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# TV and Entrepreneurship

## Abstract

We empirically analyse whether television (TV) can influence entrepreneurial identity and incidence. To identify causal effects, we utilise a quasi-natural experiment setting. During the division of Germany after WWII into West Germany with a free-market economy and the socialistic East Germany with centrally-planned economy, some East German regions had access to West German public TV that – differently from the East German TV – transmitted images, values, attitudes and view of life compatible with the free-market economy principles and supportive of entrepreneurship. We show that during the 40 years of socialistic regime in East Germany entrepreneurship was highly regulated and virtually impossible and that the prevalent formal and informal institutions broke the traditional ties linking entrepreneurship to the characteristics of individuals so that there were hardly any differences in the levels and development of entrepreneurship between East German regions with and without West German TV signal. Using both, regional and individual level data, we show then that, for the period after the Unification in 1990 which made starting an own business in East Germany, possible again, entrepreneurship incidence is higher among the residents of East German regions that had access to West German public TV, indicating that TV can, while transmitting specific images, values, attitudes and view of life, directly impact on the entrepreneurial mindset of individuals. Moreover, we find that young individuals born after 1980 in East German households that had access to West German TV are also more entrepreneurial. These findings point to second-order effects due to inter-personal and inter-generational transmission, a mechanism that can cause persistent differences in the entrepreneurship incidence across (geographically defined) population groups.

*Keywords: entrepreneurship, TV, culture, occupational choice, institutions*

*JEL Classification: D02, D03, J24, L26, M13, O30, P20, P30, Z10*

# 1. Introduction

Entrepreneurship is considered a key driver of development in free-market economies (Schumpeter 1912, 1942; Baumol 1990, 2010; Baumol, Litan and Schramm 2007). Thus, understanding what determines entrepreneurial preferences and ‘identity’ of individuals is crucial for understanding growth as well as for the design of policies supporting it. In fact, entrepreneurs are considered as individuals with proactive mindset that recognize and provide solutions to needs and problems in society. However, they are also often referred as to romantics, dreamers, visionaries or conquerors (Schumpeter 1912), meaning, that the entrepreneurial act itself is not self-evident and cannot be fully explained within the framework of the standard economic model that assumes rational actors.

decision to become an entrepreneur is a function of both, more traditional and ‘objective’ factors (e.g. abilities, skills, resource endowment, etc.) as well as more ‘subjective’ factors (for an overview see Parker 2009; Acs and Audretsch 2010). Particularly with respect to the latter, Akerlof and Kranton (2000) argue that individual’s identity, meaning a person’s self-perception or sense of self, influences individual behavior in general and, hence, the choice of a particular occupation. Specifically, individuals reap utility not only from actual outcomes, but also from acting in a certain way, particularly according to their own view of who they are or ideally should be and what they should or should not do to live up to this ideal concept of the self (Akerlof and Kranton 2000; Benz and Frey 2008a, b). Consequently, norms, values, preferences, view of life, status/esteem attached to different occupations etc. play a role in individuals’ decision to become entrepreneurs. Indeed, the empirical literature on the individual determinants of entrepreneurship has found preferences for independence and autonomy as well as the quest for being one’s own boss, for self-discovery, self-realization, economic freedom and justice to be distinctive characteristics of entrepreneurs and that such more ‘subjective’ factors appear to be strong predictors of entrepreneurship (Hamilton 2000; Hyytinen, Ilmakunnas and Toivanen 2013; Berglann et al. 2011; Croson and Minniti 2012; Benz and Frey 2008a, b; van Gelderen and Jansen 2006). In line with Akerlof and Kranton (2000), the typical argument here is that subjective factors create an additional non-monetary utility. However, how preferences for entrepreneurship are formed and how individuals’ entrepreneurial identity is shaped is comparably under-researched.

In this paper, we analyze empirically whether the decisions of individuals to become entrepreneurs—as alternative to dependent employment—can be influenced via television (TV). First, pictures and contents transmitted via TV might show that entrepreneurship can be an alternative to dependent employment in a first place, for instance by pointing to (business) opportunities that have not been realized/recognized so far. However, TV might also shape the choice of an occupation by affecting individuals’ personality characteristics, preferences and identity. For instance, TV transmits—deliberately or not—images that might create specific attitudes, form specific values and preferences, and shapes individuals’ view of the self. Thus, TV viewers might identify with fictitious or real media characters and role models, assuming (parts of) their personality traits and identity (Bandura 2001; Rosengren and Windahl 1972; Cohen 2001; Adams-Price and Greene 1990; Hoffner and Buchanan 2005).

This might be particularly the case whenever the TV representation of the real world tends to entail more glamour, more stereotypes, and more drama without negative aspects (Wright et al. 1995). Thereby, the process of identification can extend well beyond the particular viewing situation (e.g., sharing emotions and opinion while watching). It can lead to durable changes in attitudes, values, aspirations or other characteristics, and, therefore, in personality, identity and behavior (Rosengren et al. 1976; Bandura 1986, 2001; v. Feilitzen and Linne 1975; Hoffner 1996; Hoffner and Buchanan 2005). There is even evidence that TV can strategically be employed in order to form (the opinion of) individuals and to ‘transform’ society in a distinct way (McMillan and Zoido 2004).

To identify the causal effect of TV on entrepreneurship we make use of a quasi-natural experiment setting from East Germany which provides us with an exogenous regional variation in the availability of West German public TV (Hyll and Schneider 2013; Hennighausen 2015; Bursztyn and Cantoni 2016). In particular, we capitalize on the fact that only a geographically-defined fraction of the population of the former socialistic German Democratic Republic (East Germany or GDR) had an exogenous access to West German public TV already prior to the Reunification of Germany in 1990 and actually watched it on regular basis (Hesse 1988; Buhl 1990; Stiehler 2001; Hyll and Schneider 2013; Hennighausen 2015; Bursztyn and Cantoni 2016; Zentralarchiv fuer Empirische Sozialforschung ZA 6073 and ZA 6008). Thus, for the period after the Reunification of Germany in 1990, which marked the start of the transition to a free market economy and made entrepreneurship in East Germany possible again, we apply econometric techniques that essentially compare the entrepreneurship incidence among the inhabitants of East German regions with access to West German TV prior the Reunification in 1990 and such without. In fact, after WWII and until the Reunification, Germany was divided into the Federal Republic of Germany (FRG, West Germany) with an individualistic culture and free market economy and the socialistic German Democratic Republic with an overbearing social security net and an egalitarian society at the expense of a centrally planned economy, own initiative and self-determination, both socially and economically (Alesina and Fuchs-Schuendeln 2007; Bauernschuster et al. 2012; Hennighausen 2015; Falck, Gold and Heblich 2016). Accordingly, not only were the formal and informal institutions in East and West very different, but also the two regimes ‘fight’ each other, with TV a major vehicle to tackle external influences and/or promote the own ideology. In particular, West German TV reflected the notion of a society in which individuals are free and responsible for their own, and where subjective well-being, material wealth, experimentation, self-discovery, self-realization, pro-active behavior rather than reliance on the state defined individual identity (Hennighausen 2015). East German TV, on the opposite, transmitted images that were not compatible with the free individual concept in general and that did not reflect the notion that entrepreneurship is desirable from individual, social and economic point of view; entrepreneurs were rather expropriators and unsocial. West Germany did not recognize another German state for very long time and the West German public TV program was (partly) designed for and aimed at broadcasting in the GDR. However, solely due to geographic and topological reasons, West German TV could not be received in some East German regions in the very North-East and in the South-East around the city of Dresden, known as ‘Valley of the Clueless’ (Etzkorn and Stiehler 1998; Hyll and Schneider 2013; Hennighausen 2015; Bursztyn and Cantoni 2016). These areas were either too far away from

West German TV transmitter stations or surrounded by mountains and the West German public TV signal was simply too weak. Thus, an exogenously defined portion of the East German population was presented (i) images and a value and preference system compatible with the notion of individual freedom and self-determination that are found to be distinctive characteristics of entrepreneurs and/or (ii) directly with entrepreneurial role models.

We address the following questions. First, we are interested whether TV can influence the entrepreneurship incidence among individuals exposed to in a first place. Moreover, we investigate whether the effects of TV fade out with time or are persistent. On the one hand, the effect of TV might vanish with time if it affects only individuals directly exposed to. In fact, empirical research has established that the individual probability to become an entrepreneur is typically inverse-U-shaped in age with a maximum at around 40 years. Hence, the effect of a (one-off) treatment might disappear after some time as the exposed individuals leave the optimal age window for entrepreneurship. On the other hand, however, there might be second-order effects if those becoming entrepreneurs influence themselves the entrepreneurship incidence among other individuals and subsequent generations (Halaby 2003). For instance, the decision to become an entrepreneur might signal to others that entrepreneurship is an alternative to dependent employment or point towards business opportunities that have not been realized/recognized so far. It might also stimulate the ‘societal legitimacy’ of entrepreneurship, remove biases and stigma, and ‘pave the way’ for further contemporaries and subsequent cohorts (for details on the concept of legitimacy see Etzioni 1987; Kibler, Kautonen and Fink 2014). Other individuals and/or subsequent generations are likely noticing the entrepreneurial behavior by peers and/or ‘ascendants’ in their environment and, while viewing them—consciously or not—as role models, might adopt their norms, values, preferences, and view of life (Bandura 1986). Moreover, individuals becoming entrepreneurs might deliberately exert an effort in disseminating their own view of life to others in order to influence their preferences and behavior. Particularly so, if they expect that their own value system is also the best for the others and reap utility from their wellbeing (Bisin and Verdier 2000, 2001) or because of bounded-rationality and subjective biases over occupational alternatives (Chakraborty, Thompson and Yehoue 2016; Corneo and Jeanne 2010). Overall, the stimulation of the further development of pro-entrepreneurship institutions by exiting entrepreneurs and the inter-personal and inter-generational transmission of an entrepreneurial identity might trigger an endogenous and self-sustaining entrepreneurial ‘culture’ within a certain population group (Bisin and Verdier 2017).

We conduct our main analysis on the effects of TV on entrepreneurship using high-quality data on the number of new firms started each year per working-age population in East German regions for the period after the Reunification of Germany in 1990. We use data at the level of the NUTS-3 regions that are fairly small units and map the geographical availability of West German TV signal reasonably well. To address the question whether TV can influence the entrepreneurship incidence in a first place, we relate the number of new firms started each year per working-age population in a region to an indicator for the region’s access to West German public TV prior to the Reunification in 1990 (by means of pooled OLS). This approach provides a simple estimate for the effect of TV for the period of investigation on average. To answer the question whether the possible effect of TV fades out

or not, we use the same pooled cross-region-over-time setting, but allow the effect of access to West German TV to differ over time. However, in order to identify the true effect of TV, certain conditions need to be fulfilled. First, possible region-specific factors that lead to differences in the entrepreneurship incidence in East German regions with and without West German TV signal in the period of analysis must be accounted for. More importantly however, there must be no differences in the levels and/or the development over time (i.e., trends) of entrepreneurship prior the period of analysis or if there any, these must be accounted for. Not least, though the strength of the West German TV signal is unlikely related to regional factors that are themselves related to entrepreneurship, there must be no (self-) selection or sorting of individuals with specific characteristics in regions with and without TV signal.

To ensure causal inference we proceed as follows. We estimate the effect of access to West German public TV conditional on a large number of contemporary controls for regional characteristics that might be related to the local entrepreneurship propensity: industry structure, qualification structure, age structure, firm size distribution, unemployment, expansion/branching and relocation of West German firms, in- and out-migration, etc. We also include the historical self-employment rate from the year 1925 as an additional control variable to account for differences in the ‘innate’ regional conditions for entrepreneurship (e.g., unobserved entrepreneurship ‘culture’). Importantly, in line with the argument that the equalization of socioeconomic conditions in the GDR and that the prevalent formal and informal institutions strongly regulated, yet suppressed private economic activities and, thereby, the natural ties linking entrepreneurship to the characteristics of individuals across regions, we show that there is no evidence for systematic differences in the levels and, indirectly, in the development of entrepreneurship prior to 1990 between East German regions with West German public TV signal and such without, which might confound our results. In particular, we first show that the share of self-employed individuals in 1989 (immediately prior the Reunification and the beginning of the period of our analysis) in the GDR is (i) much lower than in West Germany but (ii) roughly the same in East Germany regions with and without West German TV. Additionally, we apply econometric techniques (i.e., OLS) and show that the (same) share of self-employed individuals in East German regions is not related to (i) characteristic of the regions during the GDR regime or (ii) the availability of West German TV signal or (iii) region-specific long-term conditions for entrepreneurship as indicated by the self-employment rate from the year 1925. Not least, we provide evidence that highly regulated labor markets in the GDR precluded a systematic migration and spatial sorting of individuals with particular characteristics that might be related to both, entrepreneurship and West German view of life, into areas with access to West German TV. Overall, since the access to West German public TV is arguably unlikely related to specific characteristics of individuals in different regions that might be also related to entrepreneurship, we are confident to draw causal inference from our results.

