



2005

**Post-Materialism Influencing Total Entrepreneurial
Activity Across Nations**

by

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Number of Pages: 32

The *Papers on Entrepreneurship, Growth and Public Policy* are edited by the
Group Entrepreneurship, Growth and Public Policy, MPI Jena.
For editorial correspondence,
please contact: egppapers@mpiew-jena.mpg.de

ISSN 1613-8333
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Abstract:

The study of predictors of entrepreneurial activity at the country level has been dominated by economic influences. However, the relative stability of differences in entrepreneurial activity across countries suggests that other forces such as institutional and/or cultural factors are at play. The objective of this paper is to explore more specifically how post-materialism may help to explain differences in entrepreneurial activity across countries. A distinction is made between nascent entrepreneurship, new business formation and a combination of the two, referred to as total entrepreneurial activity, as defined within the *Global Entrepreneurship Monitor*. The model is also tested for the rate of established businesses, as distinct from nascent and young firms. The measure for post-materialism is based upon Inglehart's four-item post-materialism index. Because of the known interactions between economic, cultural, and social factors found in previous research, a set of economic, demographic and social factors is included to investigate the independent role post-materialism plays in prediction of entrepreneurial activity levels. In particular, per capita income is used to control for economic effects. Education rates at both secondary and tertiary levels are used as demographic variables. Finally, life satisfaction is included to control for social effects. Data from 27 countries, world-wide, are used to test the hypotheses, based on intersecting data available from the *Global Entrepreneurship Monitor*, *World Values Survey* and other published sources. Findings confirm the significance of post-materialism in predicting total entrepreneurial activity and more particularly, new business formation rates, even when controlling for these other factors.

Keywords:

comparative analysis of economies, cultural economics, entrepreneurship, self-employment, macro-economic analyses of economic development

JEL codes:

P52, Z1, M13, O11, O57

Version:

7 July 2005

Acknowledgement:

We would like to thank Peter van Hoesel, André van Stel, Ingrid Verheul and Sander Wennekers for helpful comments. We would also like to thank Jan Hutjes, Jacques Niehof and Hanneke van de Berg for their contributions to earlier versions of this paper. Earlier versions have been read at the *Small Business and Entrepreneurship Development Conference* (University of Nottingham, UK, 15-16 April 2002), the *Babson Kauffman Entrepreneurship Research Conference* (University of Colorado, Boulder, Co, 6-8 June 2002), *ICSB 47th World Conference* (San Juan, Puerto Rico, 15-19 June 2002) the *BRIDGE Annual Entrepreneurship Workshop* (Bloomington, In, 21 April 2003), the *Global Entrepreneurship Research Conference I*, Berlin (KfW bank), 1-3 April 2004 and the *Workshop on Entrepreneurship and Culture* (Max Planck Institute of Economics, Jena, 7 Februari 2005). The present report has been written in the framework of the research program SCALES which is carried out by EIM and financed by the Dutch Ministry of Economic Affairs. Lorraine Uhlaner acknowledges financial support of Arenthals Grant Thornton Netherlands, Fortis Bank, and Mees/Pierson Bank, a subsidiary of Fortis Bank specialized in private wealth management.

1. Introduction

In the late twentieth century, entrepreneurship re-emerged as a key agenda item of economic policy makers across Europe, both for specific nations as well as for the European Union as a whole (Brock and Evans, 1986; OECD, 1998; European Commission, 1999; Carree and Thurik, 2003). Moderate economic growth coupled with persistently high levels of unemployment stimulated expectations of entrepreneurship's potential as a source of job creation and economic growth (Acs, 1992; Thurik, 1996, Audretsch and Thurik, 2000). This has not always been the case. For instance, in the early and mid twentieth century - in fact until the 1980s - a focus on entrepreneurship was absent from the European economic policy agenda. The exploitation of economies of scale and scope was thought to be at the heart of modern economies (Teece, 1993). Audretsch and Thurik (2001; 2004) characterize this period as one where stability, continuity and homogeneity were the cornerstones and thus label it the '*managed economy*'. Small businesses, and hence the self-employed, were considered to be a vanishing breed.

