Unemployment Rate* (+10 percentage points) reduces the probability of conception by 10.78%, which is to say almost double the variation due to a comparable increase of negative news items. The same increase in the quarterly *GDP* per capita (+105€) is associated with almost half of the variation induced by a comparable increase in positive news items (+4.66%).

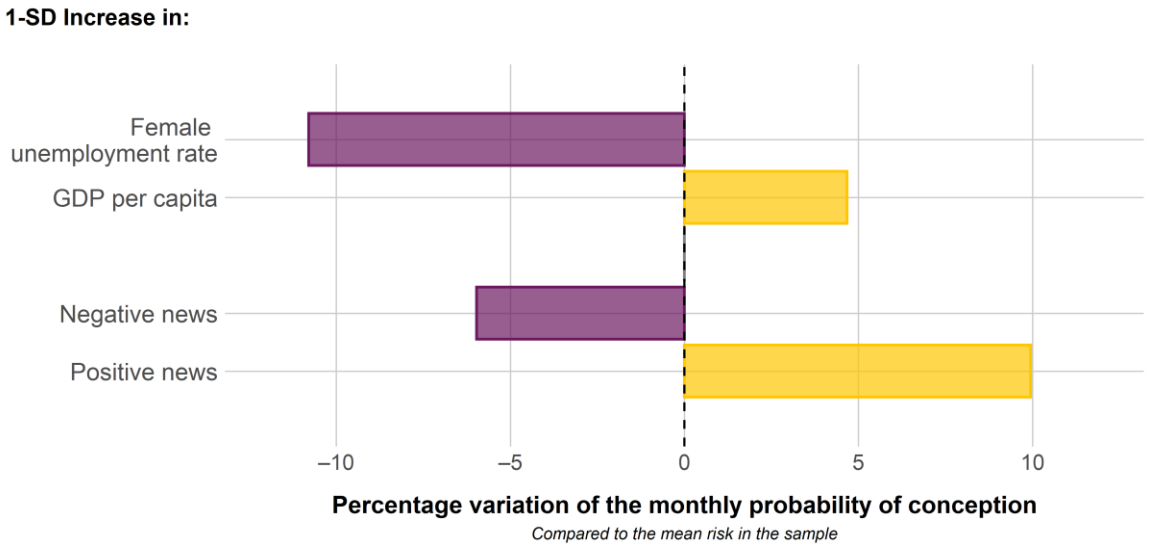

Figure 3.1 Percentage variation of the monthly probability of conception associated with comparable changes in the news coverage of the economy and macroeconomic variables, Italy.

Note: Estimates from Model B (**Table 3.1**).

Additionally, although we report results for the news coverage in the previous 12 months, we also test the average of the monthly number of economic news items reported in different preceding intervals, from 1 to 24 months earlier. The results suggest that the average coverage in very short and very long periods is not significantly associated with fertility, while the coverage in previous periods closer to 12 months is more relevant (**Figure A2** in the Appendix).

3.2 PARITY-SPECIFIC ANALYSIS

We empirically test also for the possibility of parity-specific reactions to the *TG1*'s coverage of the economy in Italy by conducting separate discrete-time event-history analyses for the transitions to first and second child (**Table 3.2**).

Table 3.2 Average Marginal Effects of news coverage variables on the transitions to first and second child from discrete-time logit models, Italy.

Variable	*First-Order Births*	*Second-Order Births*
	Coefficient	
# Negative News	−0.00005**	−0.00010
	(0.00003)	(0.00008)
# Positive News	0.00009*	0.00021
	(0.00005)	(0.00015)
# Unclear News	−0.00004*	0.00004
	(0.00002)	(0.00006)
Observations	365,119	110,310
Individuals	7,342	3,521
Conceptions events	1,486	1,119

Notes: Robust standard errors are in parenthesis. Estimates refer to standardized variables. Models include all controls listed in **Table 3.1** (Model B).

**p<.10; **p<.05*

Regarding childless women, we find that changes in the average number of negative, positive, and neutral (or unclear) economic news features reported over the previous 12 months are significantly associated with the probability of conceiving a first child (**Table 3.2**, first column). One more positive news item leads to an increase of approximately 2.23% in the monthly probability of first conception (with respect to a mean risk of conception of 0.41%). However, an additional negative news story results in a reduction of roughly 1.35% in the probability of conception. The average marginal effects of news coverage

variables estimated on the primiparous mothers' subsample (**Table 3.2**, second column) are close to (or larger than) those estimated for childless women—although it must be noted that their statistical precision is lower. Generally speaking, it is likely that media news coverage of the economy is also associated with higher-order conceptions, although the uncertainty surrounding our estimates prevents any firm conclusions in this regard.

3.3 THE "RELATIVE" COVERAGE AND TONE OF ECONOMIC NEWS

The public's attention may be diverted from the economy to other prominent topics if these are given greater coverage in the news schedule. For this reason, a *relative* indicator may be more appropriate for addressing the economic coverage's association with fertility. Similarly, a unique measure that jointly considers both positive and negative news items reported at the same time may more accurately capture the news tone/fertility nexus. Finally, the relationship between the news coverage of the economy and fertility may change according to their composition by tone, as well as that between the news tone and fertility may change according to the level of coverage. To address these considerations, we account for the coverage reserved for other topics in the same period, for the balance between positive and negative economic news items, as well as the interaction between them, considering our two relative measures of news coverage: the *Percentage* of economic features out of all news items (centered around its mean of 3.3%), and the percentage of positive news stories over positive and negative economic news stories (Pos / pos + neg).

Findings, reported in **Table A2** of the Appendix, show that the "relative coverage" of the economy is negatively associated with fertility (regardless of its tone), whereas an increase in the "relative positive tone" of economic news items is positively correlated with it (regardless of the incidence of economic news

items). These results confirm our previous findings that the tone of news reports on the state of the economy is associated with fertility behavior and add the role of the *Percentage*. Moreover, the interaction term between the relative news coverage and the relative news tone is positively associated with fertility. To more precisely interpret the model's findings, the results are graphically shown in **Figure 3.2**, which reports the predicted probability of conception at different levels of *Percentage* and *Pos / pos + neg* corresponding approximately to the 10th, 50th, and 90th percentiles of their distributions. The negative association between the relative coverage of the economy and the probability of conception remains until news items are mostly negative (*Pos / pos + neg*<=50%), but it can be mitigated by an improvement in tone. When positive news features outnumber negative ones, an increase in the *Percentage* of economic news is positively associated with fertility. The positive association between fertility and the relative positive tone of news items is stronger as the *Percentage* of economic coverage grows. When this percentage exceeds its mean by 1.5 percentage points (i.e., when it stands at approximately 4.8%), passing from a *Pos / pos + neg* of 20% to 70%, the predicted probability of conception varies from approximately 0.37% to 0.51%, which correspond to −20.72% and +10.72% variations compared to the sample average (0.46%, dotted line in **Figure 3.2**). We must note that using *Pos / pos + neg* as a continuous variable forces the relationship between the average tone and the probability of conception to be linear. Therefore, we replicate the analysis splitting it into three classes (*Pos / pos + neg* <35%="Extremely negative coverage," *Pos / pos + neg* <50%="Slightly negative coverage," *Pos / pos + neg* >=50%="Positive coverage") in accordance with the 30th and 60th percentiles of its distribution. The results are highly similar (**Figure A3** in the Appendix).

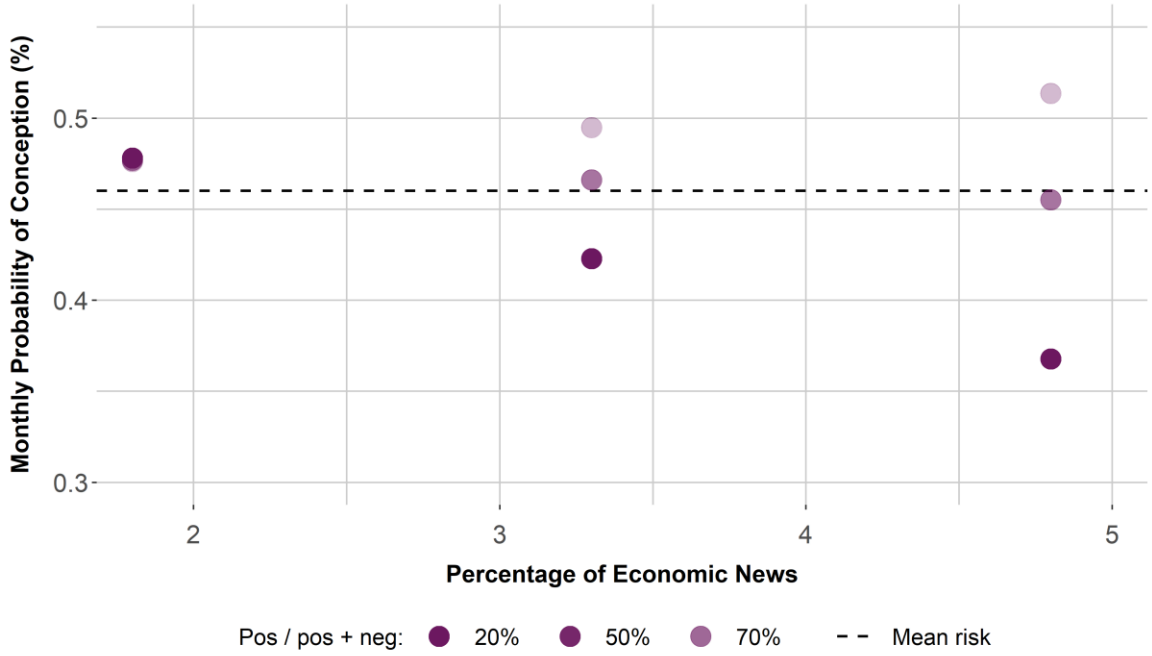

Figure 3.2 Predicted probability of conception at different levels of the *Percentage* of economic news items and *Pos / pos + neg* (the percentage of positive news items among positive and negative economic news items), Italy.