The results of our analysis indicate that the entrepreneurship incidence among the residents of East German regions that had access to West German public TV prior to the Reunification in 1990 is, in the period after the Reunification on average, ca. 9-10 percent higher than that among the residents of other East German areas that had no such access.

Moreover, we find that the differences between East German regions with and such without access to West German public TV do not fade out with time and are still significant, both in terms of magnitude and statistically, even more than 15 years after the Reunification. The findings suggest that entrepreneurial activity can be shaped and that TV is one effective channel in transporting and developing an entrepreneurial identity or ‘culture’.

Additionally, we utilize individual level data and confirm the findings that East German citizens that have lived in regions with access to West German TV during the socialistic regime are indeed more likely to start an own business. More importantly however, we show that East German citizens born after 1980 in households that lived in regions with West German TV prior the Reunification in 1990 are also more likely to start an own business than their counterparts. For individuals that were at maximum 10 year old at the time of the Reunification in 1990 (when differential treatment disappears), it seems plausible to assume that even if they have watched West German TV, their main interest was in children program rather than in social, political and economic issues. Hence, their entrepreneurial behavior is likely to have been influenced by TV only through their parents. Hence, these findings suggest the existence of a second-order effect of TV, namely that there is an inter-personal and/or inter-generational transmission of entrepreneurial behavior which cause, even in the case of an one-off treatment, differences in the entrepreneurship incidence of population groups or regions which can last at least in the medium term. This, in turn, is informative for pro-entrepreneurship policies.

The remainder of the paper is organized as follows. Section 2 outlines the relation and contribution of our paper to the existing literature. In Section 3 we present the empirical setting, particularly the conditions for entrepreneurship in East Germany and the geographical availability of West German public TV. Section 4 outlines the strategy to identify causal effects and describes the data. In Section 5 we present the results of our empirical analysis. Section 6 summarizes and concludes.

## 2. Relation and Contribution to Literature

Our study adds to several different strands of the literature. Our study contributes to (i) the scientific literature on individuals’ decision to become entrepreneurs by identifying the role of transmitting values, norms, preferences or attitudes as a mechanism that influences individuals’ entrepreneurial identity and (ii) to the discussion on appropriate policy measures to promote entrepreneurship. For instance, policy measures including entrepreneurial role models rely often on the well documented positive association between own entrepreneurial propensity and that of parents (Aldrich et al. 1998; Aldrich and Kim 2007; Parker 2009; Hout and Rosen 2000; Johnson 2002; Wyrwich 2015; Chlosta et al. 2012; Falck, Heblich and Luedermann 2012), neighbors (Giannetti and Simonov 2009; Andersson and Larsson 2016), coworkers (Nanda and Sorensen (2010), acquaintance and fellow members (Stuart and Sorensen 2005; Bauernschuster, Falck and Heblich 2010). We also provide evidence for an inter-personal and/or inter-generational transmission of entrepreneurial behavior from



household members whose entrepreneurial incidence has been influenced by TV to younger members which have been arguably not directly impacted by TV. However, a particular advantage of our paper is that our empirical setting also allows us to analyze and identify the effect of transmitting values, norms, preferences or attitudes. In particular, we analyze the role of TV as transmission channel which rules out both, personal interactions that are also a major vehicle for the transfer of tangible assets (resources, wealth, etc.) and intangible assets (skills, abilities, business contacts, etc.) as well as learning that might also influence the choice of an occupation (Falck, Heblich and Luedermann 2012).

Our study also provides support for the importance of values, norms and preferences for entrepreneurial behavior, the formation of an entrepreneurship ‘culture’ or mindset, and long-term economic development. For instance, growth in Chakraborty, Thompson and Yehoue (2016) is driven by the occupational choice of individuals, which is, in turn, influenced by transmission of values, norms and preferences from one generation to the next. Similarly, Doepke and Zilibotti (2013) suggest a model of endogenous technical change where growth is driven by the innovative activity of entrepreneurs; that is, the growth rate of the economy depends on the fraction of the population choosing an entrepreneurial career. How many entrepreneurs there are in a society hinges on the transmission of personality characteristics, values, norms and preferences between generations. Also Corneo and Jeanne (2010) show that symbolic values can shape occupational choice and economic development. They propose a model of endogenous growth, in which occupations carry symbolic values that make them more or less attractive. Occupational choice is not only driven by the material rewards associated with the various occupations, but also by the esteem that they confer. The evolution of symbolic values is endogenous and determined by transmission of value systems between generations. Particularly relevant for policy, the strength of the transmission of entrepreneurial propensity across individuals and/or generations and the degree in which this transfer benefits from face-to-face interactions and close proximity may cause persistent geographical differences in entrepreneurship and related economic outcomes (Glaeser et al. 2010).

Not least, our study contributes to the literature on the effects of media in general and TV in particular on the behavior of individuals by adding a new dimension: occupational choice, specifically entrepreneurship. Regarding TV, available studies have analyzed possible effects on individuals’ material aspirations as measured by the importance attached to consumption, material wealth and income (Hyll and Schneider 2013), the consumption of advertised products (Bursztyn and Cantoni 2016), self-reliance (Hennighausen 2015), savings, debt and financial literacy (Berg and Zia 2013; Baker and George 2010), health care (Abdulla 2004; Ramafoko, Andersson and Weiner 2012), status in the society, family planning and fertility (Rogers et al. 1999; La Ferrara, Chong and Duryea 2012; Jensen and Oster 2009), voting behavior (Gentzkow 2006; DellaVigna and Kaplan 2007; Enikolopov, Petrova and Zhuravskaya 2011; Durante and Knight 2012), sexual orientation, gender schemata/roles (Calvert and Huston 1987; Signorielli 1990; Rivadeneyra Lebo 2008).<sup>1</sup> Worth mentioning, public health research has found that children who are heavy viewers perceive TV as more realistic and are more likely to aspire to jobs shown on TV (Wright et al. 1995).

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<sup>1</sup> Similarly, there is also evidence for an effect of radio on voting behavior (Adena et al. 2015) and violence (DellaVigna et al. 2014; Yanagizawa-Drott 2014).

Our study also relates to the literature on the effects of edutainment on entrepreneurship. However, edutainment for entrepreneurship is about implementing a specific contents in entertainment shows on TV to purposely increase audience knowledge about the specific educational issue, and aims, similarly to more traditional classroom entrepreneurship education, at transferring skills and abilities as to increase the likelihood of successfully running an own business (Bjorvatn et al. 2015; Berg and Zia 2013; Banerjee and Duflo 2011; Singhal and Rogers 1999). Differently, the main mechanism of impact in our paper is the transmission of more general preferences and values that influence the view of and the aspiration to entrepreneurship as an occupational alternative in the first place.

### 3. Empirical Setting—Entrepreneurship and West German TV in East Germany

This section describes the conditions for entrepreneurship in East Germany and the availability of West German public TV.

#### *Conditions for entrepreneurship in East Germany*

Entrepreneurship in the GDR did essentially not exist. It was not compatible with the socialistic ideology fundamentally based on the belief that capital alone is unproductive, labor is the only production factor that creates value (while using capital), and that a ‘liberal’ economy fails to guarantee a ‘fair’ distribution of the value added between capital owners and workers. Thus, in a socioeconomic order, in which capital is concentrated in only few individuals and wealth defines well-being and prospects, individuals will actually be not free, and such a system will inevitably generate tensions and ultimately break down. A nationalization of private assets and capital as well as more social and redistributive state will, on the opposite, help create an egalitarian society, which will guarantee freedom from economic restraints and equality of opportunities, and help sustain social peace.

In this line of thinking, entrepreneurship was seen in the GDR neither as an expression of a fundamental individual and economic freedom, nor as a mechanism to create jobs and foster innovation and economic development. Entrepreneurs were rather ‘capitalists’ that exploit workers. Accordingly, a process of expropriation of private firms, land as well as further private property and wealth was launched in the GDR already in 1946, immediately after the WWII and the division of Germany, and ‘throttled’ virtually all private economic activities (Pickel 1992). This had twofold consequences. First, many existing private companies fled head over heels to West Germany. Second, starting an own business in the GDR became virtually impossible and only very few private firms continued operating, solely in cases where a ‘solution’ could not be provided by the central state or it was particularly ineffective and infeasible. However, also these firms were heavily regulated and controlled and nearly all of them partly ran by the state, whereas the owners became virtually agents of the central state. At the same time, the role of the central state in private, social and economic life has been extended. Specifically, a paternalistic state has been established, which

guaranteed right to work, a retirement pension, as well as medical care and other social services to everybody. The socialistic doctrine also implied a redistributive state, i.e. removing differences in various respects and an equalization of socioeconomic conditions in order to ensure equality of opportunities and prospects for everybody and everywhere.

In public life, entrepreneurs were stigmatized and referred to as unsocial. For instance, education was deliberately designed and systematically used, yet instrumented, for the purpose of the official state doctrine to form a specific mindset in the population, to inculcate 'socialist' individuals with a critical attitude toward liberal economies and the role of capital and entrepreneurs (Latsch 2015; Falck, Gold and Heblich 2016; Fuchs-Schuendeln and Masella 2016). Specifically, the alleged exploitation of workers by entrepreneurs was an overarching topic in school curricula (subject called Social Studies or *Staatsbuergerkunde*; SBK 1983a, b; SBK 1984), and students have been taught that entrepreneurs 'pocket' the value created by workers.

TV in East Germany was also politically motivated and, from its very beginning, instrumented for the purpose of the official state doctrine. In fact, the central state recognized the role of media in influencing public opinion and TV was officially considered a well suited mean to spread the socialistic ideology and to streamline or raise individuals accordingly (Norden 1965; Holzweissig 2002). In order to achieve the goal of promoting the socialistic agenda, the East German TV broadcasted often and extensively discussions of political and social issues, typically placed at prime time. Moreover, even entertaining on East Germany TV was biased towards the official state doctrine (Braumann 1994; Holzweissig 2002). What to be produced and broadcasted was carefully planned by the central authorities based on two criteria: (i) content, images, and messages had to be not critical with respect to the official state ideology, (ii) not only talent of the actors, but also their political orientation (Honecker and Lamberz 1977).

Overall, the socialistic doctrine and the centrally-planned economy in the GDR had devastating effects on private firm ownership and entrepreneurship. In fact, from virtually similar levels prior the WWII in East and West Germany, the share of self-employment dropped to 1.65 percent by 1989 in East Germany, while it was 10.5 percent in West Germany. The handful private firms in the GDR were fairly small, typically consisting of the owner (pro-forma and actually agent of the central state) and only very few employees, and almost exclusively concentrated in retail industry and handcraft industry (craftsmen, artisans) (Brezinski 1987).

More importantly, however, the formal and informal institutions in the GDR broke the natural ties linking entrepreneurship and the characteristics of the individuals by suspending the respective underlying mechanisms at individual level. In particular, the equal economic and social 'treatment' of all individuals, irrespective of individual efforts, and the fact that the central state decided and provided for the needs of the own citizens, without giving them responsibilities (nor rights) undermined responsibility and discouraged creativity, own initiative and proactive behavior. For instance, Friehe, Pannenberg and Wedow (2015) find significant differences between former GDR and FRG residents regarding important attributes of personality such as locus of control, neuroticism, conscientiousness, and openness, which

are also found to be related to entrepreneurship (Parker 2009; Acs and Audretsch 2010). Similarly, Alesina and Fuchs-Schuendeln (2007) find that, after the Reunification, East Germans are more in favor of redistribution and state intervention than West Germans, and that they believe less that individual behavior, own initiative and effort are responsible for ones wellbeing, rather than the state or mere luck. The effects of the GDR socialization were found especially strong for older cohorts, who lived under communism for a longer time period. Alesina and Fuchs-Schuendeln (2007) also estimate that the effects of the socialistic regime will last over generations for 20 to 40 years. Moreover, research shows that socialization in the GDR resulted ultimately in differences in the behavior and the economic prospects of former GDR compared to former West German citizens. In particular, the socialization in the socialist regime led to a lack of self-reliance in East Germans (born and) living in the regions of the former socialist GDR as compared to their West German counterparts who have always lived in the free market economy of the FRG (Bauernschuster et al. 2012). These differences seem to be of a significant magnitude and to persist after the breakdown of the regime in 1989, and can also not be explained by differences in individual characteristics or economic development. Moreover, Bauernschuster et al. (2012) suggest that this lack of self-reliance in East Germany might be responsible for a comparably lower entrepreneurial incidence. Furthermore, Falck, Gold and Heblich (2016) show that East German students, irrespective of whether they received some education in the GDR or in the free-market economy after the Reunification, have lower entrepreneurial intentions than students that grew up in West Germany.