The late twentieth century witnessed massive downsizing and restructuring of many large firms as well as the decline of the centrally-led economies in Central and Eastern Europe built on certainty and the virtues of scale. By the 1980s evidence mounted to demonstrate that this move away from large firms toward small, predominantly young firms was a sea-change, not just a temporary aberration of the 1970s. Audretsch and Thurik (2001) label this new economic period, based less on the traditional inputs of natural resources, labor and capital, and more on the input of knowledge and ideas, as the '*entrepreneurial economy*'. Paradoxically, the increased degree of uncertainty creates opportunities for small and young firms, and hence leads to higher rates of entrepreneurship, including higher rates of self-employment. Further study shows that this change does not take place in all developed economies at the same time or to the same degree (Audretsch, Thurik, Verheul, Wennekers, 2002). Hence comparative research may explain these variations (Reynolds, Hay, Bygrave, Camp and Autio, 2000; Acs, Arenius, Hay and Minniti, 2005).

This study focuses on the determinants of entrepreneurial activity across countries, as defined in the Global Entrepreneurship Monitor (GEM) (Reynolds, Camp, Bygrave, Autio and Hay, 2001). *Total entrepreneurial activity* is defined as the share of adults in the total population of 18 to 64 years old who are either actively involved in starting a new business (*nascent entrepreneurship*) or in managing a business less than 42 months old (*new business formation*) (Reynolds, Camp, Bygrave, Autio and Hay, 2001). This research study is part of a larger research stream predicting the rate of various business activities at the macro economic-level. Until recently, the only data readily available for many countries combined starter and established business activity into a measure of self-employment. Self-employment level differs largely across countries (Audretsch, Thurik, Verheul and Wennekers, 2002; Wennekers, Thurik and Uhlaner, 2002; Blanchflower, 2000; Grilo and Irigoyen, 2005; Grilo and Thurik, 2005). Self-employment is a major factor benefiting spillover effects of entrepreneurial energy (Wennekers and Thurik, 1999; Reynolds, Hay, Bygrave, Camp and Autio, 2000). However, a widening participation of countries in GEM now makes it possible to retest some of these hypotheses more directly for entrepreneurial activity. In particular, data for GEM allows researchers to compare estimates of nascent, new, and/or established business rates (or a combination thereof) relative to the overall adult population for countries participating in the research program. Grilo and Thurik (2004) even discriminate between six entrepreneurial engagement levels.

Past comparative research, whether for self-employment or aspects of total entrepreneurial activity, has focused primarily on economic factors. Policies for stimulating entrepreneurship

have to take these factors into account. However, policy makers should be aware of the limits of policy influence. In particular, some factors, such as cultural characteristics, which are imbedded in the population and change more slowly, are much less susceptible to policy measures (Hofstede, 2001). That is why a different strand of research is developing which deals with sociological indicators such as culture and institutions. Some of this research uses the indices developed by Hofstede to measure different dimensions of culture, including individualism, masculinity, uncertainty avoidance and power distance (Hofstede, Noorderhaven, Thurik, Uhlaner and Wildeman, 2004; Wennekers, Thurik, van Stel and Noorderhaven, 2005; Noorderhaven, Thurik, Wennekers and van Stel, 2004). Though less well known in the economics literature, an extensive literature in political science exists using an alternative cultural indicator, post-materialism, first coined by Inglehart (Abramson and Inglehart, 1999; Inglehart, 1977; Inglehart, 1990; Inglehart, 1992; Inglehart, 1997; Inglehart, 2000). Post-materialism describes the degree to which a society places immaterial life-goals such as personal development and self-esteem above material security. This phenomenon is a candidate when using cultural characteristics for the explanation of entrepreneurship across countries. Hence, the objective of this paper is to explore whether post-materialism explains differences in total entrepreneurial activity rates across countries. In particular, we investigate to what degree economic or cultural variables including post-materialism dominate the explanation of entrepreneurial activity at the country level. Previous research on a set of 14 OECD countries found a significant linkage between post-materialism and self-employment although the relationship was weakened when other social and economic factors were controlled for (Uhlaner, Thurik and Hutjes, 2002). However, the dependent variable in that study combined the rate of activity for both starters and established firms, and furthermore, did not include nascent entrepreneurial activity. The current study provides an opportunity to examine effects of selected economic, social and cultural factors on total entrepreneurial activity, (as well as its two components: nascent entrepreneurship and starters) separately from its effects on established firms.