Coherently with what outlined above, the numbers of economic news items are especially correlated with fertility during months in which the economy is frequently reported on. It emerges from an additional analysis we conduct by augmenting Model B (**Table 3.1**) with interactions between the absolute numbers of economic news items and dummies identifying specific subperiods characterized by different levels of economic news coverage (**Figure 3.3**). Precisely, we split the period of major fluctuations in the time series of economic news coverage (between January 2007 and July 2013) into *Ups* and *Downs* subperiods (according to whether the monthly number of news items reported in the preceding 12 months is above or below the period average of 40 items). We identify the following *Sharp Decline* from August 2013 to September 2014 (when a series of relatively relevant consecutive reductions in the economy's news coverage occurs), and the final months of (almost constant) *Low coverage* (October 2014–August 2015). The results (**Table 3.3**) suggest that the number

of economic news items is significantly correlated with fertility only during periods of high coverage (the *Ups*).

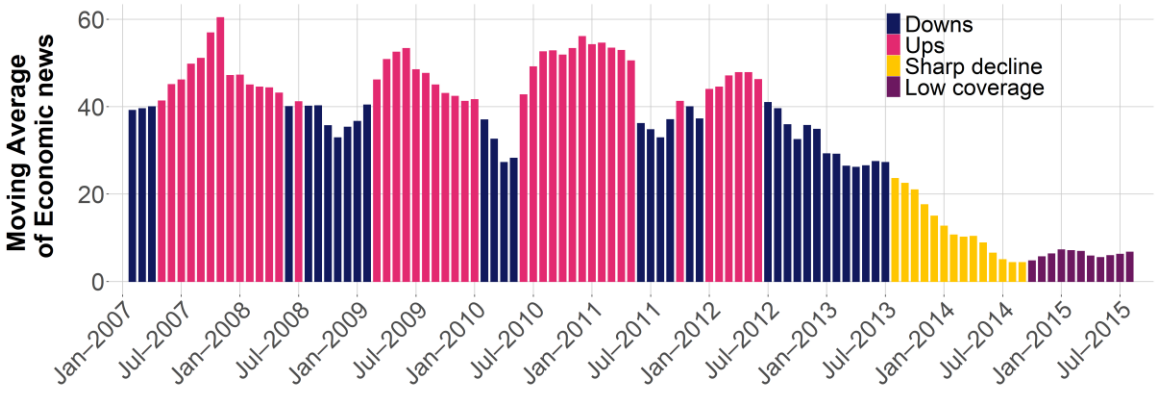

Figure 3.3 Moving averages of the monthly number of economic news reported by the Italian *TG1* during the previous 12 months split in subperiods, Jan 2007–Aug 2015.

Table 3.3 Linear Probability Model predicting the probability of conception by including interactions between subperiod dummies and news coverage variables, Italy.

Variable	Coefficient			
	Downs	*Ups*	*Sharp decline*	*Low coverage*
# Negative News	0.00025	−0.00035**	−0.00343	0.00208
	(0.00031)	(0.00014)	(0.00433)	(0.00438)
# Positive News	−0.00012	0.00038**	0.00357	−0.00208
	(0.00049)	(0.00019)	(0.00460)	(0.00477)
Person-months	644,038			
Individuals	12,521			

Notes: Robust standard errors are in parenthesis. Estimates refer to standardized variables. The model includes all controls listed in **Table 3.1** (Model B).

***p<.05*

However, the statistical precision can be burdened by the small sample size on which are based the estimates of other interactions. This can cause greater

uncertainty around the estimates, also if the coefficients are large. Being aware that such interactions can capture the associations of period rather than of the level of coverage, we check that the pattern of results remains by augmenting the models with yearly and monthly fixed effects.

4

Findings From (Multi-)Media News Coverage in Germany

4.1 THE INCIDENCE OF NEWS BY TOPIC IN DIFFERENT MEDIA

The second empirical chapter of this thesis focuses on the case of Germany. In this section, we first investigate the association of the news coverage of the economy with fertility and compare it with that of the news coverage on companies and social policy. According to results PCA (**Figure 2.2**), we can identify three separate clusters of variables highly correlated within them: that on the coverage of the economy, that on the coverage of company, and that on the coverage of social policy. We conclude that each topic coverage is aligned between the media groups. We thus derive the *Percentage* of each topic out of all news in all media. We separately include them in model (1) as news coverage variable (C_t). As shown in **Figure 4.1**, the largest and statistically significant variation in the monthly probability of conception (compared to the mean risk observed in the sample–0.43%) is due to one-standard-deviation increase in the economy's coverage, which emerges to be detrimental for fertility (*Q1a*) net of all controls (the full model is reported in tabular form in **Table A3** of the Appendix). On the contrary, a greater coverage of companies and social policy has a positive association with fertility, but they are not statistically significant.

Henceforward, we focus exclusively on economy's news items excluding those on companies and social policy. As per *Q1b*, we wonder which media group (weekly magazines, television programs, or the tabloid) has a major impact. We run the model in equation **(1)** by separately including the economic incidence (*Percentage*) in weekly magazines, television, and the tabloid. Results (**Figure 4.2**) reveal that an increase in the incidence of economic news reported by weekly magazines leads to the largest reduction in the monthly probability of conception (of 7.06% compared to the mean risk observed in the sample that is 0.43%). This answers the research question *Q1b*. The television economic coverage, although

with lower magnitude, is statistically significant in association with the probability of conception. A one-standard-deviation increase in the television incidence of economic news determines a relative variation of the monthly probability of conception of −5.06%. The average age of *ARD Tagesschau* viewers was 64 in 2019, that is definitely above the reproductive age.[16] It could be the reason why we find a lower association of television news coverage with fertility. Indeed, weeklies reach an audience whose age composition is fairly aligned with that of the general population over the time span (Allensbach 2005, 2010, 2015, 2018). A comparable change in the *BILD*'s (tabloid) incidence of economic news is not associated with fertility. In light of this, hereafter we focus exclusively on news reported by weeklies. Finally, all findings presented about Germany refer to the news coverage in the previous semester. Such associations reduce for periods that are shorter or longer than six months (**Figure 4.3**).

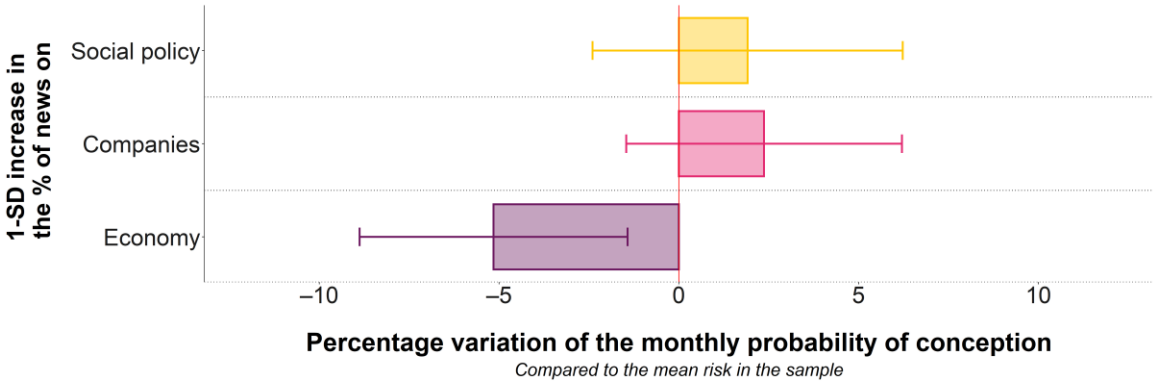

Figure 4.1 Percentage variation of the monthly probability of conception, compared to the mean risk observed in the sample, due to one-standard-deviation increase in the (semestral) *Percentage* of news on economy, company, and social policy in various German media.

Note: standard deviations are equal to 0.58 percentage points for the incidence of news on social policy, 1.21 for that on companies and 3.24 for that on economy.

[16] As reported in "An insight into the social media strategy of the "Tagesschau" by Petra Schwegler (https://blog.medientage.de/) available here.

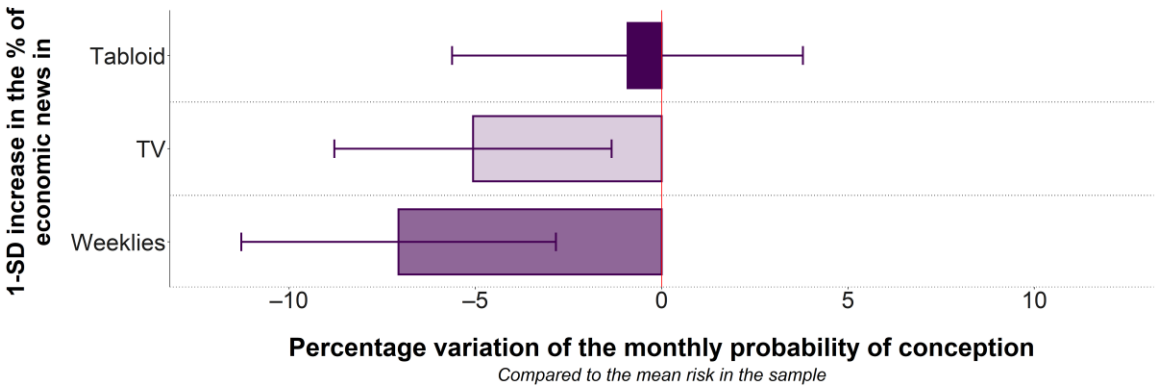

Figure 4.2 Percentage variation of the monthly probability of conception, compared to the mean risk observed in the sample, due to one-standard-deviation increase in the (semestral) *Percentage* of news on economy in German weeklies, television and the tabloid.

Note: standard deviations are equal to 0.98 percentage points for the incidence of economic news in the tabloid, 3.87 for that in television and 2.76 for that in weeklies.