#### *West German TV in the GDR*

In the GDR, West German public TV (i.e., *ARD*, *ZDF*) was exogenously available in large parts of the country, which influenced individuals' mindset. Besides the provision of TV for the own citizens, a further, politically motivated objective of West Germany was to make its own TV available also to all East German citizens since its very start on Dec 25, 1952. In fact, West Germany refused to recognize the existence of another German state until the Basic Treaty (*Grundlagenvertrag*) in 1972. Even after that, Reunification was a fundamental element in the official West German doctrine. Thus, parts of the West German public TV program were specifically designed for the GDR (e.g., *The Morning Show*, *Vormittagsprogramm*, since 1961) and TV transmitters were purposely located along the inner German border and in West Berlin as to ensure broadcasting in the territory of East Germany.

Nearly all residents of East German areas with access to West German public TV already prior the Reunification actually watched it, a fact that became widely known as 'enduring subscription' of East German citizens to West German TV or a 'collective desertion from the Republic every evening' (Dohlus 1991; Braumann 1994; *Zentralarchiv fuer Empirische Sozialforschung* ZA 6073 and ZA 6008). While East German TV was perceived due to its political mission as drab and dreary and heavily biased with respect to both, entertaining as well as the representation and discussion of social, political and economic issues, West German public TV was considered by East Germans as an objective and free medium and was highly appreciated as an alternative source of information or alternative

point of view and perspective. In fact, West German public TV was used to verify the impartiality of the East German journalism and to fill potential information gaps; anecdotal evidence and interviews with East German citizens even suggest that some citizens learned about the true nature of the socialistic state from Western TV (Braumann 1994; Holzweissig 2002). However, also entertaining on West German public TV transmitted messages and images of free and self-determining individuals. For example, the character of Bobby Ewing from the popular “Dallas” soap suggested a picture of a firm owner very different from that of an ‘unsocial capitalist’ that was characteristic for the socialistic doctrine. Either way, West German public TV was seen as an antipode to East German TV and provided ‘food’ for critical discussion, thus stimulating own thinking and opinion (Holzweissig 2002).

From the perspective of the East German state, West German public TV was perceived as a ‘menace’ and there were some, though unsuccessful, attempts to prevent East German citizens from watching it. For instance, jamming West German public TV or removing aerials able to receive West German public TV turned out either infeasible or largely ineffective and were defaulted.<sup>2</sup> Very soon, the state-owned East German TV remained the only mean to counteract West German ‘propaganda’. Erich Honecker, the General Secretary of the Socialist Unity Party of Germany, who led the GDR from 1971 until the fall of the Berlin Wall in 1989, referred himself TV to as to the most powerful weapon of the socialistic state (Norden 1965; Honecker and Lamberz 1977; Holzweissig 2002).<sup>3</sup> This, however, had adverse effects on popularity of the own TV and positive effects on that of the West German one. In particular, the instrumentation of TV in East Germany as a mean to counter-fight the perceived western propaganda further exacerbated its political bias, making it even less popular. In the early 1980’s, the socialistic state tried to eliminate the rising misalignment between own interests and those of the public. Since December 1982, the East German TV

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<sup>2</sup> Jamming West German public TV signal turned out infeasible since it could not be restricted to the territory of East Germany and would have impeded TV reception in West Germany too. Another campaign, called ‘*Ochsenkopf*’, was started already in the early 1960s with the aim at removing aerials suited to receive West German public TV, however, was also abandoned soon. Specifically, the broadcasting frequency of West German public TV differed from that of the East German one and the aerials required to receive West German public TV looked differently, often nicknamed ‘*Ochsenkopf*-aerials, after the West German TV transmitter ‘*Ochsenkopf*’ in the *Fichtelgebirge* mountain in Northern Bavaria close to the inner German border. Accordingly, East German households that wanted to watch Western television were potentially recognizable. Thus, ‘voluntary’ troops of the Free German Youth (*Freie Deutsche Jugend, FDJ*), the official youth movement of the GDR and the Socialist Unity Party of Germany, were sent out to seek, locate and remove such aerials. However, also this venture failed. The number of households with ‘*Ochsenkopf*-aerials was too large. Moreover, in vicinity of West German transmitters, for instance in Berlin and surroundings or along the inner German border, reception of West German TV was also possible with indoor aerials. In cases where outdoor aerials were required, East German citizens showed creativity in locating the aerials. In fact, the division ‘Political Agitation’ of the Central Committee of the Socialistic Party reported in 1966 that East German citizens often mounted ‘*Ochsenkopf*-aerials on balconies or window ledges just before starting watching and dismounted them afterwards. Not least, such campaigns were considered by the population as a violation of privacy and the Socialistic Party feared larger conflict with the public.

<sup>3</sup> TV in East Germany was considered so important as a mean to promote the socialistic ideology that the central state did—despite technological backwardness, material shortages and production difficulties of the East German economy—put tremendous efforts to ensure fast and complete spread of TV in the entire country. TV in East Germany, the German TV Broadcast (*Deutsche Fernsehfunk, DFF*), started officially on January 3, 1956; on October 3, 1969, a second channel was introduced, *DFF 2*. While at the beginning, there were only few TV receivers in East Germany, the share of household that owned a TV receiver increased to 94 percent by 1986 at a pace comparable with that in West Germany and other industrialized countries, at times even faster (Norden 1965; Holzweissig 2002; Meyen 2003; Table A1).

changed its program (*alternative Programmgestaltung*). Journalistic was shortened and moved to later broadcasting time; only exception were topics and events regarded as particularly important for the central state. Instead, East German TV started broadcasting at prime time entertaining: movies, series, talks, humor, sports, and other shows ‘demanded’ by the public (Holzweissig 2002).<sup>4</sup> Overall, however, the attempts to keep the public attached came fairly late, while the identification of East German citizens with the own TV was already seriously disturbed. Data collected in East Germany prior the Reunification and classified until 1990 reveal a continuously decreasing identification of East German citizens with the own TV till the fall of the ‘Iron Curtain’ in 1989 (Braumann 1994).

Empirical studies indicate an influence of West German public TV on different dimensions of the personality and behavior of East German citizens: material aspirations (Hyll and Schneider 2013), consumption patterns (Bursztyn and Cantoni 2016), self-reliance (Hennighausen 2015), xenophobia (Hornuf and Reiger 2017). A common approach in these studies is to combine information about individuals’ current residence (post Reunification) and information about the regional availability of West German public TV signal prior the Reunification to construct a measure for each individual’s exposure to TV and to relate it to the outcome of interest for the period after the Reunification in 1990. A notable exception is Hyll and Schneider (2013) and Hennighausen (2015), who use data on the outcome of interest collected during the GDR era. Considering our research question, namely the impact of TV on entrepreneurship, the study that is most closely related to our research question is probably Hennighausen (2015), who find evidence that residents of regions that had access to West German TV are more inclined to believe that a high level of effort pays off for the society and also for themselves.

#### 4. Identifying the Effect of West German public TV on the Entrepreneurship Incidence of East German citizens

This section describes the data and the empirical strategy to identify the causal effect of West German public TV on the post Reunification entrepreneurial incidence among the inhabitants of East German areas where it could be received and was watched prior the Reunification in 1990.

##### *Data and Definitions*

Elementary for our analysis is the assessment of the geographical availability of West German public TV in East Germany.<sup>5</sup> Since no official information is available, we follow Bursztyn

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<sup>4</sup> A few western movies were imported like the Danish ‘Olsen gang’ about a fictional gang of habitual criminals. Similarly, East German TV started airing the sport show ‘*Sport Echo*’ on late Saturday afternoon. The program started showing the top matches of the first GDR soccer league (*Oberliga*) as a counterpart to the West German TV ‘*Sportschau*’ that broadcasted at the same time on Saturday (much more attractive) West German first league (*Bundesliga*) soccer.

<sup>5</sup> Mainly the first public West German TV, *ARD*, could be received almost anywhere and everywhere in East Germany. The strength of the signal of the second public West German TV, *ZDF*, was somewhat weaker and its availability was sometimes hampered by weather conditions. Private West German TV could be received mainly

and Cantoni (2016) who, in a recent study on the effects of West German TV on the consumption behavior of East Germans, use an irregular terrain model (ITM version 1.2.2; Hufford 1995) to predict the strength of West German public TV signal at specific location depending on characteristics of the transmitter (height, power, frequency) and characteristics of the respective location (distance from transmitter, geography, topology). In particular, the territory of the GDR is divided in 1×1 kilometer cells (ca. 52 arc-seconds) and the strength of the signal of the first public West German TV (*ARD*) is predicted at 10 meters above the ground under normal weather conditions. However, because data on entrepreneurship in Germany is available only at the level of the NUTS3 regions (*Kreise*)<sup>6</sup>, the (unweighted) average signal strength for these regions is calculated and a region is classified as being able to receive West German public TV if the average signal strength exceeds the threshold of -86.8 dB, the average signal strength in the city of Dresden. The choice of this particular discontinuity-threshold is justified by anecdotal evidence that West German public TV was generally not available in Dresden (known as ‘Valley of the Clueless’), except for only few small quarters located at hills and under optimal weather conditions (Bursztyn and Cantoni 2016). However, also data of the *Zentralarchiv fuer Empirische Sozialforschung ZA 6073* and *ZA 6008* show that, in Dresden less than 6 percent of the inhabitants watched West German TV daily and ca. 68 percent never, while in adjacent regions, classified as being able to receive West German TV, ca. 95 percent of the inhabitants watched it daily or several times per week and only 1-2 percent never (cf. Table 1 and Table A2).

Overall, there are 75 East German regions in which West German public TV signal was exogenously available and 11 regions, in which it was not (Figure 1).<sup>7</sup> The East German regions, in which West German public TV signal was exogenously available accounted for about 85 percent of the total population, while the few regions without such access (in the North-East and in the South-East around the city of Dresden) for only 15 percent (Hesse 1988; Buhl 1990; Etzkorn and Stiehler 1998; Stiehler 2001; Hyll and Schneider 2013; Hennighausen 2015; Bursztyn and Cantoni 2016; *Zentralarchiv fuer Empirische Sozialforschung ZA 6073* and *ZA 6008*). In these areas the strength of the signal of West German public TV transmitters was below the threshold required for reception due to geographical and topological reasons (i.e. these regions were either too far away from West German TV transmitter stations or surrounded by mountains). Thus, we define our treatment variable as a binary one, with unity for East German regions in which West German public TV signal could be received prior the Reunification in 1990 and zero for East German regions where West German public TV signal was not available at that time.

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by satellite or cable; *RTL* could be received by aerials, however, only in selected areas in West Germany but not in East Germany. In East Germany satellite antennas and cable TV infrastructures were very rare until 1990.

<sup>6</sup> The NUTS3 regions (*Kreise*) are fairly small units and map the geographical availability of West German TV signal reasonably well (see also Bursztyn and Cantoni 2016).

<sup>7</sup> NUTS3 regions (*Kreise*) classified as such, in which West German public TV signal was not available on average are: Greifswald (13001), Neubrandenburg (13002), Stralsund (13005), Demmin (13052), Nordvorpommern (13057), Ostvorpommern (13059), Ruegen (13061), Uecker-Randow (13062), Dresden (14612), Goerlitz (14626), Saechsische Schweiz-Osterzgebirge (14628). All other NUTS3 regions are classified as such, in which West German public TV signal was available on average. Berlin is not included in our analysis. East Berlin was capital of the GDR, and resources were disproportionally allocated to East Berlin at the expense of other parts of the country. Moreover, the fusion of East and West Berlin makes it impossible to separate the former western and eastern part of the city.

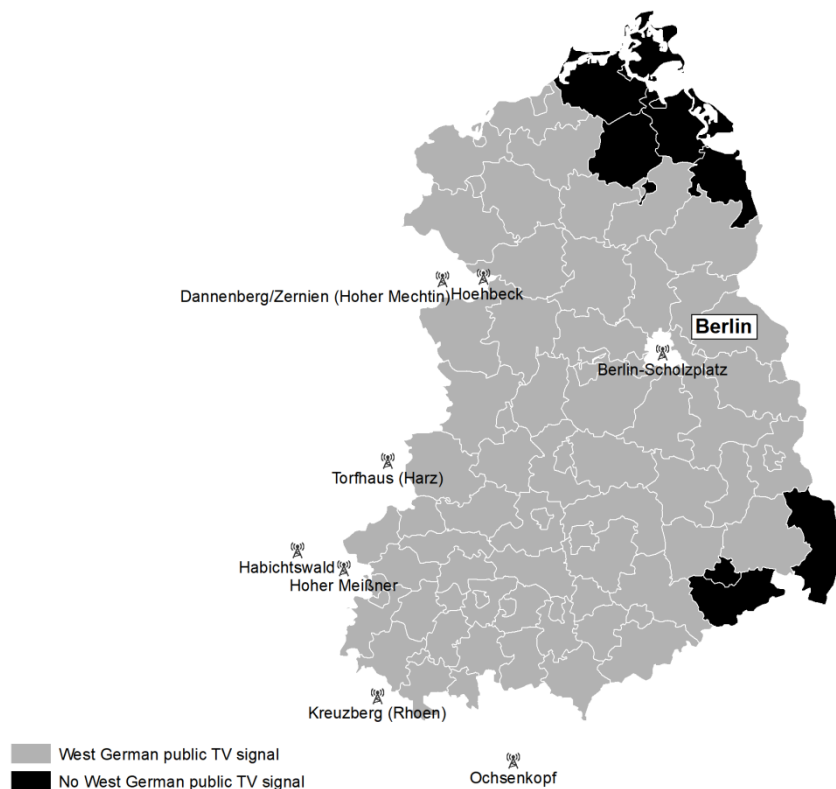


Figure 1: East German regions with and without West German public TV signal

The entrepreneurship data that we use stem from the ‘Mannheim Foundation Panel’, and are originally collected by *Creditreform*, Germany’s largest credit rating agency, and prepared by the Center for European Economic Research (*ZEW*) (Engel and Fryges 2002).<sup>8</sup> There are several important advantages of these data in our specific case. The data contain information on the yearly number of newly started firms that are registered in the German Trade Register (*Handelsregister*). However, also small firms and other business ventures that are typically unregistered and therefore difficult to identify, enter the data depending on the scope of their credit demand and on their business relations. This is of a particular importance in East Germany, since a non-negligible fraction of the newly founded firms are relatively small scale and in selected industries such retail and personal or not-business-related services. Another advantage related to the specific East German context is that the data allow identifying and sorting out East German firms that have been privatized after the Reunification in 1990 and that are not de novo entrants.

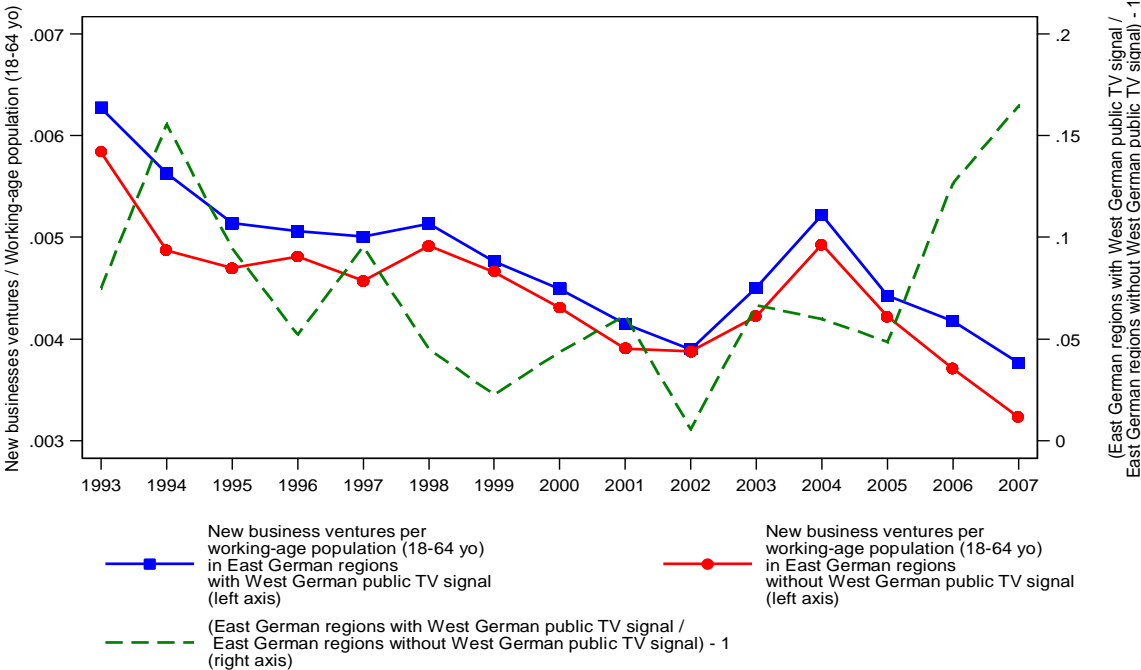
<sup>8</sup> Alternatively, data from the Establishment History Panel (*BHP*) at the Institute for Employment Research in Nuremberg (*IAB*) have been also used to measure entrepreneurship at regional level. In these data, however, new firm can be identified, only if and not before they hire at least one employee subject to Social Insurance.



We look at the period after the Reunification of Germany in 1990, because starting an own business in East Germany became possible only with the integration of the GDR into West Germany and the adoption of the free-market system. Moreover, with the Reunification West German TV became available in all East German regions. We use data from 1993 until 2007. For earlier years, 1990-1992, the data are considered not particularly reliable (Engel and Fryges 2002). We stop in 2007 due to data availability reasons and because new businesses enter the data with a significant time lag (in cases 70 months).<sup>9</sup> This delay might be particularly long for small firms in specific industries since these are typically unregistered and detected by *Creditreform* only with their first credit demand of a certain volume (Engel and Fryges 2002).

*Identification*

A first look at the data (Figure 2) shows that, on average for the period of analysis from 1993 to 2007, the incidence of entrepreneurship was higher in East German regions that could receive West German public TV signal prior the Reunification in 1990 (blue solid line, squares) than in East German regions that could not (red solid line, circles). Moreover, there is no evidence suggesting a fade out. The difference in entrepreneurship incidence between regions with West German public TV signal and such without (green dashed line) varies on average around 7-8 percent of the entrepreneurial incidence in regions without TV signal and does not seem to disappear with time.



Note: Information on new businesses ventures stems from the 'Mannheimer Foundation Panel' of the Center for European Economic Research (ZEW) and includes yearly number of newly founded firms and persons becoming self-employed. Working-age population is population aged 18-64 from Federal Statistical Office. Regions are NUTS3 (definition 2010): 75/11 regions had/not West German public TV signal prior the Reunification in 1990; Berlin is excluded.

Figure 2: Entrepreneurship in East German regions with and without West German public TV signal prior the Reunification in 1990

<sup>9</sup> In our analysis of the mechanisms causing possible persistence, we use individual level data until 2015.

To identify the true impact of TV on average for the period after the Reunification, 1993-2007, we use an econometric framework that essentially compares the entrepreneurial incidence in East German regions where West German public TV could be received prior the Reunification in 1990 to that in East German regions where West German public TV could not be received. Our basic regression specification is<sup>10</sup>

$$Y_{it} = \alpha + \beta \cdot TV_i + X'_{it} \cdot \gamma + Z'_i \cdot \delta + D_t + \varepsilon_{it}. \quad (1)$$

The dependent variable,  $Y_{it}$ , indicates the entrepreneurship incidence in an East German NUTS3 region  $i$  at time  $t$ , as measured as the number of new firms started each year per working-age population (18-64 years old).  $TV_i$  is our binary treatment variable that indicates the availability of West German public TV signal, with unity if West German public TV signal could be received in an East German region  $i$  prior the Reunification in 1990 and zero otherwise (see above for details on the classification of regions into such with and such without West German public TV signal).  $X'_{it}$  and  $Z'_i$  are sets of control variables: unemployment, qualification structure, industry structure and firm-size structure (from the Social Insurance Statistics and the Establishment History Panel of the Institute for Employment Research, *IAB*), as well as age structure and in- and out-migration (from the Federal Statistical office).  $\alpha$  is a common intercept.  $D_t$  is a full set of year dummies.  $\varepsilon_{it}$  denotes the error term. The coefficient of interest is  $\beta$ . The easiest way to think of  $\beta$  is as of the average post-treatment difference (i.e., for the period after the end of the treatment with the German Reunification in 1990) in the entrepreneurship incidence in regions with access to West German public TV prior the Reunification and East German regions without such access.

To address the question about the persistence of the possible effects of TV on entrepreneurship we estimate a regression specification in which the impact of TV, the  $\beta$ , is allowed to vary over time:

$$Y_{it} = \alpha + \beta_t \sum TV_i \cdot D_t + X'_{it} \cdot \gamma + Z'_i \cdot \delta + D_t + \varepsilon_{it}. \quad (2)$$

The variation of  $\beta$ 's over time indicates whether and how the possible impact of TV on the yearly entrepreneurship incidence changes over time, in particular whether it fades out or persists.<sup>11</sup> As mentioned above, on the one hand, differential exposure to West TV started in 1953 and ended in 1990, so that several successive cohorts were treated. However, since the probability to become an entrepreneur is typically inverse-U-shaped in age with a maximum at around 40 years and does not vary between different cohorts, the effect of an one-eff treatment might c.p. vanish with time as the individuals exposed to the treatment leave the optimal age window for entrepreneurship. On the other hand, already-entrepreneurs might signal to other individuals that entrepreneurship is an alternative to dependent employment or point towards business opportunities that have not been realized/recognized so far. Moreover, there might be a process of inter-personal and inter-generational transmission of values,

<sup>10</sup> We also estimate more demanding specifications in order to prove the robustness of the results (cf. Results).

<sup>11</sup> We prefer this specification over an essentially identical one that includes the main effect of TV and the time-interaction terms, because (i) it is more convenient when it comes to confidence intervals for the yearly effect of TV and (ii) the  $\beta$ 's can be directly compared to the differences between East German regions with West German public TV and such without in Figure 2 (green dashed line).

norms and preferences, which could stimulate the formation of a self-sustaining entrepreneurial ‘culture’, and lead to persistent differences between population groups or regions.<sup>12</sup>

A straightforward way to get estimates for the impact of TV according to equations (1) and (2) is to use OLS.<sup>13</sup> However, for the  $\beta$ 's to capture the true effect of TV on entrepreneurship certain conditions have to be fulfilled. The entrepreneurship incidence in East German regions with West German public TV signal and such without and its development over time prior the period of analysis (i.e. prior 1990) need to be comparable; if there are any differences, these need to be accounted for. Otherwise,  $\beta$  might capture—beyond the pure effect of TV—further systematic differences between regions with and without West German public TV signal. Moreover, contemporary influences that might lead to differential development of entrepreneurship in the two types of regions must be accounted for. While our econometric approach takes the later issue explicitly into account (by means of the sets of control variables included in  $X'_{it}$  and  $Z'_i$  in equation (1) and (2)), the first condition deserves some more discussion.

Generally, our empirical setting provides a number of reasons that do not suggest systematic differences between regions with West German public TV signal and such without. As detailed above, whether West German public TV could be received or not in a given East German region depended on the location of West German TV transmitters and on region's geography/topology, and should, therefore, not be related to past levels and development of entrepreneurship in the respective region. Unless there are specific reasons for a link between region's geography/topology and the incidence of entrepreneurship, the regional variation in access to West German public TV could be considered exogenous from regions' perspective, thus ensuring the comparability of the two groups of regions and providing a gold standard setting to identify causal effects. Moreover, there is no evidence for spatial sorting of individuals with certain characteristics that might be related to entrepreneurship (e.g. West German view of life) in East German regions with access to West German public TV, which might confound the estimates. Specifically, due to heavy regulation of professional life, job mobility and geographical migration in the GDR were very limited (Mohs 1980). In the GDR, professional training, job supply and allocation were centrally planned and coordinated. Accordingly, people in the GDR typically stayed where they were born and on their first job a lifelong. Data indicate that interfirm mobility in the GDR dropped sharply with the establishment of the socialistic state and then continued decreasing to reach ca. 9 percent in 1979 and ca. 7 percent by the collapse of the GDR; for a comparison, interfirm mobility in West Germany was 17 percent during the crisis in 1983 and 24 percent during the boom years prior the Reunification in 1990 (Gruenert 1997a, b). Spatial mobility that is naturally lower than job mobility was particularly low in the GDR due to the shortage of residential building and centrally planned allocation of housing (Ehmer 2013). Overall, between 1970 and 1988 the geographical mobility in the GDR was ca. 2.5 per 100 citizens on average per year, around the half of the respective figure in West Germany (various Statistical Yearbooks of the GDR; Ehmer 2013).

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<sup>12</sup> Social interactions, a major transmission vehicle, are local (Glaeser et al. 2010).

<sup>13</sup> We prefer OLS over Hausman and Taylor (1981) or Correlated random-effects (Mundlak 1978; Wooldridge 2010) and hybrid models (Allison 2009), which have also been used with time invariant variables.