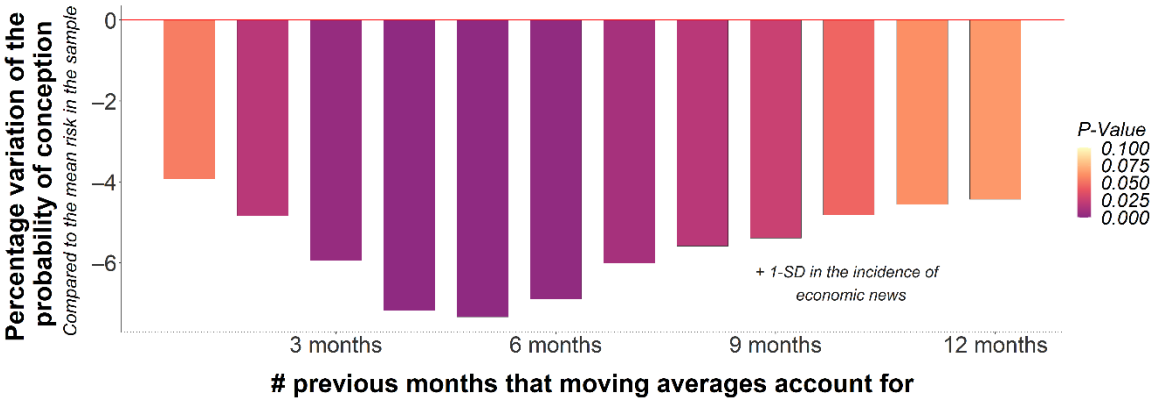

Figure 4.3 Percentage variation of the monthly probability of conception, compared to the mean risk observed in the sample, due to comparable changes in the news coverage of the economy in German weeklies over preceding periods.

Notes: The analysis is carried out on a panel which starts in January 2002 (first month for which we can calculate the average amount of news in the preceding 12 months) to ensure comparability between findings.

4.2 PARITY-SPECIFIC ANALYSIS

We further address the conditional probability of transition to first and second childbirth by means of discrete-time event-history models (**Table 4.1**). Findings reveal that changes in the incidence of economic news are not associated with the likelihood of becoming mothers. The coverage of economic news is, instead, statistically significant, and substantially relevant in association with the monthly probability of a second-order conception.

Table 4.1 Average Marginal Effects of news coverage on the transitions to first and second child from discrete-time logit models, Germany.

Variable	*First-Order Births*	*Second-Order Births*
Percentage	−0.00018 (0.00013)	−0.00064* (0.00033)
Observations	360,134	138,356
Individuals	6,516	3,438
Conceptions events	1,397	1,167

Notes: Flag for missing information included. Robust standard errors are in parenthesis. Estimates refer to standardized variables. Models include all controls.

**p<.10*

A one-standard-deviation increase in the incidence of economic news determines a reduction of 7.46% in the monthly probability of conceiving the first child (compared to the sample mean risk of 0.84%). In Italy, the association of economic news coverage with first-order fertility is statistically significant but not with second-order fertility. However, assuming the mediation role of economic perceptions behind this relationship (**Figure 1.3**), these findings are in line with the heterogeneity in the economic perceptions/fertility nexus documented for Germany: no associations emerged between economic worries

and first-order fertility, whereas they were found when considering second-order births (Kreyenfeld 2015). Moreover, we note that according to the AWA[17] survey on *Bild am Sonntag*, *Der Spiegel*, and *Focus* (Allensbach 2005, 2010, 2015, 2018), the readership of these magazines is composed by a larger quote of individuals living in households with children than the general population. It is therefore likely that women with one child are more exposed to weeklies' news coverage compared to childless women.

4.3 THE TONE OF ECONOMIC NEWS

Once assessed the relationship between the incidence of economic news and fertility, we delve into the role of the news tone by testing the number of positive and negative news reported on average in the previous semester net of all control variables. Results, reported in tabular form in the Appendix (**Table A4**), reveal that one-standard-deviation increase in the number of negative news (around 18 items) leads to a reduction in the monthly probability of conception of 7.44% (compared to the mean risk observed in the sample that is 0.43%). *Inter alia*, the size of this variation is similar to those estimated for Italian fertility in the case of comparable changes in the economic news coverage. Instead, a comparable increase in the number of positive news reported by German weeklies (around 3 items) is not significantly correlated with fertility. In Germany, not only the associations of positive and negative items have opposite directions, but also a worsening in the tone of the economic news coverage matters more than its improvement for fertility behavior (*Q2*). We exclude the variable # *Unclear news* from the analysis after verifying that it is (negatively) associated with individual fertility but this association is statistically significant only if such a measure is solely included in the model. However, the relative variation in the probability of

[17] Acronym for "Allensbacher Markt– Und Werbeträgeranalyse" (market and advertising medium analysis of Allensbach).

conception induced by an increase in the number of unclear items appears to be almost as large as that estimated for the number of negative items.

We run a fine-grained analysis including in model (1) the average number of economic news reported by weeklies in various preceding periods (from 1 to 12 months before the fertility outcome). The following analysis is carried out excluding months before January 2002 (first month for which we can calculate the average amount of news in the preceding 12 months) to ensure comparability between findings. Here we rely on 708,654 monthly-observations of 11,057 women. **Figure 4.4** shows the percentage variations in the probability of conception (compared to the mean risk observed in the sample that is 0.43%) due to one-standard-deviation increase in the average number of economic items (positive ones at the top and negative ones at the bottom) reported in different previous period. We observe stronger and statistically significant associations of negative items reported in the medium span (between 3 and 6 months before), but they fade away over time. Also, such associations do not emerge in the very short run. Hence, the pattern of results is rather bell-shaped. We can conclude that in Germany the negative tone of economic news has a less enduring impact on fertility than in Italy, where we find the most important associations when considering the news coverage of at least 9 months before the fertility outcome (**Figure A2** in the Appendix). Regarding positive items, the distribution of relative variations in the probability of conceptions has a longer right tail: the only significant association is that of the economic news coverage in the 2 months before the conception. In line with this, the positive effect of improvements in the coverage of the economy on economic perceptions has been proved to disappear fast over time in Germany (Tausch and Zumbuehl 2016).

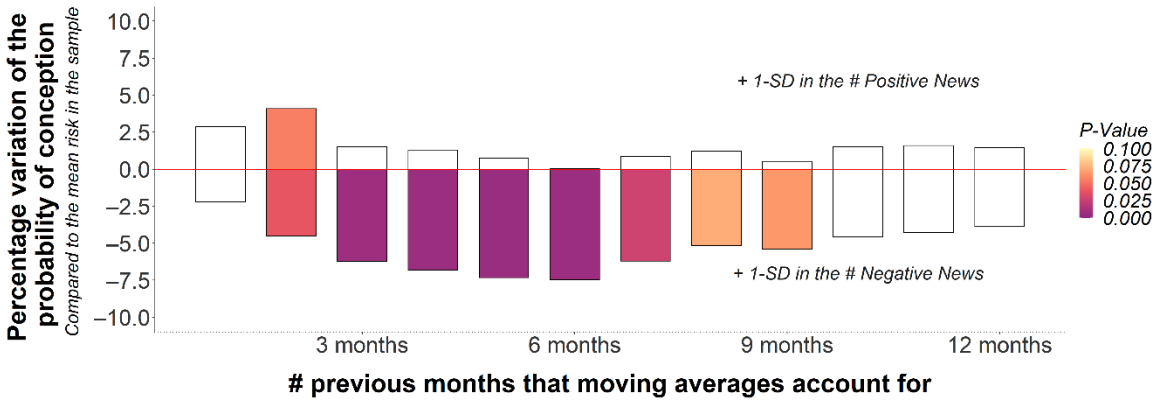

Figure 4.4 Percentage variation of the monthly probability of conception, compared to the mean risk observed in the sample, due to comparable changes in the news coverage of the economy by tone in German weeklies over preceding periods.

Note: columns in white refer to not statistically significant associations (p-value>0.10).

5

Underlying Mechanisms in the Economic News/Fertility Nexus

5.1 THE ROLE OF ECONOMIC PERCEPTIONS

In the third empirical part of this PhD thesis, we provide a more comprehensive perspective on the addressed relationship by investigating its potential underlying mechanisms of mediation and moderation. The first and major aim is disentangling the *direct association* between economic news coverage and the individual probability of conception, and their *indirect association* which we suppose is channeled by individual economic perceptions. There would be mediation if, for example, the negative association between the number of negative economic items and fertility passed through a worsening of economic perceptions associated with an increasing number of negative economic news items. Data limitations prevent us from performing the mediation analysis on the Italian case because economic perceptions are not collected in FSS. Whereas for Germany, we switch from a monthly to a "quasi-annual" panel in which data points consist of observations at the month of interview. This pattern of associations is highly likely to be interested by the presence of common confounders—i.e., the macro-economic trends. The state of the economy may influence the economic news coverage, the individuals' perceptions of the economy, and the fertility behavior, thus determining endogeneity problems. Germany is particularly well-suited for this analysis due to its economic stability. This may be useful to minimizing the confounding effect exerted by fluctuations in the state of the economy. We test the conditions by Baron and Kenny (1986) to verify the presence of potential mediation. We firstly run model in equation **(3)** (section 2.5) in four separated specifications—i.e., by combining two indicators of economic news coverage with the two measures of economic perceptions (**Table 5.1**).

Table 5.1 Linear Probability Models predicting the probability of being very worried about economy, Germany.

News coverage variable	*Probability of being very worried about the general economy*	*Probability of being very worried about the own economic situation*
	Coefficient	
Percentage	0.04760***	0.01757***
	(0.00223)	(0.00220)
# Negative News	0.06893***	0.00985***
	(0.00274)	(0.00251)
Observations	58,268	
Individuals	10,159	

Note: Flag for missing information included. Robust standard errors are in parenthesis. Models include all controls.

****p<.01*

Results suggest that increases in the percentage of economic news and in the number of negative economic news are positively associated with the probability of being very worried about the general economy, and, to a lesser extent, about the own economic situation thus meeting the first condition (*Variations in the independent variable significantly account for changes in the mediator*). Precisely, one-standard-deviation increase in the *Percentage* of economic news results in a one-quarter increase in the probability of being very concerned about the general economy, and a one-fifth increase in that of being very concerned about the own economic situation (compared to the mean risks in the sample). A comparable increase in the number of negative news leads to a slightly larger increase in the probability of being very worried about the general economy, while the associated variation in the probability of being very worried about the own economic situation is less than +5%.