Moreover, using data from 1989 (prior the fall of the Berlin Wall and the beginning of our period of analysis, 1993-2007), we do not find evidence for differences between East German regions with access to West German public TV and such without regarding a number of structural characteristics used in prior empirical research as determinants of local entrepreneurship (Table 1). Importantly, we find almost no differences regarding the share of self-employed persons in working-age population in 1989.<sup>14</sup> Furthermore, there are no major differences in terms of industry structure. Moreover, as suggested by the official state doctrine of providing equal socioeconomic conditions, we find virtually no differences in employment levels and qualification structure between East German regions with and without West German public TV signal. Furthermore, we compare the shares of self-employed persons in 1925 as a proxy for long-term ‘innate’ regional differences in entrepreneurship (e.g. entrepreneurial ‘culture’ or mindset), which might ‘pop up’ once free market conditions are restored again. However, these shares seem on average fairly similar across regions with and without West German public TV signal.

Table 1: Characteristics of East German regions with and without West German public TV prior the Reunification in 1990

	Regions without West German public TV	Regions with West German public TV
<i>Share of sector employment in total employment in 1989 (%)</i>		
Construction	7.47	6.50
Energy	3.10	2.66
Chemicals	1.44	3.98
Metals	0.64	1.62
Engineering	14.63	17.40
Light	4.68	6.51
Textiles	0.85	2.27
Food	5.82	4.16
Agriculture	15.23	13.97
Post, Telecom, Banks, Retail, etc. (omitted)		
Share of employment in working-age population in 1989 (%)	79.11	80.86
<i>Qualification of employees in 1989 (%)</i>		
Tertiary education	7.26	7.01
Technical college ( <i>Fachschule</i> )	14.62	13.85
Master craftsman diploma	4.38	4.34
Secondary education with full degree ( <i>Facharbeiter</i> )	60.16	61.90
Secondary education without full degree	3.22	3.53
Without above education	10.35	9.38
<i>Share of residents watching West German public TV in 1988/89 (%)</i>		
Daily or several times per week	15.12	92.50
Never	67.85	1.84
Self-employed in working-age population, year 1989 (%)	1.38	1.69
Self-employed share, year 1925 (%)	12.29	11.80

<sup>14</sup> There are no GDR data available that allow us to construct a measure fully identical to the entrepreneurial incidence (i.e., the yearly start-up rate) in a region after the Reunification in 1990. Thus, we use the share of self-employed persons in working-age population as a proxy for the conditions for entrepreneurship and self-employment.

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*Note:* Information about industry structure, employment level, and qualification structure stem from official East German data processed at the Institute of Employment Research (*IAB*) and is available at the NUTS3-level (*Kreise*, definition 2010) (cf. Rudolph 1990). The GDR definition of working-age population includes students, disabled individuals, self-employed and family workers, service members, and retired women between 60 and 64 (retirement age for women in GDR was 60), which explains the low share of employment in that age class.

Information about the intensity of watching West German TV by residents of East German regions stem from high-quality data collected by the Central Institute for Youth Research (*Zentralinstitut fuer Jugendforschung*) by means of anonymous and unmarked individual questionnaires in 1988-1989, immediately prior the fall of the Berlin Wall. Intensity of watching was measured in five categories: daily, several times per week, ones per week, seldom, never. Here, only the share of residents that watch West German TV daily or several times per week / never is reported. Regional assignment is possible only at the level of the GDR districts (*Bezirke*), which are significantly larger than the NUTS3 regions that we use in the empirical analysis. Precisely due to this relative large size, some parts of the Dresden district actually had access to West German TV, which explains the comparably large share of individuals that watched West German TV daily or several times per week. Data have been collected for the districts of Schwerin, Magdeburg, Berlin, Cottbus, Leipzig, Karl-Marx and Erfurt, in which West German TV was available as well as the district of Dresden, where West German TV was generally not available. Data from the further districts with West German TV access (Neubrandenburg, Potsdam, Frankfurt Oder, Cottbus, Halle, Gera, Suhl) as well as from the second district with no access to West German TV (Rostock) are unfortunately not available.

Data on self-employment in East Germany in 1989 have been originally collected by the GDR Statistical Office and then adjusted to the NUTS3 regional definition (Kawka 2007).

Self-employment in 1925 is the share of self-employed males in non-agricultural private sector industries in all male employees without helping female members. Self-employment/Entrepreneurship by women was not typical in Germany in 1925 (Fritsch and Wyrwich 2014). Data stem from *Statistik des Deutschen Reiches* (1927).

In a further, more thorough test for systematic differences prior the period of analysis between regions with West German TV signal and such without, which might confound the estimates for the effect of TV, we regress the share of self-employed persons in the working-age population in East German regions in 1989 on the availability of West German public TV signal and a set of regional characteristics that are typically used in prior research on the determinants of entrepreneurship and self-employment at regional level (Table 2). This approach provides explicit test for differences in the levels of entrepreneurship/self-employment immediately prior the period of analysis. Nevertheless, the results are also informative of differences in trends, which are difficult to test since longitudinal data on entrepreneurship/self-employment from the GDR period are not available. On the one hand, prior empirical research has largely established that the determinants of both, entrepreneurship over time and cross-sectional differences in the long run, tend to be the same (cf. Fritsch and Storey 2015; Fritsch 2011). On the other hand, as detailed above, the formal and informal institutions in the GDR (e.g. centrally planned economy, paternalistic and redistributive state, equality of socioeconomic conditions, etc.) suspended the mechanisms naturally linking entrepreneurship/self-employment and the characteristics of the individuals across regions, which might cause differential trends. Not only were private firms almost completely nationalized with the establishment of the socialistic state after WWII, but also starting an own business became equally impossible everywhere. Accordingly, we expect (i) no differences between regions with West German TV signal and such without, and (ii) low, if any, explanatory power for the included RHS variables.

Indeed, the results presented in Table 2 provide no evidence for systematic differences in self-employment between East German regions with and such without West German TV signal in 1989; the estimate for the availability of West German TV is close to zero and statistically insignificant. We do find that the local industry structure explains a significant

portion of the cross-regional variance in the level of self-employment in 1989, a result to be, however, expected since private firm ownership in the GDR was concentrated in few specific sectors. Apart from that, however, the average characteristics of the residents of a region do not provide meaningful results and/or have virtually no explanatory power. For instance, the results for qualification structure indicate that self-employment tend to be lower in regions with comparably more residents with higher and/or technical qualification, whereas empirical research has established a positive relationship between qualification and entrepreneurship and self-employment at both, individual and regional level (Parker 2009; Acs and Audretsch 2010; Fritsch 2011). Similarly, the results indicate no relationship between the share of employed persons in total working-age population and local self-employment level, while previous literature documents a strong association between employment status and the propensity to become entrepreneur or self-employed (Parker 2009; Acs and Audretsch 2010; Fritsch 2011; various waves of the Global Entrepreneurship Monitor). Importantly, we do also find no association between past (in 1925) self-employment and self-employment in 1989 under the planed-economy regime in the GDR, whereas previous research has established that (some of) the determinants of entrepreneurship and self-employment are ‘sticky’, thereby causing high persistence at regional level. For instance, Fritsch and Wyrwich (2014) report that the self-employment rate in German regions in 1925 is still positively correlated with self-employment and start-up rates after 1990 under free market conditions.

Overall, we are confident to draw a causal inferences from the OLS estimates of  $\beta$ 's from specifications (1) and (2) regarding impact of TV on entrepreneurship.

Table 2: Explaining self-employment in East Germany, 1989

Share of self-employed in working-age population in East Germany 1989						
<i>Share of sector employment in total employment in 1989 (ln)</i>						
Construction	-0.061 (0.087)				-0.048 (0.089)	-0.049 (0.090)
Energy	-0.033 (0.024)				-0.010 (0.034)	-0.010 (0.034)
Chemicals	-0.004 (0.020)				-0.000 (0.021)	-0.000 (0.021)
Metals	0.019 (0.014)				0.019 (0.014)	0.019 (0.014)
Engineering	0.079 (0.067)				0.090 (0.069)	0.089 (0.075)
Light	0.170*** (0.038)				0.155*** (0.051)	0.155*** (0.047)
Textiles	0.045*** (0.013)				0.051*** (0.016)	0.051*** (0.015)
Food	-0.140* (0.075)				-0.108 (0.088)	-0.107 (0.091)
Agriculture	0.070*** (0.019)				0.107*** (0.033)	0.107*** (0.033)
Post, Telecom, Banks, Retail, etc. (omitted)						
<i>Share of employees by qualification in 1989 (ln)</i>						
Tertiary education		-0.128 (0.328)			0.118 (0.250)	0.106 (0.270)
Technical college ( <i>Fachschule</i> )		-1.285* (0.679)			-1.039* (0.526)	-1.050* (0.535)
Master craftsman diploma		-0.949*** (0.344)			0.020 (0.281)	0.012 (0.321)
Secondary education with full degree ( <i>Facharbeiter</i> )		0.950 (1.999)			-1.852 (1.465)	-1.916 (1.724)
Secondary education without full degree		-0.0279 (0.207)			-0.320 (0.195)	-0.327 (0.202)
Without above education(omitted)						
Share of employment in working-age population in 1989 (ln)				-0.385 (0.353)	-0.638 (0.397)	-0.636 (0.404)
Self-employed, year 1925 (ln)					-0.147 (0.350)	0.270 (0.311)
West German public TV (yes=1, no=0)						0.008 (0.105)
Constant	-3.724*** (0.481)	-9.660** (3.706)	-4.246*** (0.0984)	-4.478*** (0.770)	-6.579** (2.729)	-6.716** (3.451)
NUTS3 regions	86	86	86	86	86	86
R <sup>2</sup>	0.651	0.313	0.008	0.004	0.694	0.694

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*Note:* Results from OLS regression, robust standard errors. Level of analysis NUTS3 regions (*Kreise*, definition 2010); Berlin is excluded.

Data on self-employment in East Germany in 1989 have been originally collected by the GDR Statistical Office and then adjusted to the NUTS3 regional definition (Kawka 2007).

Information about industry structure, employment level, and qualification structure stem from official East German data processed at the Institute of Employment Research (*IAB*) and is available at the NUTS3-level (*Kreise*, definition 2010) (cf. Rudolph 1990).

Self-employment in 1925 is the share of self-employed males in non-agricultural private sector industries in all male employees without helping female members. Self-employment/Entrepreneurship by women was not typical in Germany in 1925 (Fritsch and Wyrwich 2014). Data stem from *Statistik des Deutschen Reiches* (1927).



## 5. Results

This section reports the results of the empirical analysis. Overall, we find strong evidence that TV can influence entrepreneurial identity and the decision to start an own business. In addition, we find differences in the entrepreneurial incidences between different (geographically defined) population groups or regions, which last at least in the medium term and are arguably caused by second-order effects due to the inter-personal and inter-generational transmission of entrepreneurial behavior.

### *Effects on Average, 1993-2007*

In Table 3 we report the results from OLS estimations of different specifications of equation (1) for the effect of the availability of West German public TV in East German regions prior 1990 on the entrepreneurship incidence in these regions for the period 1993-2007 on average. We start with a fairly basic specification and then successively add further control variables to prove the robustness of the results for the variable of main interest. In specification (1.1) we include time dummies to control for all kinds of influences that equally apply to regions with and without West German public TV signal (e.g. macroeconomic business cycles, changes in national and global demand and market conditions, national policy changes, etc.) as well as the employment shares in sixty two-digit industries (WZ1993) to account for systematic sectoral differences between regions. In specification (1.2) we additionally include the distance to the next West German NUTS3 region at the inner German border to account for possible confounding effects since (i) many West German firms were started in East Germany or (ii) moved to East Germany or (iii) opened plants in East Germany, particularly in regions along the inner German border, because of lower costs of factors of production (i.e., labor), and partly due to lower transportation costs, and subsidies. In specification (1.3), we additionally include the shares of the inhabitants of a region in different age groups (18-24 yo; 25-34 yo; 35-44 yo; 45-54 yo; 55-64 yo; rest) since the propensity to start an own business varies with age. In specification (1.4), we include the shares of local employment with different qualification levels (low, middle, high, and unknown) since the entrepreneurship propensity differs with qualification. In specification (1.5), we deploy the shares of local firms in different size classes to account for that (i) the individual probability to start an own business differs with the size of the current employer and/or (ii) firms of different sizes have different subsidiary probability. In specification (1.6), we include the local unemployment rate to account for differential entrepreneurship propensity from un-/employment. In specification (1.7), we use the shares of local residents that in- and out-migrate to account for the possibility (i) that (in- and/or out-)migration is related, both at individual and local level, to entrepreneurship, and (ii) that not all current local residents might have grew up and been socialized in the region prior 1990. In specification (1.8), all control variables mentioned above are simultaneously included; in specification (1.9) all control variables but in- and out-migration are deployed since information on in- and out-migration is available only from 1995 on, but not for the entire period of analysis, 1993-2007. In specification (1.10), we include—in addition to all previously used control variables—also the share of self-employed in working-age population in 1989 as a catch-all control variable for the conditions at the end

of the GDR regime. In specification (1.10), we further include the share of self-employed in 1925 to account for further, not directly observed, ‘innate’ local factors and conditions that might cause long-term regional differences in the entrepreneurship incidence. Specifications (1.11) is based on (1.10), except for the fact that in- and out-migration are excluded again, since available only from 1995 on. In specification (1.12), we control for region-specific time trends by including a flexible third order (cubic) polynomial; in this specification, we exclude age structure as well as in- and out-migration since these are likely to follow region-specific trends.

Overall, the results reported in Table 3 indicate that, on average for the period 1993-2007 when entrepreneurship and self-employment became possible in East Germany, the entrepreneurship incidence is higher in regions that had West German public TV signal prior the Reunification in 1990 than in regions without access to West German TV, across specifications by 9-10 percent.<sup>15</sup>

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<sup>15</sup> The results for the control variables are as expected and not further discussed.

Table 3:: TV and Entrepreneurship – Basic results

Dep: NEW_BUSINESSES / POP_18-64 (ln)	(1.1)	(1.2)	(1.3)	(1.4)	(1.5)	(1.6)	(1.7)	(1.8)	(1.9)	(1.10)	(1.11)	(1.12)
TV <sub>i</sub> (yes=1; no=0)	0.147*** (0.028)	0.106*** (0.031)	0.112*** (0.032)	0.0808** (0.031)	0.105*** (0.029)	0.103*** (0.030)	0.0845*** (0.032)	0.0683** (0.030)	0.0898*** (0.030)	0.117*** (0.031)	0.0879*** (0.032)	0.139* (0.081)
2digits_IND_SHARES <sub>it</sub>	+	+	+	+	+	+	+	+	+	+	+	+
D <sub>t</sub>	+	+	+	+	+	+	+	+	+	+	+	
NUTS3*TREND												+
NUTS3*TREND <sup>2</sup>												+
NUTS3*TREND <sup>3</sup>												+
DIST_KM_TO_WEST <sub>i</sub> (ln)		-0.062*** (0.019)	-0.051*** (0.019)	-0.084*** (0.020)	-0.069*** (0.019)	-0.055*** (0.019)	-0.060*** (0.018)	-0.081*** (0.021)	-0.081*** (0.021)	-0.049** (0.021)	-0.060** (0.023)	0.017 (0.059)
POP_18-24_SHARE <sub>it</sub> (ln)			0.007 (0.175)					0.086 (0.175)	0.098 (0.165)	-0.023 (0.167)	0.014 (0.186)	
POP_25-34_SHARE <sub>it</sub> (ln)			0.0453 (0.208)					-0.166 (0.204)	-0.015 (0.196)	-0.180 (0.197)	-0.253 (0.209)	
POP_35-44_SHARE <sub>it</sub> (ln)			0.545** (0.214)					0.581*** (0.217)	0.432** (0.203)	0.347* (0.200)	0.489** (0.219)	
POP_45-54_SHARE <sub>it</sub> (ln)			0.479*** (0.158)					0.548*** (0.161)	0.399** (0.156)	0.405*** (0.151)	0.512*** (0.170)	
POP_55-64_SHARES <sub>it</sub> (ln)			0.192 (0.207)					0.270 (0.208)	0.261 (0.196)	0.283 (0.204)	0.286 (0.216)	
POP_REST_SHARE <sub>it</sub> (ln) (omitted)												
EMPL_UNKNOWN_QUALI_SHARE <sub>it</sub> (ln)				0.021 (0.044)				0.076 (0.048)	0.043 (0.044)	0.027 (0.042)	0.059 (0.048)	-0.114 (0.076)
EMPL_MIDDLE_QUALI_SHARE <sub>it</sub> (ln)				-0.320 (0.252)				0.169 (0.280)	-0.166 (0.267)	-0.451* (0.258)	-0.103 (0.298)	-0.549 (0.518)
EMPL_HIGH_QUALI_SHARE <sub>it</sub> (ln)				0.136** (0.064)				0.203*** (0.068)	0.149** (0.063)	0.109* (0.059)	0.160** (0.073)	0.003 (0.096)
EMPL_LOW_QUALI_SHARE <sub>it</sub> (ln) (omitted)												
FIRMS_20-49_EMPL_SHARE <sub>it</sub> (ln)					0.269** (0.120)			0.144 (0.128)	0.331*** (0.103)	0.225** (0.112)	0.088 (0.131)	0.488** (0.209)
FIRMS_50-1999_EMPL_SHARE <sub>it</sub> (ln)					-0.119 (0.081)			-0.116 (0.098)	-0.030 (0.081)	0.038 (0.080)	-0.061 (0.099)	-0.0225 (0.116)
FIRMS_200+_EMPL_SHARE <sub>it</sub> (ln)					-0.131** (0.055)			-0.160** (0.061)	-0.127** (0.057)	-0.073 (0.055)	-0.117** (0.059)	-0.0445 (0.086)
FIRMS_1-19_EMPL_SHARE <sub>it</sub> (ln) (omitted)												



### *Robustness*

In Table 3 we find a strong evidence for an effect of TV on entrepreneurship across various specifications and conditional on different sets of control variables. We account for a large number of contemporary factors that might influence entrepreneurship. Additionally, we include historical entrepreneurship rates as a catch-all control for (not directly observed) regional characteristics that might cause systematic and persistent differences in the entrepreneurship incidence across regions. Moreover, we control for all kinds of unobserved factors that lead to region-specific trends in entrepreneurship incidence.

As an additional robustness test we include now (Table 4) also dummies for Planning regions (*Raumordnungsregionen, ROR*) to account for further unobserved, time-invariant factors shared by adjacent NUTS3 regions belonging to the same larger spatial units. The Planning regions are functional economic entities that are supposed to account for spatial clustering of (i.e., similarity in) socioeconomic conditions, economic and social interactions, and migration/commuting at smaller geographical scale and, therefore, comprise of typically three to four NUTS3 regions (BBR 2003).

Overall, the results from these additional tests which are presented in Table 4 clearly show that our previous findings of significant differences in the entrepreneurship incidence between regions with and such without West TV are robust to the inclusion of the Planning regions dummies that control for unobserved, time-invariant factors shared by NUTS3 regions in the same Planning region; at the same time, the Planning regions dummies are jointly significant and increase the share of explained variance.

Table 4: TV and Entrepreneurship – Further robustness tests

Dep: NEW_BUSINESSES / POP_18-64 (ln)	(1.13)	(1.14)	(1.15)	(1.16)
TV <sub>i</sub> (yes=1; no=0)	0.111*** (0.035)	0.103*** (0.035)	0.084** (0.042)	0.089** (0.038)
2digits_IND_SHARES <sub>it</sub>	+	+	+	+
D <sub>t</sub>	+		+	
D <sub>Planning Region</sub>	+		+	
D <sub>t</sub> x D <sub>Planning Region</sub>		+		+
DIST_KM_TO_WEST <sub>i</sub> (ln)	-0.064** (0.032)	-0.066* (0.035)	-0.095*** (0.035)	-0.088** (0.038)
POP_18-24_SHARE <sub>it</sub> (ln)	0.048 (0.164)	0.008 (0.186)	0.127 (0.197)	0.141 (0.184)
POP_25-34_SHARE <sub>it</sub> (ln)	-0.050 (0.193)	0.440** (0.187)	-0.003 (0.220)	0.422** (0.209)
POP_35-44_SHARE <sub>it</sub> (ln)	0.397* (0.219)	0.499** (0.251)	0.647** (0.258)	0.650** (0.270)
POP_45-54_SHARE <sub>it</sub> (ln)	0.353** (0.151)	0.540*** (0.151)	0.533*** (0.187)	0.755*** (0.161)
POP_55-64_SHARES <sub>it</sub> (ln)	0.297 (0.208)	0.525** (0.205)	0.388 (0.238)	0.599** (0.242)
POP_REST_SHARE <sub>it</sub> (ln) (omitted)				
EMPL_UNKNOWN_QUALI_SHARE <sub>it</sub> (ln)	0.032 (0.042)	0.115** (0.054)	0.064 (0.053)	0.083 (0.067)
EMPL_MIDDLE_QUALI_SHARE <sub>it</sub> (ln)	-0.350 (0.271)	0.299 (0.319)	-0.077 (0.322)	0.162 (0.348)
EMPL_HIGH_QUALI_SHARE <sub>it</sub> (ln)	0.150** (0.060)	0.184** (0.074)	0.158** (0.073)	0.188** (0.074)
EMPL_LOW_QUALI_SHARE <sub>it</sub> (ln) (omitted)				
FIRMS_20-49_EMPL_SHARE <sub>it</sub> (ln)	0.303*** (0.107)	0.435*** (0.127)	0.226* (0.129)	0.410*** (0.144)
FIRMS_50-1999_EMPL_SHARE <sub>it</sub> (ln)	0.035 (0.080)	0.038 (0.090)	-0.046 (0.099)	-0.009 (0.101)
FIRMS_200+_EMPL_SHARE <sub>it</sub> (ln)	-0.072 (0.049)	-0.114** (0.053)	-0.103* (0.056)	-0.162*** (0.057)
FIRMS_1-19_EMPL_SHARE <sub>it</sub> (ln) (omitted)				
UNEMPL / POP_18-64 <sub>it</sub> (ln)	-0.002 (0.038)	0.017 (0.038)	0.006 (0.041)	0.060 (0.041)
IN_MIGRATION / TOTAL_POP <sub>it</sub> (ln)			0.103** (0.042)	0.110** (0.045)
OUT_MIGRATION / TOTAL_POP <sub>it</sub> (ln)			-0.066 (0.046)	-0.029 (0.051)
Self-employed 1989 / WORK_POP <sub>i</sub> (ln)	0.146*** (0.047)	0.128** (0.052)	0.124*** (0.044)	0.101** (0.046)
Self-employed 1925 <sub>i</sub> (ln)	0.305*** (0.093)	0.245** (0.096)	0.148 (0.099)	0.065 (0.095)
Constant	0.445 (1.694)	2.382 (1.712)	1.744 (1.885)	3.433** (1.724)
Observations (NUTS3 regions * Years)	1,288	1,288	1,116	1,116
Years	1993-2007	1993-2007	1995-2007	1995-2007
NUTS3 regions	86	86	86	86
R <sup>2</sup>	0.806	0.877	0.789	0.870

Results of an OLS estimation. Clustered (at NUTS3 level) standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All variables in logs. Berlin is excluded.

Dependent variable, *NEW\_BUSINESSES / POP\_18-64*, is the yearly number of new firms per working age population (18-64 yo) from the Establishment History Panel of IAB. *2digits\_IND\_SHARES* are the shares of employment in sixty two-digit industries (WZ1993) from the Social Insurance Statistics of IAB. *DIST\_KM\_TO\_WEST* is the distance (in km) to the next West German NUTS3 region. *POP\_\*\_SHARE* are the shares of employment in different age categories from the Federal Statistical Office. *EMPL\_\*\_QUALI\_SHARE* are the shares of employment with different qualification levels from the Social Insurance Statistics of IAB. *FIRMS\_\*\_EMPL\_SHARE* are the shares of firms in different size classes from the Establishment History Panel of IAB. *UNEMPL / POP\_18-64* is the share of unemployed in working age population (18-64 yo) from IAB. *IN\_MIGRATION / TOTAL\_POP* and *OUT\_MIGRATION / TOTAL\_POP* are the shares of in- and out-migrated individuals in total regional population from the Federal Statistical Office. *Self-employed 1989 / WORK\_POP* is the share of self-employed in working age population in 1989. *Self-employed 1925* is the share of self-employed males in non-agricultural private sector industries in all male employees without helping female members in 1925 from *Statistik des Deutschen Reiches (1927)* (cf. Fritsch and Wyrwich 2014).

### *Persistence of Effects*

In Table 5 we report the results from our analysis whether the effect of West German public TV which was available in some but not all East German region since starting broadcasting in the 1950s and until 1989, fade out with time or persists, potentially leading to longer-lasting regional differences in entrepreneurial incidence. In particular, we interact our indicator variable for the local availability of West German TV signal ( $TV_i$ ) with year dummies for the period 1993-2007 to allow the effect of TV to differ over time. In specification (2.1) we account for distance to the West, industry structure, age structure, qualification structure, firm size structure, un-/employment, past self-employment from the years 1989 and 1925 as well as common time effects.<sup>16</sup> In specification (2.2), Planning region dummies are additionally included to account for unobserved time-invariant effects that are common to adjacent NUTS3 regions belonging to the same (larger) Planning region. In specification (2.3), the Planning region dummies are interacted with the time dummies to account for unobserved, Planning region-specific time ‘shocks’.

The results indicate that, though some variation over the period, the effect of TV does not disappear with time. Overall, the estimates correspond in terms of magnitude well to the simple differences in the entrepreneurship incidence of regions with West German TV and such without (Figure A1).

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<sup>16</sup> In- and out-migration are not accounted for since available only from 1995 on, which would shorten the period available for analysis of persistence, 1993-2007.