Second, we run the model in equation **(2)** and that in equation **(4)** (section 2.5) in three different configurations (Models (2), (4)/1, (4)/2, (4)/3). **Table 5.2** reports the estimates from models including the incidence of economic news out of all news as the main independent variable. Findings from Model (2) document that the *total* economic news/fertility association is statistically significant also in the quasi-annual panel. Precisely, we find that one-standard-deviation increase in the incidence of economic news leads to a 11.37% relative reduction in the probability of conception in the next semester. Moreover, we verify that the indicators of economic perceptions are significantly correlated with individual fertility. Being very concerned about the general economy and somewhat concerned about the own economic situation are associated with a lower probability of conception compared to not being concerned at all (Model (4)/1, (4)/2, and (4)/3 in **Table 5.2**). The second condition for mediation (*Variations in the mediator significantly account for changes in the dependent variable*) is thus satisfied. Then, we test if and to what extent the association of the economic news coverage with fertility is reduced net of economic perceptions. The coefficient associated to the incidence of economic news is reduced when controlling for the individual perceptions of the general economy (Model (4)/1), while the individual perceptions on the own economic situation seem to not mediate the economic news/fertility nexus (Model (4)/2). In Model (4)/3, in which we include both indicators of economic perceptions, the association between the incidence of economic news and fertility is reduced by 6.77% compared to Model (2). Considering the numbers of economic news by tone in lieu of the incidence of economic news, findings are similar (**Table 5.3**). The inclusion of individual perceptions leads to a reduction of 12.72% in the coefficient associated to the number of negative news (passing from Model (2) to Model (4)/3), as well as to a lower statistical significance. Also in this case, the reduction is mainly driven by perceptions of the general economy rather than those of the own economic situation (Model (4)/1 vs. Model (4)/2). It makes totally sense since economic

news items precisely report the narrative of the general economy. The last condition (*There must be a statistically significant association between the independent and the dependent variable. It shrinks when controlling for the mediator*) is satisfied.

Table 5.2 Linear Probability Models predicting the probability of conception on the "quasi-annual" panel, Germany.

Variable	Coefficient			
	Model (2)	*Model (4)/1*	*Model (4)/2*	*Model (4)/3*
Worries about the general economy (Ref: Not concerned at all)				
Very concerned		−0.00551*		−0.00529**
		(0.00304)		(0.00314)
Somewhat concerned		−0.00288		−0.00226
		(0.00245)		(0.00248)
Worries about the own economic situation (Ref: Not concerned at all)				
Very concerned			−0.00249	−0.00101
			(0.00286)	(0.00295)
Somewhat concerned			−0.00563**	−0.00497**
			(0.00230)	(0.00233)
News coverage of the economy				
Percentage	−0.00275***	−0.00258***	−0.00272***	−0.00256***
	(0.00087)	(0.00087)	(0.00087)	(0.00087)
Observations	58,268			
Individuals	10,159			

Note: Flag for missing information included. Robust standard errors are in parenthesis. Models include all controls. **p<.10; **p<.05; ***p<.01*

Table 5.3 Linear Probability Models predicting the probability of conception on the "quasi-annual" panel, Germany.

Variable	Coefficient			
	Model (2)	*Model (4)/1*	*Model (4)/2*	*Model (4)/3*
Worries about the general economy (Ref: Not concerned at all)				
Very concerned		−0.00591* (0.00305)		−0.00563* (0.00315)
Somewhat concerned		−0.00318 (0.00244)		−0.00255 (0.00248)
Worries about the own economic situation (Ref: Not concerned at all)				
Very concerned			−0.00276 (0.00286)	−0.00120 (0.00296)
Somewhat concerned			−0.00576** (0.00230)	−0.00505** (0.00233)
News coverage of the economy				
# Negative News	−0.00212** (0.00103)	−0.00188* (0.00104)	−0.00208** (0.00103)	−0.00185* (0.00104)
Observations		58,268		
Individuals		10,159		

Note: Flag for missing information included. Robust standard errors are in parenthesis. Models include all controls and the news coverage variable # *Positive News. *p<.10; **p<.05*

To test the statistically significance of this partial mediation, the Sobel-Goodman test (Baron and Kenny 1986) is applied. One of the drawbacks of this test is that it allows to explore only continuous or binary variables as mediators. Therefore, we perform this analysis after recoding the categorical indicator of perceptions as a dummy distinguishing when a woman is very concerned from when she is somewhat or not concerned, or the value is missing. Given the findings shown above, we run the test focusing solely on the mediating role of the general economy's perceptions, while controlling for perceptions on the own

economic situation. The indirect association of the incidence of economic news with the probability of conception is statistically significant albeit weakly. We test the significance of the indirect associations also by performing the Aroian (1947) and the Goodman (1960) test. All in all, individual economic perceptions, operationalized as worries about the general economy, explain a small albeit not negligible part of the observed relationships between economic news and individual fertility (*Q3*).

To conclude the investigation of the role of economic perceptions, we address their moderation mechanism by augmenting Model (4)/3 (**Table 5.2** and **Table 5.3**) with interactions between news coverage variables and the two indicators of economic perceptions (considered one at a time). Findings suggest that women who are not concerned about *their own economic situation* are the most responsive to increases in the incidence of economic news items and in the number of those with negative tone. However, we also find that fertility is more inhibited by changes in the news coverage of the economy when women are somewhat concerned about *the general economy* rather than very or not concerned at all.

5.2 GROUP-SPECIFIC REACTIONS

In view of role of economic perceptions, and the documented heterogeneity in the association between economic perceptions and fertility (Hofmann and Hohmeyer 2013; Kreyenfeld 2010, 2015), we wonder if the latter is reflected in the news coverage/fertility nexus. The moderation mechanisms is investigated by augmenting our base model in equation **(1)** (section 2.4) with a set of interactions between the news coverage indicators and the socio-demographic controls.

In the case of Italy, the results indicate that the associations shown in **Table 3.1** are almost exclusively driven by women aged 25–34, the age group in which (first) childbirths are mostly concentrated. Regarding education, news coverage/fertility associations are statistically significant only for women with upper-secondary education, a group which constitutes almost half of our sample. The low statistical precision of the estimated associations for women with lower-secondary and tertiary education may be due to the smaller sample size of these subgroups. Also, the negative association between the number of negative economic news and fertility is stronger among cohabiting women than among married women. Non-union fertility is also negatively associated with a worsening in the news coverage. This may be explained considering that selection into cohabitation among women in Italy is driven by economic uncertainty (Vignoli et al. 2016). A similar pattern of associations also emerges for positive news. We detect no heterogeneity in the associations between news coverage variables and fertility by employment status, and no substantial differences by gender. Indeed, we replicate our analyses on a panel of 12,348 male respondents included in the FSS surveys (2,619 conception events out of 633,394 observations). The pattern of results (**Table A5** in the Appendix) is highly similar to that estimated for the female sample (**Table 3.1**).

In the case of Germany, women in the age class 25–34, whereby (first) childbirths are concentrated, are more responsive to changes in the economic news coverage (as in the case of Italy). Our results indicate that the association between a worsening of the news coverage and fertility is driven by high-earning and high-educated women. First, we may advance that this is because such segments of population are more vulnerable to deteriorating economic conditions and are more responsive when the media report negative facts that may suggest it—e.g., those who earn more are in a good financial position and may thus have more to lose (Hofmann and Hohmeyer 2013). Second, people with medium-high level of education and high income are relatively more among

readers of *Der Spiegel* and *Focus* than in the general population (Allensbach 2005, 2010, 2015, 2018). This supports the argument that media effects are stronger among the exposed population (Wanta and Hu 1994). Finally, starting from the consideration that all actors aim to reduce uncertainty in its own life, each individual adopts different strategies to do so (Friedman et al. 1994). While pursuing their career is the strategy more often preferred by high educated individuals, those with low levels of education may decide to enter parenthood to reduce uncertainty about their future. This may be a reason why negative reactions to negative news are weaker among low educated women both in Italy and Germany. Coherently with the heterogeneity by education and income, women with a full-time job are those among whom we find the strongest reaction to increases in the negative economic coverage. In line with what emerged for Italy, women in cohabitation or LAT (Living Apart Together) are the most inhibited in their fertility by an increase in the number of negative news. However, we must note that non-marital fertility in Germany is more widespread than in Italy (Dorbritz 2008; Konietzka and Kreyenfeld 2002). We find also geographical heterogeneity: the fertility of women living in West Germany is more inhibited by more negative economic news than that of women living in the East. Beyond the differences in fertility of Eastern and Western German women, the former GDR still suffers from an economic deficit. Residents are also more responsive to changes in the news coverage compared to foreigners, perhaps because among residents the quote of German speakers is higher, and their access to media content is facilitated. Finally, we note that the economic news coverage/fertility associations remain also by excluding direct immigrants.

In terms of media comparison, the percentage of economic news in television programs, contrary to that in weeklies, has a stronger association with fertility of married and part-time employed women. Interestingly, we find that low earning women, who are unresponsive to changes in the news coverage in weekly magazines, have a lower probability of conception when the television incidence

of economic news increases. We attempt to explain these differences between the two media groups by virtue of differences in their target audience. The audience of television programs is likely to be composed by low and middle socio-economic classes, while in-depth weeklies such as *Der Spiegel* and *Focus* have more readers belonging to high socio-economic classes as noted above. However, we are speculating on the possible reasons behind the heterogeneity found among media sources without giving any certain interpretation.

We may conclude that the economic news coverage/fertility nexus considerably changes among population's segments (*Q4*) and type of media (and relative audience's characteristics). It interests mostly young adult women and medium to high educated ones. Also, out-of-marriage conceptions are those more associated to changes in the news coverage of the economy.

5.3 ADDITIONAL ANALYSIS AND ROBUSTNESS CHECKS

Here we present further analyses conducted to provide a more in-depth understanding on the key findings discussed in this PhD thesis and/or to test their robustness. All results are based on model in equation **(1)** (section 2.4) augmented with additional macro-level variables or modified from a methodological point of view.

We first consider that the effects of the economy's news coverage may reasonably change according to objective economic developments. The potential moderating role of macroeconomic controls is thus tested by interacting news coverage variables with the macroeconomic indicators. For Italy, on the one hand, the interactions between the GDP per capita and the amounts of economic news splitted by tone are not statistically significant. On the other hand, the relationship between economic news and fertility weakens when the *Female Unemployment Rate* increases in the meanwhile (**Table A6** in the Appendix). Given

the sharp increase of the unemployment rate and the heavy decrease in the economic news coverage after 2012, we check the results also by excluding the period 2013–2015. For Germany, no evidence emerges on a potential moderating role of macroeconomic indicators.

Second, we have already verified that the association of economic news coverage with fertility behavior partially passes through variations in individual economic perceptions. However, the perceptions of individuals may be reflected in their economic behaviors (e.g., their consumption habits), thus affecting the economy itself. Hence, news coverage can also affect fertility indirectly, passing by changes in the state of the economy. Empirically speaking, if so, the coefficients associated to news coverage variables would reduce in size and lose significance after controlling for macroeconomic factors. Our findings reveal that this is not the case. We conduct a stepwise approach by adding macroeconomic controls one at a time to the Base Model (model in equation **(1)** without *GDP* and *Female Unemployment Rate*). The confidence intervals of the coefficients associated with the number of negative (**Figure 5.1**) and positive news items (**Figure 5.2**) for Italy, and the percentage of economic news (**Figure 5.3**) for Germany, almost completely overlap and their statistical significance is not reduced by including macroeconomic controls.

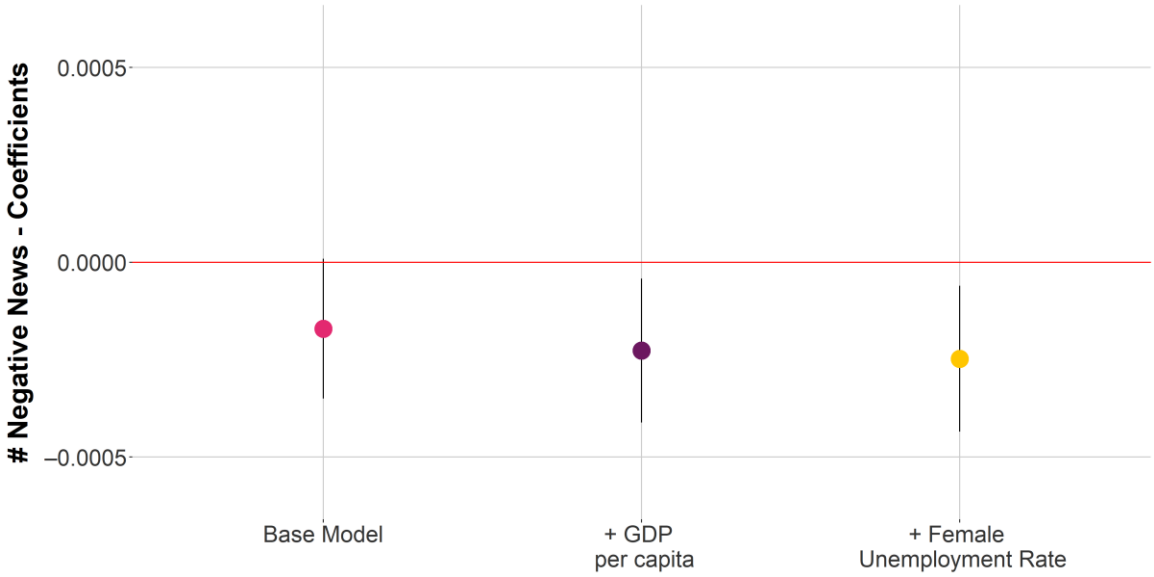

Figure 5.1 Confidence intervals of the number of negative economic news reported by TG1 from LPMs predicting the probability of conception, Italy.

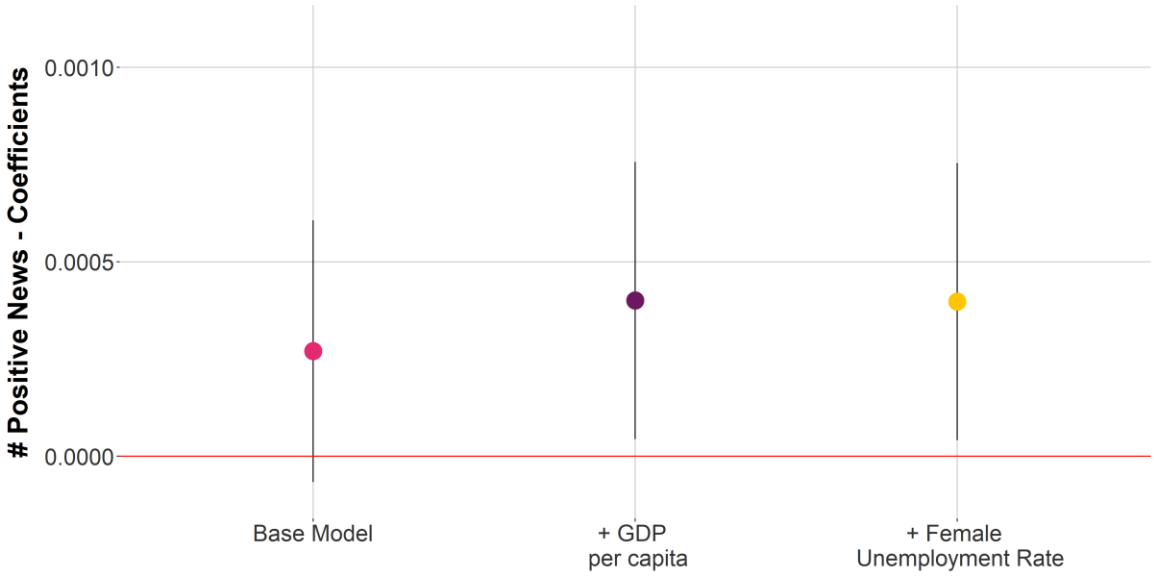

Figure 5.2 Confidence intervals of the number of positive economic news reported by *TG1* from LPMs predicting the probability of conception, Italy.

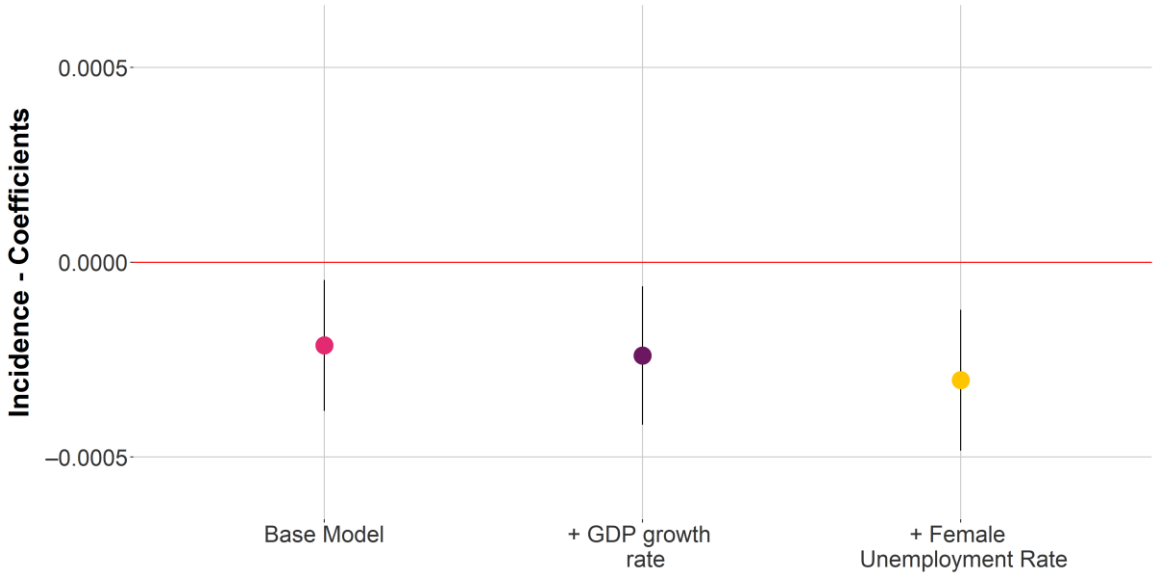

Figure 5.3 Confidence intervals of the Percentage economic news reported by weeklies from LPMs predicting the probability of conception, Germany.

Third, considering the turmoil that affected Italian economy during the study period, we control that the associations between economic news coverage and fertility remain even after augmenting the models with a series of further indicators of objective economic conditions (the GDP growth rate, the percentage of temporary employment, the percentage of part-time female employment) and aggregate measures of economic perceptions (consumer confidence, yields of government bonds with maturities close to 10 years, and the incidence of Google searches for the term "spread" (Comolli and Vignoli 2021)). We add them either one at a time and jointly to the base model. As shown in **Table 5.4**, most of these indicators, when jointly considered, are not statistically significant in the association with individual fertility. The GDP growth rate is (weakly) positively associated with fertility, as well as the government bond yields (in this case the direction is unexpected). However, the associations of news coverage variables with fertility and that of *Female Unemployment rate* remain statistically significant and substantially relevant.

Table 5.4 Linear Probability Models predicting the probability of conception by including further macro-economic indicators, Italy.

Variable	Coefficient
CCI	0.00005
	(0.00029)
"Spread" GT	−0.00015
	(0.00016)
Bond	0.00061**
	(0.00027)
Unemployment rate	−0.00050**
	(0.00024)
% Temporary	0.00021
	(0.00021)
Part-time	0.00135
	(0.00129)
GDP growth rate	0.00032*
	(0.00017)
Inflation rate	−0.00168
	(0.00207)
# Negative News	−0.00025*
	(0.00014)
# Positive News	0.00057**
	(0.00027)
# Unclear News	−0.00043*
	(0.00025)
Person-months	644,038
Individuals	12,521

Note: Robust standard errors are in parenthesis. Models include all controls listed in **Table 3.1** (Model B) except for the *GDP per capita* given the inclusion of the *GDP growth rate*.

**p<.10; **p<.05*

Especially during the Great Recession, Italians may be also influenced by economic developments outside the country. We add the female unemployment rate at both EU-19 and global levels to Model B as substitutes for the country-

wide unemployment rate. Estimates from these models (**Table 5.5**) reveal no significant association of these unemployment indicators with fertility, whereas they confirm that the associations of news coverage variables remain quite unchanged. Then, considering that male unemployment rate is more affected by economic downturns than the female unemployment rate (Hoynes et al. 2012), we verify that the results remain virtually unchanged when replacing the female unemployment rate with that of males in all previous models for Italy and Germany.

Table 5.5 Linear Probability Models predicting the probability of conception by including unemployment rate at EU-19 and global levels, Italy.

Variable	Coefficient	
EU unemployment	−0.00011	
	(0.00046)	
Global unemployment		0.00012
		(0.00013)
# Negative News	−0.00024**	−0.00027**
	(0.00011)	(0.00011)
# Positive News	0.00040**	0.00040**
	(0 .00018)	(0.00018)
# Unclear News	−0.00013	−0.00011
	(0 .00015)	(0.00013)
Person-months	644,038	
Individuals	12,251	

Note: Robust standard errors are in parenthesis. Models include all controls listed in **Table 3.1** (Model B) except for the *Female Unemployment rate* at national level.