Table 5: TV and Entrepreneurship – Persistence

Dep: NEW_BUSINESSES / POP_18-64 (ln)	(2.1)	(2.2)	(2.3)
1993*TV <sub>i</sub> (yes=1; no=0)	0.093* (0.055)	0.079 (0.052)	0.014 (0.064)
1994*TV <sub>i</sub> (yes=1; no=0)	0.196*** (0.048)	0.170*** (0.047)	0.028 (0.070)
1995*TV <sub>i</sub> (yes=1; no=0)	0.134*** (0.046)	0.116** (0.051)	0.160** (0.062)
1996*TV <sub>i</sub> (yes=1; no=0)	0.118* (0.066)	0.101 (0.070)	0.104 (0.094)
1997*TV <sub>i</sub> (yes=1; no=0)	0.124*** (0.036)	0.109** (0.042)	0.059 (0.049)
1998*TV <sub>i</sub> (yes=1; no=0)	0.091** (0.042)	0.081* (0.044)	0.079** (0.038)
1999*TV <sub>i</sub> (yes=1; no=0)	0.048 (0.042)	0.037 (0.049)	0.108* (0.059)
2000*TV <sub>i</sub> (yes=1; no=0)	0.077* (0.039)	0.066 (0.047)	0.122* (0.062)
2001*TV <sub>i</sub> (yes=1; no=0)	0.109** (0.042)	0.106** (0.048)	0.142** (0.059)
2002*TV <sub>i</sub> (yes=1; no=0)	0.065 (0.049)	0.058 (0.054)	0.115** (0.046)
2003*TV <sub>i</sub> (yes=1; no=0)	0.129*** (0.039)	0.120*** (0.041)	0.181*** (0.066)
2004*TV <sub>i</sub> (yes=1; no=0)	0.111* (0.056)	0.106* (0.056)	0.139*** (0.039)
2005*TV <sub>i</sub> (yes=1; no=0)	0.113** (0.049)	0.115** (0.050)	0.142* (0.080)
2006*TV <sub>i</sub> (yes=1; no=0)	0.178*** (0.060)	0.181*** (0.059)	0.134** (0.057)
2007*TV <sub>i</sub> (yes=1; no=0)	0.207*** (0.058)	0.217*** (0.057)	0.0488 (0.067)
2digits_IND_SHARES <sub>it</sub>	+	+	+
D <sub>t</sub>	+	+	
D <sub>Planning Region</sub>		+	
D <sub>t</sub> X D <sub>Planning Region</sub>			+
DIST_KM_TO_WEST <sub>i</sub> (ln)	-0.049** (0.021)	-0.063* (0.032)	-0.065* (0.035)
POP_18-24_SHARE <sub>it</sub> (ln)	-0.058 (0.171)	0.007 (0.170)	0.001 (0.185)
POP_25-34_SHARE <sub>it</sub> (ln)	-0.146 (0.197)	-0.020 (0.190)	0.451** (0.187)
POP_35-44_SHARE <sub>it</sub> (ln)	0.273 (0.210)	0.291 (0.230)	0.490* (0.250)
POP_45-54_SHARE <sub>it</sub> (ln)	0.407*** (0.150)	0.351** (0.154)	0.554*** (0.153)
POP_55-64_SHARES <sub>it</sub> (ln)	0.256 (0.212)	0.252 (0.217)	0.529** (0.207)
POP_REST_SHARE <sub>it</sub> (ln) (omitted)			
EMPL_UNKNOWN_QUALI_SHARE <sub>it</sub> (ln)	0.028 (0.043)	0.032 (0.042)	0.105* (0.056)
EMPL_MIDDLE_QUALI_SHARE <sub>it</sub> (ln)	-0.444* (0.258)	-0.327 (0.274)	0.254 (0.331)
EMPL_HIGH_QUALI_SHARE <sub>it</sub> (ln)	0.112* (0.061)	0.155** (0.061)	0.186** (0.073)
EMPL_LOW_QUALI_SHARE <sub>it</sub> (ln) (omitted)			
FIRMS_20-49_EMPL_SHARE <sub>it</sub> (ln)	0.256** (0.115)	0.348*** (0.110)	0.447*** (0.130)
FIRMS_50-1999_EMPL_SHARE <sub>it</sub> (ln)	0.013 (0.081)	0.011 (0.082)	0.037 (0.091)
FIRMS_200+_EMPL_SHARE <sub>it</sub> (ln)	-0.072 (0.057)	-0.076 (0.051)	-0.120** (0.054)



FIRMS\_1-19\_EMPL\_SHARE<sub>it</sub> (ln) (omitted)

UNEMPL / POP_18-64 <sub>it</sub> (ln)	-0.020 (0.042)	-0.007 (0.039)	0.020 (0.039)
Self-employed 1989 / WORK_POP <sub>i</sub> (ln)	0.101** (0.042)	0.138*** (0.047)	0.125** (0.053)
Self-employed 1925 <sub>i</sub> (ln)	0.399*** (0.084)	0.308*** (0.091)	0.250*** (0.095)
Constant	-0.609 (1.530)	0.035 (1.749)	2.403 (1.730)
Observations (NUTS3 regions * Years)	1,288	1,288	1,288
Years	1993-2007	1993-2007	1998-2007
NUTS3 regions	86	86	86
R-squared	0.782	0.810	0.878

Results of an OLS estimation. Clustered (at NUTS3 level) standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All variables in logs. Berlin is excluded.

Dependent variable, *NEW\_BUSINESSES / POP\_18-64*, is the yearly number of new firms per working age population (18-64 yo) from the Establishment History Panel of IAB. *2digits\_IND\_SHARES* are the shares of employment in 60 two-digit industries (WZ1993) from the Social Insurance Statistics of IAB. *DIST\_KM\_TO\_WEST* is the distance (in km) to the next West German NUTS3 region. *POP\_\*\_SHARE* are the shares of employment in different age categories from the Federal Statistical Office. *EMPL\_\*\_QUALI\_SHARE* are the shares of employment with different qualification from the Social Insurance Statistics of IAB. *FIRMS\_\*\_EMPL\_SHARE* are the shares of firms in different size classes from the Establishment History Panel of IAB. *UNEMPL / POP\_18-64* is the share of unemployed in working age population (18-64 yo) from IAB. *IN\_MIGRATION / TOTAL\_POP* and *OUT\_MIGRATION / TOTAL\_POP* are the shares of in- and out-migrated individuals in total regional population from the Federal Statistical Office. *Self-employed 1989 / WORK\_POP* is the share of self-employed in working age population om 1989. *Self-employed 1925* is the share of self-employed males in non-agricultural private sector industries in all male employees without helping female members in 1925 from *Statistik des Deutschen Reiches* (1927) (cf. Fritsch and Wyrwich 2014).

### *Really persistence?*

In our main analysis at the regional level, we find no indication for fade out of the effects of TV even more than 15 years after the Reunification in 1990 when differences in treatment disappear and the inhabitants of all East German regions got access to West German TV. These findings correspond to Hennighausen (2015), who report that exposure to West German TV stimulated self-reliance and pro-active behavior of East German citizens and that this effect lasts for at least 10 years after the Reunification. However, it could be argued that our period of analysis is too short in order to make a definitive statement about persistence, because the individual probability for entrepreneurship first increases in age to reach a maximum at around 40 years and then decreases. In particular, since differential treatment took place between 1953 and 1989, it might be that the observed TV effects are due to differences in the entrepreneurial incidence of cohorts that are in the optimal age window for entrepreneurship in our period of analysis. However, if the effects on the entrepreneurial propensity are limited to only individuals directly exposed to the treatment, differences between population groups or regions will inevitably disappear in future. For instance, analyzing the legacy of socialistic socialization during the GDR regime in general, Alesina and Fuchs-Schündeln (2007) estimate that the effects on the individual preferences for redistribution and for more state interventions will probably last for 20 to 40 years—roughly two generations.

However, inter-personal, in particular inter-generational transmission of entrepreneurial behavior might give rise to endogenous self-sustaining level of entrepreneurship causing longer-term or even persistent differences between population

groups and/or regions. Such second-order effects might arise, as detailed above, if those becoming entrepreneurs, deliberately or not, pave the way for others and subsequent generations by showing that entrepreneurship is an alternative to dependent employment in a first place, by pointing towards unrecognized/unrealized opportunities, by stimulating the development of favorable formal and informal institutions, and/or by transferring certain values, norms and preferences that form the entrepreneurial identity of others.

In order to better understand what mechanisms cause and explain our regional level analysis findings of no fade out even more than 15 years after the Reunification in 1990, we utilize further individual data from the German Socioeconomic Panel (GSOEP). GSOEP contains comprehensive information on a variety of characteristics of individuals/households, annually collected by means of a survey of a representative subsample of the German population. Since the major objective of the GSOEP is to allow longitudinal analysis, the surveyed sample is kept stable; panel updates are minor, only to reflect major changes in the socio-economic and/or –demographic structures at the aggregate. We use the information on status and type of employment contained in the GSOEP to construct an individual level panel data set.

Similarly to our analysis above, we apply econometric techniques that compare the probability of East German citizens that had access to West German public TV prior the Reunification in 1990 and those who had no such access. However, our main interest is not on the effects on average for the entire period after the Reunification. Rather, we are interested in the effects for different (birth) cohorts and in different time periods after the Reunification in 1990. This will help to better understand whether our findings are simply due to the fact that successive cohorts that were treated enter and then leave the optimal age window for entrepreneurship in our period of analysis. Moreover, in order to test whether there are second-order effects that might cause long-term, perhaps even persistent differences, we analyze possible differences in the entrepreneurship incidence of individuals born in 1980 and later in households that had an access to West German public TV to that of similar individuals from households without such access. For these individuals, it seems reasonable to assume that up to an age of 10 years, they were interested and exposed to only selected parts of West German TV program that were particularly aimed at children in general and therefore unlikely conveyed, directly or not, any social messages. In other words, for such individuals, impact on their entrepreneurial mindset is arguably more likely only through their parents, which were directly exposed to the West German TV treatment.

Table 6: Explaining Persistence – TV and Entrepreneurship/Self-employment of individuals in different cohorts

Dep: Entrepreneurship/ Self-employment (yes=1; no=0)	Individuals born <1950			Individuals born 1950-1979				Individuals born <=1979				Born >=1980
	Period 1993-1999	Period 2000-2007	Period 1993-2014	Period 1993-1999	Period 2000-2007	Period 2008-2014	Period 1993-2014	Period 1993-1999	Period 2000-2007	Period 2008-2014	Period 1993-2014	Period 1999-2014
<b>TV (yes=1; no=0)</b>	0.003** (0.001)	0.002* (0.001)	0.002** (0.001)	0.008** (0.004)	0.001 (0.005)	-0.001 (0.007)	0.004 (0.003)	0.006** (0.002)	0.001 (0.003)	-0.001 (0.006)	0.003 (0.002)	0.013** (0.006)
$D_t$	+	+	+	+	+	+	+	+	+	+	+	+
Sector dummies	+	+	+	+	+	+	+	+	+	+	+	+
Age (years)	+	+	+	+	+	+	+	+	+	+	+	+
Age <sup>2</sup> (years)	+	+	+	+	+	+	+	+	+	+	+	+
Gender (female=1; male=0)	+	+	+	+	+	+	+	+	+	+	+	+
Years schooling	+	+	+	+	+	+	+	+	+	+	+	+
Unemployment (yes=1; no=0)	+	+	+	+	+	+	+	+	+	+	+	+
Marital status (married=1; otherwise=0)	+	+	+	+	+	+	+	+	+	+	+	+
Entr/self-empl parent (yes=1; no=0)												+
Constant	-0.003 (0.082)	0.347 (0.388)	0.013 (0.067)	-0.025 (0.039)	0.034 (0.062)	-0.122 (0.079)	-0.010 (0.017)	-0.006 (0.015)	0.033 (0.031)	-0.106 (0.068)	0.005 (0.013)	-0.121 (0.098)
$R^2$	0.013	0.021	0.010	0.020	0.023	0.013	0.016	0.016	0.019	0.012	0.013	0.036
Individuals	908	509	919	1,187	803	511	1,204	2,095	1,312	639	2,123	379
N (Individuals*Years)	4,710	2,381	7,457	6,169	4,892	2,677	13,738	10,879	7,273	3,043	21,195	2,059
Average age (in years) in the period of analysis	57	55	59	36	43	51	41	47	44	48	52	23

*Note:* Results of an OLS estimation of the yearly probability of individuals from different cohorts to become an entrepreneur or self-employed in different time periods after the Reunification in 1990 as a function of the availability of West German public TV signal prior 1990. Dependent variable is binary, with unity in the year in which an individual becomes starts an own business, and zero for all previous years. *TV* is binary, with unity if an individual has lived in 1990 in an East German region where West German public TV could be received.  $D_t$  is a set of year dummies. *Unemployment* is binary, with one for years of unemployment. *Entr/self-empl parent* is binary, with one if at least one of the parents is or has been a firm founder or self-employed. Clustered (at individual level) standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Data: German Socioeconomic Panel (GSOEP).