***p<.05*

Furthermore, we explore variations in fertility reactions over time. We augment the main models with interactions between the news coverage measures and years, controlling for yearly fixed effects. A worsening in the news coverage of the economy has a stronger association with fertility in Italy during 2009–2010,

and in Germany in 2001, 2010, and 2015, years in which some economic and non-economic events occurred worldwide threatening the Western world and increasing (economic) uncertainty (e.g., in 2009–2010 the economic crisis in Greece and the Great Recession; terroristic attacks in Paris in the late 2015). Stronger fertility reactions to increases in the number of positive news items are instead found in 2010–2011 in Italy and in 2006 and 2016 in Germany.

As regard the methodology, we verify that the news coverage/fertility associations remain including random effects instead of fixed effects. The results of the analysis carried out on both Italian and German data are reported in **Table 5.6**. The coefficients associated to news coverage variables by including individual random effects are not only statistically significant but also similar in size to those estimated by including fixed effects. Finally, the same pattern of results emerges when applying logistic models with fixed effects instead of LPMs.

Table 5.6 Linear Probability Models predicting the probability of conception with the inclusion of fixed and random effects.

Variable	Coefficient			
	Fixed effects-Italy	*Random effects-Italy*	*Fixed effects-Germany*	*Random effects-Germany*
# Negative News	−0.00025***	−0.00021**	−0.00032***	−0.00027**
	(0.00010)	(0.00009)	(0.00011)	(0.00011)
# Positive News	0.00040**	0.00038**	−0.00002	−0.00001
	(0.00018)	(0.00018)	(0.00010)	(0.00009)
Observations	644,038		734,640	
Individuals	12,521		11,105	

Notes: Robust standard errors are in parenthesis. Estimates refer to standardized variables. Models include all controls.

***p<.05; ***p<.01*

Discussion and Conclusions

Over the last decade, the relationships at playing in Europe between economic conjunctures and fertility have been often puzzling. Most countries have witnessed an unexpected fertility decline involving, even more surprisingly, areas with wealthy economic conjunctures typically characterized by high fertility levels. Recent research has argued that individuals are not only influenced by objective economic constraints, but also by *socially-constructed narratives of the future* when taking long-term binding decisions (Beckert 2016; Beckert and Bronk 2018), including those concerning fertility (Vignoli et al. 2020a). The media represent a crucial building-block of these narratives (Vignoli et al. 2020b) since they are the major source of economic information for most citizens (Joris et al. 2014, 2018). According to the agenda setting theory, the content conveyed by the media has the power to influence people's perceptions (McCombs and Shaw 1972). These effects are amplified under uncertain conditions which cause people to seek more information (Berger and Calabrese 1975) to orient their life choices. Nowadays, the rising economic uncertainty in Western countries may thus boost the effects of the media. In a nutshell, the core argumentation of this PhD thesis is that media-conveyed narratives of the economy influence individuals' fertility behavior also passing by changes in individual perceptions about the economy, over and above the role of objective economic constraints. We empirically test such a hypothesis by investigating the association between the economic news coverage in various media and individual fertility, net of indicators of personal and national economic conditions. Then, we investigate the potential mediating role of individual economic perceptions in this relationship. The case-studies here addressed are Italy and Germany, whose economic situations and institutional contexts are very different. Also, in the last decade Italian fertility has dramatically plummeted, whereas Germany is a stand-alone case of increasing fertility in Western Europe. These antipodal conditions make the comparison between them particularly interesting to deal with and compare. We use indicators of the incidence and tone of economic news in the Italian most

popular television newscast (*TG1*) and German weeklies, television programs, and a tabloid followed by a relevant share of the population. We combine the news coverage data with nationally-representative individual-level panel data stemming from the *Family and Social Subjects Survey* for Italy and the *Socio-Economic Panel* for Germany.

No research has so far directly addressed the economic news coverage/individual fertility relationship, nor its underlying mechanisms. Sobotka et al. (2011) have suggested that media coverage of the economy can amplify the effects of rising economic uncertainty on fertility. This was documented by Schneider (2015) who reported that the press coverage of the Great Recession has contributed to the decrease in state-level fertility rates in the United States. The research conducted by Vignoli et al. (2022) approached the topic by revealing a causal connection between economic narratives and fertility intentions in Italy and Norway. The study is based on a controlled laboratory experiment where mock news bulletins on the economic prospects of the country were manipulated and submitted to participants. Given all outlined above, we first wonder the following: *Is the incidence of economic news items associated with individual fertility behavior, controlling for individuals' employment conditions and aggregate measures of economic conjuncture? (Q1a).* Relying on multiple media sources, we formulate a further related research question (*Q1b*): *News coverage from which media source is most associated with fertility?* Our findings reveal that an increase in the percentage of economic news out of all news has a negative association with the probability of conception in both countries. In the case of Germany, this association is stronger when considering the coverage of the economy in weekly magazines than in other media, like television. A possible motivation is that the two German television broadcasters (*ARD/ZDF*) serve a viewership that is on average above the reproductive age.

Besides the mere effect of news on the perceived relevance of a topic to the public, the framing theory adds the role of the news tone (McCombs 2011). Via

the research question *Q2*, we wonder whether the association between economic news and fertility outcomes changes based on the tone of the news. Our results indicate that an increase in the absolute number of negative economic news is negatively associated with the probability of conception, while improvements in the news tone are positively correlated with fertility. The association between economic news and fertility behavior (*ceteris paribus*) is found to be substantially relevant. In the case of Italy, the positive fertility reaction to an increase in positive news is almost double that of a comparable increase in the *GDP per capita*. On the other hand, the negative fertility reaction to an increase in negative news is almost half that of a comparable increase in the *Female Unemployment Rate*. Interestingly, positive economic news items are more important in shaping fertility behaviors than negative ones in Italy, whereas negative ones are more strongly correlated with fertility than positive in Germany. Vignoli et al. (2022) found that negative narratives of the economy strongly lower fertility intentions in Norway, which is characterized by economic stability and prosperity, while positive narratives have weaker and smaller effects. On the contrary, in Italy, where the national economy is more turbulent, positive narratives are more impactful than negative (Vignoli et al. 2022). From a psychological point of view, the effect of new information on personal perceptions depends on the standard to which individuals are accustomed (Schwarz and Bless 1992). In line with this, economic research revealed that in Germany and Norway, which are among the wealthiest European countries, negative news items on the economy worsen individual economic perceptions more than how much positive ones improve them (Dräger 2015; Garz 2018; Lamla and Lein 2012). We may conclude that where the economic trend is turbulent, a positive economic narrative is more important, while negative news coverage seems to be more impactful where the economic fabric is prosperous. In line with this argumentation, our findings indicate that for people living in Italy, used to a strong economic hardship, a positive media narrative of the economy is more relevant. On the contrary,

people living in Germany, used to receive reassuring inputs on the state of the economy, are more sensitive to a worsening of economic media narratives. All in all, the more distant the tone of a news is from the habitual economic conjuncture, the more it seems to influence people's perceptions and behaviors by producing an economic narrative that provides a major "distance experience" from their habitual "contact experience" of daily life (Dewey 1930:58; Mische 2009:697).

Previous literature shows evidence of both the correlation between the news coverage of the economy and individual economic perceptions (Garz 2012; Tausch and Zumbuehl 2018) and the role of economic perceptions in influencing fertility (Bhaumik and Nugent 2011; Kreyenfeld 2010, 2015). Once addressed the *total association* between the news coverage of the economy and individual fertility, we thus aim to unravel their *direct association*, or rather to delve into the mediating role of individuals' economic perceptions (*Q3: Is the economic news/fertility relationship channeled by individuals' economic perceptions?*). Due to data at hand, we limit this part of the analysis to the German case. Results suggest that individual perceptions of the general economy explain a small albeit not negligible part of the outlined relationships. Precisely, we find that 12.72% of the estimated relationship between the number of negative news and individual fertility passes through the probability of being very worried about the general economy. Much of the association (87.28%) seems thus to be channeled by other mediators. However, it is imperative to recognize that the measures of perceptions we have at our disposal are not the best suited to capture the extent of the mediation mechanism we have hypothesized. Our indicators refer to economic concerns and thus represent the operationalization of a specific (and limited) part of economic perceptions. Furthermore, our measures present some drawbacks. They are collected only at the date of interview (i.e., approximately annually), we are thus not able to account for changing perceptions in the short run. Also, respondents self-report their level of economic concern. Albeit this is a common

way to measure subjective factors, the reliability of self-assessed indicators is affected by measurements error, contamination, and underlying uncertainty (e.g., Wilcox and Wlezien 1993). The trustworthiness in reporting self-assessed conditions is proved to depend on socio-demographic factors (Crossley and Kennedy 2002 on the self-assessing of health status). Moreover, analyses of the full sample (without distinguishing by socio-economic and demographic factors) may lead to an underestimation of the role of perceptions in some groups. For instance, worries about own employment situation turned out to delay the timing of motherhood among highly educated women, while having an opposite association for low educated ones (Kreyenfeld 2010). Fertility of younger childless women is positively associated with worsening in their perceptions of the own economic situation, but this is not the case of older ones (Kreyenfeld 2015). Further heterogeneity was found by Hofmann and Hohmeyer (2013) who documented that middle-income couples who already have a child are the only ones whose fertility is affected by changes in economic perceptions.

In light of this, our final goal is analyzing the moderating role of demographic and socio-economic factors (*Q4: Do individuals react differently to changes in the news coverage of the economy according to socio-demographic factors?*). The chosen methodology does not allow to distinguish between conceptions of different parity (Kreyenfeld 2021), so we address them separately. Stronger economic news coverage/fertility associations are found among childless women in Italy and primiparous mothers in Germany. Results on age-specific fertility evidence that a worsening in the economic news coverage discourages fertility especially in the crucial life stage when women begin to build their own families, i.e., among young adult women (25–34 years old). While in Italy we do not find heterogeneity according to the employment status, women with full-time job have the strongest reaction in Germany. In both countries, economic news' associations mainly interest unmarried and medium-high educated women. We note that in Germany the subgroups among whom reactions to the news are the strongest coincide with

the segments of the population that constitute the largest portion of the German media audience. This underpins the argument that media effects are stronger among the exposed population (Wanta and Hu 1994). Finally, women who are not concerned about their own economic situation are the most responsive to worsening media narratives. This confirms that new information that is distant from an individual's own perspective may have a greater impact on influencing choices.

The analyses included in this PhD thesis present other minor caveats, largely due to data availability. First, we limit the investigation to the role of the news coverage since we have no information on individuals' exposure to the news, nor many details on the composition of the audience. We use data from Italian and German opinion-leading media followed by a relevant share of population. If we had considered any other national media in lieu of them, the proportion of the sample that is exposed to the news would have been smaller. As already mentioned, Wanta and Hu (1994) found that exposure matters in the sense that more people are exposed to the media, the stronger the media effects are. However, whether an individual is exposed or not to the media is not a prerequisite to find media effects (McCombs 1981; Wanta and Wu 1992). Interpersonal interactions enable the circulation of media news content through a diffusion process even in absence of direct exposure to the media (Hornik and Mcanany 2001). The potential effect of mass media thus transcends the direct viewers themselves by influencing perceptions and expectations of those not exposed. Although a potential slight divergence between the audience of such media and the general population may not represent a crucial issue for our findings, further studies may successfully include information on individual exposure to the media. Second, it could be argued that not including the increasingly relevant segment of online media (however, not available to us) is a severe limitation. Each of the media we consider has its own website, and many of them have social accounts, reporting text news and/or streaming video for

online circulation of content. However, besides the large circulation of the print press sources, the television channels (*RAI*, *ZDF*, *ARD*) are Public Services Media (PSMs), and universality is one of the PSM's fundamental principles (Born and Prosser 2001). This suggests that they offer an adequate picture of what "the media" daily reported in the two countries. Moreover, watching television newscasts was still an established habit for Italians to update their knowledge of current events in 2019 (ISTAT 2020). Likewise, findings from the *Time use surveys* conducted by Eurostat indicate watching TV as the most popular secondary activities among Germans (Eurostat 2019). Notwithstanding this, another natural next step of research would be to include online media. Third, we need to be caution in comparing the associations outlined in the two countries since there is a substantial difference between the media news data we have at our disposal. For Italy we rely solely on a single media source, the drawback is that we are so able to account for a limited part of news circulating in the country. For Germany we employ various media sources, so covering a wider spectrum of media news. Unfortunately, we cannot disaggregate the number of news items by individual media source, preventing us from making a precise comparison with the association of the *TG1* news coverage. The estimated association of German weeklies is indeed the average of those of each single media included in the group (*Der Spiegel*, *Focus*, and *Bild am Sonntag*). However, the universality of the media considered, their large circulation and the level of consonance between different media in both Italy and Germany (Arrese and Vara-Miguel 2015; Roessler 2007) ensure that our data provide a suitable picture on the news coverage/fertility nexus in the two countries. Fourth, the association between economic news coverage and fertility may vary by geographic area. Italy suffers a considerable economic gap between the wealthier North and the more disadvantaged South. The East of Germany, in spite of the economic disadvantage, is more secularized and less conservative compared to the West. Unfortunately, Italian micro-level data contain information about respondent's residence only at the time of the

interview (i.e., in 2009 and 2016) which prevents us from delving into this aspect. By contrast, we partially address the geographic heterogeneity in Germany by revealing stronger associations between a worsening in news coverage and fertility in the West of the country than in the East. This finding further underpins the argumentation that a negative narrative of the economy is more crucial for people living in wealthier areas since it is more distant from their daily life. Local media (like the regional newscasts of *Rai 3* for Italy) would perhaps be the best candidates to address local-specific associations. To the best of our knowledge, these data are neither available nor coded. Fifth, we note that the economy's news coverage may partly embody real economic trends. We thus control for traditional macroeconomic correlates of fertility (e.g., Comolli 2017; Goldstein et al. 2013; Lanzieri 2013; Matysiak et al. 2021). Nonetheless, we cannot exclude the possibility that our indicators of economic news coverage are not fully independent of actual economic developments. Finally, in this analysis we only account for women's economic perceptions, although those of partners are also available in the GSOEP data. Including them would have limited our analysis to women in couples only. For the same reason, we do not consider the partner's employment status (this information is unavailable in FSS 2016). Future studies focusing on couples rather than individuals could successfully test the role of partner's economic perception and employment situation. However, we verify that results are virtually unchanged when considering the household income instead of individual labor earning.

Against these shortcomings, and even though the setting of the analyses prevents us to derive firm causal conclusions, our findings bolster the claim that, in a context of increased economic uncertainty (as that of Western Europe), whether economically stable (as that of Germany) or affected by economic turbulence (as that of Italy), media-conveyed narratives of the economy influence fertility behaviors, also by means of changes in individual perceptions. These media narratives are socially-constructed by a continuous, dynamic, and

(potentially) mutual influence between societal beliefs and the media's economic coverage. Beyond extending the literature on media effects, our results are suggestive of what may underlie the fertility trend in contemporary Western societies. The Great Recession, and later the COVID-19 pandemic, fueled general perceptions of uncertainty regarding future economic conditions, above and beyond the direct and objective experience of unemployment or company bankruptcy, even in countries where economic growth promptly resumed post-crisis (Hofmann et al. 2017; Sobotka et al. 2011). In this context, economic narratives of the future (especially those channeled by the media) may become more salient for fertility decisions in Western societies (Vignoli et al. 2020a, 2020b). To conclude, our contribution has at least two implications. First, it promotes the media narratives of the economy as a crucial predictor of fertility that should be systematically considered in future literature. Second, this thesis highlights the importance of educating people in a critical and informed access to news, which includes checking the reliability of information sources and developing skills for the correct interpretation of basic economic indicators and summary statistics. In fact, although reactions to (negative) economic news are weaker among low educated women, we have already discussed that such heterogeneity is likely attributed to the adoption of diverse strategies to alleviate uncertainty, which are influenced by socioeconomic circumstances, or may relate to the composition of the media audience. Therefore, different reactions by level of education may not necessarily be linked to understanding of the news content or awareness of economic consequences of reported events (which are likely to increase with education). Policy interventions, such as campaigns against fake news and educational programs within schools, should thus be implemented.

This PhD thesis, being to our knowledge the first micro-level study on the subject, is far from conclusive in understanding the full economic news/fertility nexus. Among the research developments we would like to pursue, a key step is to broaden the types of media-conveyed narratives to relate with fertility behavior

and other life domains. We have mentioned studies dealing with the role of the news coverage on relevant topics other than economic. For instance, climate change is a primary matter of concern worldwide (especially for young adults). Worries on the environment have been recently found to limit fertility intentions (Arnocky et al. 2021; Helm et al. 2021), as well as influencing the willingness of experts to intervene on the topic of population growth (Van Dalen and Henkens 2021). Uncertainty about environmental issues have, as well as economic uncertainty, a future-oriented dimension: potential parents may fear a bleak environmental future for their children and thus abandon possible fertility plans. At these premises, (media-)narratives about climate change deserve further exploration in fertility studies. Moreover, we have exclusively focused on the media, however, other social actors (e.g., peers and family) intervene in the formation of shared narratives. Data from social media are perhaps the best candidates for exploring the role of media, peers, parents, and other actors, in a joint and interconnected perspective, for shaping narratives about the future and influencing fertility behaviors. A next point of interest would be to isolate the proportion of economic news coverage that deviates from the economic reality to addresses the "direct" effect of media narratives of the economy on fertility above the mere reporting of economic facts. It can be pursued by adopting the approach used for a similar purpose by Boydstud et al. (2018). Finally, we conduct the analysis on two European case-studies which provide a first and robust empirical evidence of the economic news/fertility link. Expanding the knowledge on this novel topic to other country-cases, perhaps outside Europe, and differences within countries is essential.

APPENDIX

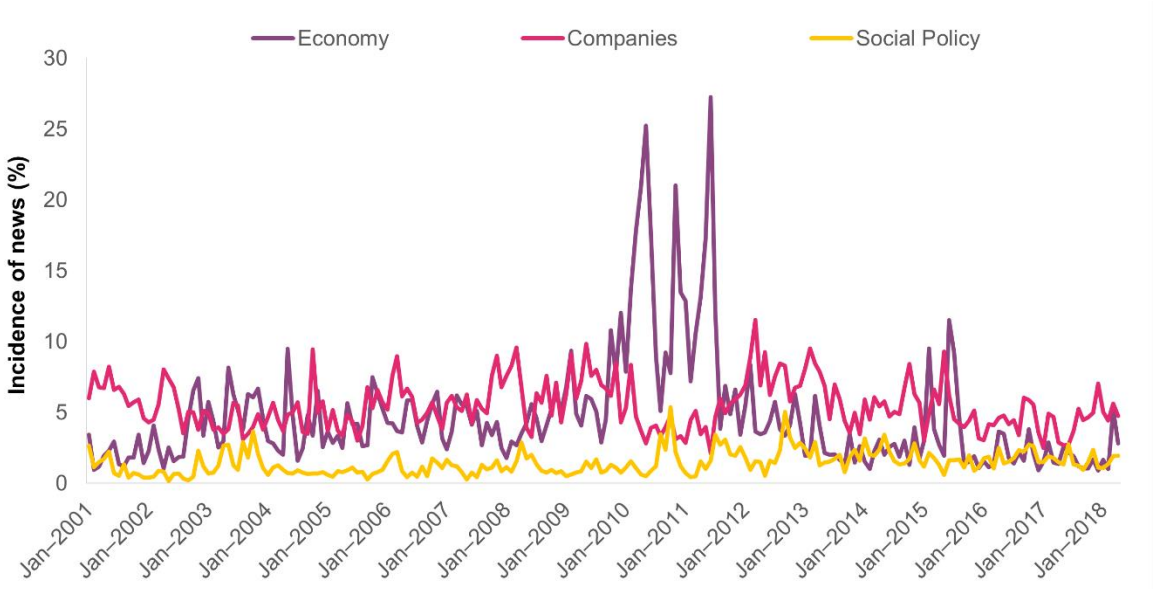

Figure A1 Monthly (multi-)media incidence of news on companies, economy, and social policy in Germany, Jan 2001–Apr 2018.

Table A1 Summary statistics of media news variables.