The results of a linear estimation by means of OLS are reported in Table 6. First, the results indicate that individuals who lived in areas where West German TV could be received are more likely to start an own business. However, within a certain cohort, the differences between treated and non-treated tend to become slightly smaller over time. This is consistent with previous findings that the entrepreneurship probability declines after individuals reach certain age, implies, however, that potential differences between population groups or regions will, inevitably, disappear after certain time.<sup>17</sup>

Regarding the subsample of individuals born before 1950, we find that the relationship between exposure to West German TV and the probability to start an own business is more pronounced for the sub-period 1993-1999 than for the subsequent years 2000-2007.<sup>18</sup> In fact, the youngest members of that cohort are between 1993 and 1999 forty to fifty years old (on average 57), between 2000 and 2007 over fifty (on average 55) and (the investment in) entrepreneurship becomes less attractive. Over the entire period, 1993-2014, in the subsample of individuals born before 1950 entrepreneurship propensity is higher for treated individuals than for non-treated.<sup>19</sup>

Similarly, for younger cohorts of individuals born between 1950 and 1979, we find significant differences in the entrepreneurship propensity of treated and non-treated only in first decade (1993-1999) after the Reunification. In that period, the oldest members of that cohort were between forty and fifty years (on average 36), which corresponds well with the empirical findings on the entrepreneurship probability maximizing age. In later periods, 2000-2007 or 2008-2014, we do not find significant differences in the probability of treated and non-treated individuals; in these two period members of that cohort were on average 43 and 51 years old, respectively (cf., footnote 17). For the entire sample of individuals born before 1979, we find very similar results.

A tentative conclusion so far is that TV can point towards entrepreneurial opportunities and can develop entrepreneurial identity, however, the entrepreneurially minded individuals are not only more likely to become entrepreneurs but to do so more quickly. These findings can explain differences between treated and non-treated population groups in the short- and medium run, but do not necessarily imply such in the long run.

However, we find significantly higher entrepreneurship probability in the sub-sample of individuals born in 1980 and later. For these individuals, we assumed that TV their entrepreneurial decision mainly through their parents. Under this assumption, the results are indicative of second-order effects, namely inter-personal and/or intergeneration transmission mechanisms that can cause longer-term difference between treated and non-treated population groups or regions.

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<sup>17</sup> We are aware that treated individuals that do not become entrepreneurs or self-employed in earlier period might downward-bias the results for subsequent years.

<sup>18</sup> There are only very few observations for the third sub-period, 2008-2014.

<sup>19</sup> There might be further specific factors that apply to the subsample of individuals born before 1950, so that treated individuals show higher entrepreneurship probability than non-treated individuals even in higher ages (on average 59): pre-socialistic experience, specific (job market) conditions during the early and turbulent years of transition, etc.

## 6. Summary and conclusions

In this paper we address the question whether the entrepreneurial mindset of individuals and their decision to start an own business can be influenced through TV. In fact, TV conveys—deliberately or not—content that might increase awareness of entrepreneurship as an alternative to dependent employment in a first place, might point to business opportunities that have not been realized/recognized so far, or can promote images, specific values, preferences and norms that might impact on individual identity and the desirability of an occupation.

Empirically, we utilize a quasi-natural experiment setting, namely that during the division of Germany, West German public TV was exogenously available in some (but not all) regions of socialistic East Germany (GDR). In our basic analysis, we apply econometric techniques that essentially compare the entrepreneurship incidence among the inhabitants of East German regions with West German TV signal to that of the inhabitants of regions without such signal for the period after the Reunification in 1990, when free market conditions were restored and entrepreneurship and self-employment became possible again. We control for (i) a large number of contemporary observable factors and region-specific (cubic) time trends, (ii) for regional differences in the level of (quasi) self-employment at the end of the socialistic regime in 1989, (iii) for the conditions for entrepreneurship in 1925 to account for not directly observed region-specific factors that might cause long-term systematic differences, as well as (iv) unobserved time-invariant factors that are common to similar and adjacent regions belonging to the same spatially larger functional economic entity. Moreover, in line with the argument that the formal and informal institutions of the socialistic GDR suspended the natural mechanisms linking entrepreneurship to the characteristics of individuals across regions and made starting an own business equally impossible everywhere, we show that there is no evidence for systematic difference in the level and the development of self-employment in regions with West German TV signal and such without prior the period of analysis. Not least, the very low job and regional mobility in the GDR suggest no spatial sorting of individuals with specific characteristics. Given the empirical setting and the robustness of the results, we are confident in drawing causal inference.

The results reveal that, after the Reunification in 1990, when free market conditions were restored and entrepreneurship and self-employment became possible again, the entrepreneurial incidence among the inhabitants of East German regions that had West German TV signal is higher than that of the inhabitants of other East German regions without West German TV signal and that these differences are still significant, both in terms of magnitude and statistically, even more than 15 years after differential treatment exposure ends.

In an additional individual level analysis, we do not only confirm the findings from our basic analysis at the regional level, but also lift the mechanisms behind our findings of no fade-out. In particular, we show that our findings of no fade-out are not an artefact due to differences in the entrepreneurial propensity of treated and non-treated individuals within multiple successive cohorts, which, however, will inevitably end in diminishing differences

between population groups and/or regions after certain time. Instead, we uncover second-order effects due to inter-personal and/or inter-generational transmission of entrepreneurship from generations directly exposed to the treatment to subsequent generations that are arguably not exposed, which can cause persistent differences in the entrepreneurship propensity across population groups and/or regions.

A strand of the literature research discusses how cultural biases, subjective values and the inter-generational transmission of such affect individuals occupational choices and, therefore, economic development and growth (Chakraborty, Thompson and Yehoue 2016; Doepke and Zilibotti 2013). Another strand of the literature discusses that the choice of a particular occupation depends not only on expected monetary outcomes on the action taken, but also from the certain way individuals behave, particularly according to their own view of who they are or ideally should be and what they should or should not do to live up to this ideal concept of the self (Akerlof and Kranton 2000; Benz and Frey 2008a, b). In this paper we connect these strands of the literature and show that the specific images, values and 'role models' individuals are presented and confronted with, can shape their view of the self, thus influencing their (entrepreneurial) 'identity' and the choices (of occupation) they make, which can lead to long-term differences in entrepreneurship incidence and related economic outcomes between population groups and/regions. More generally, however, we would like to look at the findings in this a this paper as a stimulus for further research to try to better understand how institutions, in particular informal ones, shape entrepreneurship and related economic development.

In terms of policy, the results point towards the relevance of further channels to stimulate entrepreneurship in addition to more traditional measures. Indeed, existing entrepreneurship policies are typically focused on supporting (nascent or want-to-be-) entrepreneurs while providing skills important for successfully starting and running an own business and, more generally, improving the framework conditions relevant for entrepreneurship (e.g., physical, financial, legal infrastructure, etc.) (for overview see Audretsch, Grilo and Thurik 2007). Only relatively recently, pro-entrepreneurship policy stated realizing the cultural dimensions of the entrepreneurship phenomenon and considering measures based on entrepreneurial 'role models'. Our results suggest a role for instruments aimed at stimulating the development of an entrepreneurial identity and preferences for specific occupations (or esteem attached to) in the first place. Thus, our findings supports the notion promoted by the OECD in its recent "Studies on SMEs and Entrepreneurship" to use media in order to develop a positive image of an entrepreneur and to increase the awareness of entrepreneurship in order to sustain entrepreneurial spirit in prospering regions and to create a pro-entrepreneurship 'culture' in lagging regions.

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## Appendix

Table A1: TV spread in East and West Germany

year	Share of households with TV receiver (in %)	
	East Germany	West Germany
1954	1	4
1956	5	11
1958	17	24
1962	31	37
1964	42	50
1966	54	61
1968	64	71
1970	69	77
1974	80	76
1978	87	80
1982	90	92
1986	94	97

Source: Meyen (2003).

Table A2: Availability and intensity of watching West German public TV in East German regions in 1988/89

	Daily or several times per week / never (%)	West German public TV available
Schwerin	91.62 / 1.05	Yes
Magdeburg	95.57 / 1.11	Yes
Berlin	93.03 / 0.24	Yes
Cottbus	96.67 / 1.67	Yes
Leipzig	82.48 / 5.47	Yes
Dresden	15.12 / 67.85	No
Karl-Marx	93.89 / 2.09	Yes
Erfurt	94.22 / 1.25	Yes

*Note:* Information about the intensity of watching West German TV by residents of East German regions stem from high-quality data collected by the Central Institute for Youth Research (*Zentralinstitut fuer Jugendforschung, Zentralarchiv fuer Empirische Sozialforschung ZA 6073 and ZA 6008*) by means of anonymous and unmarked individual questionnaires in 1988-1989, immediately prior the fall of the Berlin Wall. Intensity of watching was measure in five categories: daily, several times per week, ones per week, seldom, never. Here, only the share of residents that watch West German TV daily or several times per week / never is reported. Regional assignment is possible only at the level of the GDR districts (*Bezirke*), which are larger than the NUTS3 regions that we use in the empirical analysis. Precisely due to this relative large size, some parts of the Dresden district actually had access to West German TV, which explains the comparably large share of individuals that watched West German TV daily or several times per week. Data have been collected for the districts of Schwerin, Magdeburg, Berlin, Cottbus, Leipzig, Karl-Marx and Erfurt, in which West German TV was available as well as the district of Dresden, where West German TV was generally not available. Data from the further districts with West German TV access (Neubrandenburg, Potsdam, Frankfurt Oder, Cottbus, Halle, Gera, Suhl) as well as from the second district with no access to West German TV (Rostock) are unfortunately not available.

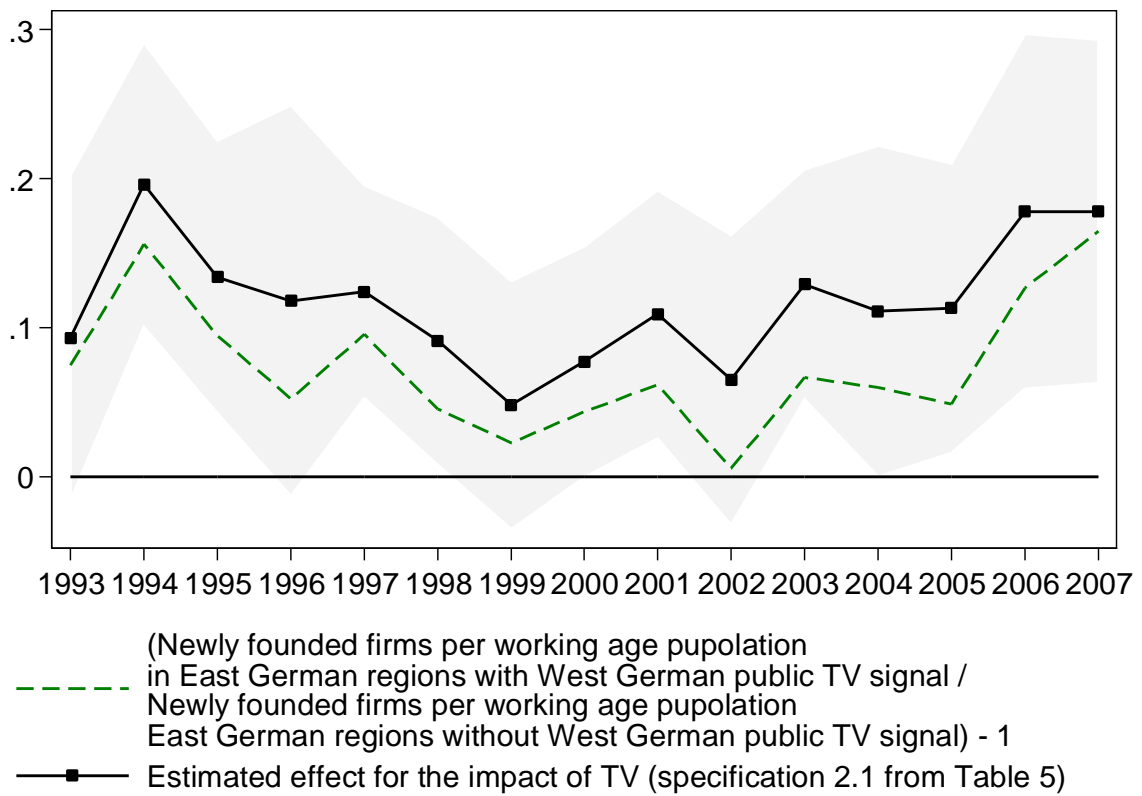


Figure A1: Persistence of TV effects

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