	Italy (TG1)		Germany (Weeklies)		Germany (TV)		Germany (Tabloid)	
Variable (From Media Tenor)	Mean	SD	Mean	SD	Mean	SD	Mean	SD
# Negative News	7.64	9.71	17.86	20.13	70.84	103.87	10.59	10.51
# Positive News	6.24	8.39	2.83	4.54	13.24	16.81	3.17	3.98
# Unclear News	22.50	19.24	17.62	16.99	61.25	68.76	9.66	7.08
Variable (Built by authors)	Mean	SD	Mean	SD	Mean	SD	Mean	SD
# Negative News	7.28	4.47	17.72	14.96	70.33	79.11	10.60	6.87
# Positive News	6.49	4.31	2.80	3.15	13.18	13.90	3.16	2.97
# Unclear News	23.82	8.18	17.53	13.28	61.39	51.26	10.03	5.46
Percentage	3.30	1.26	4.77	2.76	4.79	3.87	3.03	0.98
Pos / pos + neg	45.95	16.39	16.35	13.44	19.46	15.60	24.89	15.49
Period	Jan 2007–Aug 2015		Jul 2001–Apr 2018					

Note: the authors built the variables as moving averages of Media Tenor variables in the previous year and semester, respectively, for Italy and Germany.

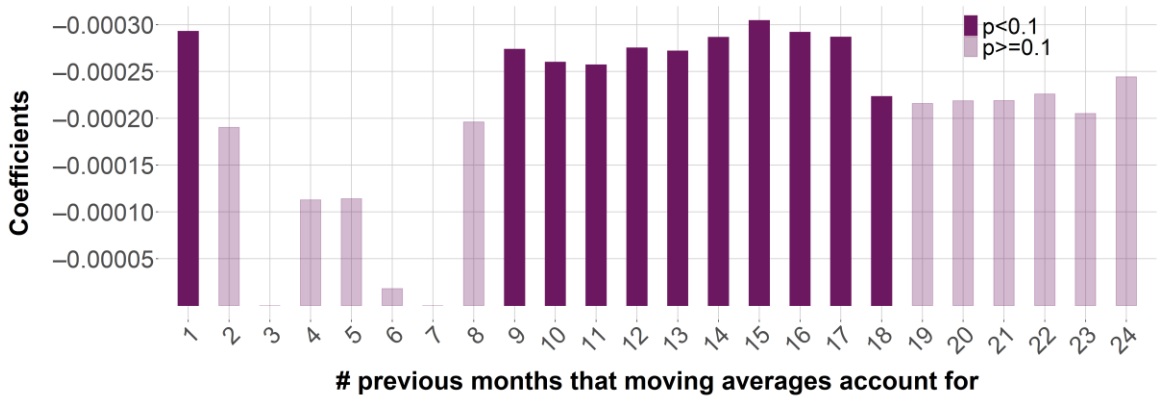

Figure A2 Estimated coefficients of the (standardized) variable indicating the monthly number of negative economic news reported by *TG1* in the previous *n* months (with *n* from 1 to 24), Italy, Jan 2008–Aug 2015.

Notes: Estimates refer to standardized variables. Models include all controls listed in **Table 3.1** (Model B). The panel sample here used covers the period between January 2008 (first month for which we can calculate the average number of news in the preceding 24 months) and August 2015 (504,799 person-months and 11,939 individuals) to ensure comparability.

Table A2 Linear Probability Model predicting the probability of conception by including relative indicators of economic news coverage Italy.

Variable	Coefficient
Percentage	−0.00071**
	(0.00031)
Pos / pos + neg	0.00024**
	(0.00012)
Percentage × Pos / pos + neg	0.00065*
	(0.00033)
Observations	644,038
Individuals	12,251

Notes: *Percentage* is centered on its mean. Robust standard errors are in parenthesis. Estimates refer to standardized variables. Models include all controls listed in **Table 3.1** (Model B).

**p<.10; **p<.05*

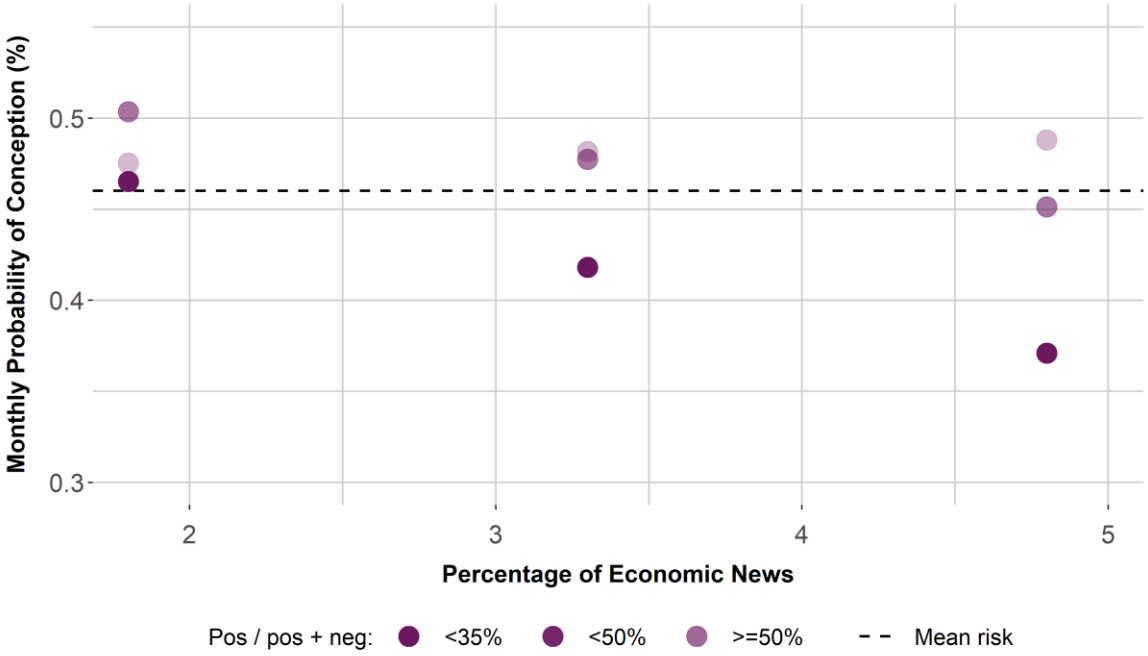

Figure A3 Predicted probability of conception at different levels of *Percentage* of economic news and *Pos / pos + neg* (the percentage of positive news items among positive and negative economic news) split in classes, Italy.

Note: The model includes all controls listed in **Table 3.1** (Model B).

Table A3 Linear Probability Model predicting the probability of conception, Germany.

Variable	Coefficient
Constant	−0.00522***
	(0.00047)
Individual specific controls	
Age	0.00886***
	(0.00221)
Age^2	−0.00986***
	(0.00127)
Employment (ref: Not employed)	
Unemployed	0.00257***
	(0.00053)
Part-time employed/Training	0.00300***
	(0.00032)
Full-time employed	0.00647***
	(0.00040)
Other	−0.00483***
	(0.00044)
Individual Labor Earning (log)	−0.00031**
	(0.00013)
Level of Education	
Medium	−0.00050
	(0.00037)
High	0.00112*
	(0.00067)
Student	−0.00194***
	(0.00035)
Migrant	−0.00020
	(0.00074)
East Germany	0.00009
	(0.00054)
Union (ref: Not in union)	
In couple – No cohabitation	0.00127***
	(0.00024)

Cohabitation	0.00355*** (0.00041)
Marriage	0.00597*** (0.00049)
Macroeconomic controls	
Female Unemployment Rate	0.00024 (0.00019)
Growth rate of the real GDP	0.00005 (0.00008)
Time trend control	
Month	−0.00147 (0.00132)
News coverage of the economy	
Percentage	−0.00022*** (0.00008)
Observations	734,640
Individuals	11,105

Notes: Flag for missing information included. Estimates refer to standardized variables. Robust standard errors are in parenthesis.

**p<.10; **p<.05; ***p<.01*

Table A4 Linear Probability Model predicting the probability of conception by including the average number of news in the preceding semester, Germany.

Variable	Coefficient
# Positive News	−0.00002 (0.00010)
# Negative News	−0.00032*** (0.00011)
Observations	734,640
Individuals	11,105

Note: Flag for missing information included. Estimates refer to standardized variables. Robust standard errors are in parenthesis. Models include all controls.

****p<.01*

Table A5 Linear Probability Models predicting the probability of conception on the male sample, Italy.

Variable	Coefficient	
	Model A	*Model B*
# Negative News	−0.00015*	−0.00015
	(0.00009)	(0.00009)
# Positive News	0.00042**	0.00040**
	(0.00017)	(0.00017)
# Unclear News	−0.00028**	−0.00027**
	(0.00012)	(0.00012)
Observations	633,394	
Individuals	12,348	

Notes: Robust standard errors are in parenthesis. Estimates refer to standardized variables. Models include all controls listed in **Table 3.1** (Model B)

**p<.10; **p<.05*

Table A6 Linear Probability Models predicting the probability of conception by including interactions between *Female unemployment rate* and news coverage measures, Italy.

Period	Variable	Coefficient
2007–2015	Female Unemployment rate	−0.00029
		(0.00028)
	# Negative News	−0.00057***
		(0.00019)
	# Positive News	0.00072**
		(0.00030)
	# Unclear News	−0.00003
		(0.00022)
	# Negative News × Fem Unemp	0.00052**
		(0.00022)
	# Positive News × Fem Unemp	−0.00045*
		(0.00025)
	# Unclear News × Fem Unemp	−0.00030
		(0.00024)
Person-months	644,038	
Individuals	12,521	
2007–2012	Female Unemployment rate	−0.00054
		(0.00059)
	# Negative News	−0.00062***
		(0.00022)
	# Positive News	0.00079***
		(0.00028)
	# Unclear News	−0.00026
		(0.00021)
	# Negative News × Fem Unemp	0.00060**
		(0.00029)
	# Positive News × Fem Unemp	−0.00063**
		(0.00026)
	# Unclear News × Fem Unemp	0.00020
		(0.00048)
Person-months	516,002	

Individuals	12,521

Notes: Robust standard errors are in parenthesis. Estimates refer to standardized variables. Models include all controls listed in **Table 3.1** (Model B).

**p<.10; **p<.05*

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