Section two of the paper provides an overview of the models used to explain cross-country differences. It also provides a review of the cultural factors thought to influence the rate of total entrepreneurial activity at the aggregated societal level. Section three presents the model and hypotheses tested. Sections four through seven present the method, results, discussion, and conclusion sections respectively.

2. Past research on entrepreneurship rates at the aggregated society level

The rate or level of entrepreneurship at the societal level depends upon the opportunities provided by the environment as well as the capabilities and preferences of the population. These aspects in turn are influenced by available technology, level of economic development, culture, institutions and social demographics. The focus of this section will be on a limited set of those economic, cultural and social factors thought to predict entrepreneurship, based on empirical research available to date. For a further elaboration of these issues we refer to the '*eclectic*' framework of entrepreneurship proposed by Verheul, Wennekers, Audretsch and Thurik (2002) and by Wennekers, Thurik and Uhlaner (2002).

2.1. Push vs. pull factors as influences on entrepreneurship

Applicable to both economic and cultural factors is the notion of push and pull factors for business start-up and entrepreneurship in general (Stanworth and Curran, 1973; Wennekers, Thurik, van Stel and Noorderhaven, 2005). Pull factors are concerned with the expectation of being better off as an entrepreneur. Thus, individuals are often attracted to entrepreneurship with the expectation that it will provide greater material and/or nonmaterial benefits. Push factors take into account the conflict between one's current and one's desired state. Push fac-

tors are often associated with some level of dissatisfaction. Huisman and de Ridder (1984) report that frustrations with previous wage-employment, unemployment and personal crises are among the most cited motives of a large sample of entrepreneurs in eleven different countries. Van Uxem and Bais (1996) find that 50% of almost 2000 new Dutch entrepreneurs mention dissatisfaction with their previous job among their motives to start for themselves. At the macro level, Wennekers, Thurik, van Stel and Noorderhaven, (2005) also find support for push factors of entrepreneurship, as measured by self-employment as a percentage of the labor force. In particular, they find higher self-employment in countries with less prosperity (lower per capita GDP), greater dissatisfaction with society and lower life satisfaction.

2.2. Economic influences on rate of entrepreneurship

Early models of entrepreneurship focused primarily on economic factors to explain differences in self-employment across nations. Blau (1987) uses data on the American labor force to identify which factors caused the growth in entrepreneurship in the latter part of the twentieth century after a very long-term decline. He highlights two key factors: changes in technology and industrial structure. He suggests that these structural changes diminished the comparative advantage of larger firms (scale advantages) and created better opportunities for small firms as their survival became less dependent on their scale based on economic factors alone. In his general equilibrium model of self-employment he assumes that workers try to maximize the utility of income.

In the economic literature, other explanations for the rebound in self-employment in the late twentieth century are based on supply factors such as tax rates, unemployment, competition and female labor participation (Blau, 1987; Blanchflower and Oswald, 1994; Blanchflower, 2000; Evans and Leighton 1989; Meager 1992, Acs, Audretsch and Evans, 1994; Audretsch, Thurik, Verheul and Wennekers, 2002). Acs, Audretsch and Evans (1994), for instance, conclude that self-employment *decreases* with an increase in per capita GNP, female labor force participation, and the relative importance of manufacturing. They also conclude that self-employment *increases* with an increase in the relative importance of the service sector.

Audretsch, Carree, Thurik and van Stel (2005) assume a two-way causation between changes in the level of self-employment and that of unemployment -- a "Schumpeter" effect of entrepreneurship reducing unemployment and a "refugee" or "shopkeeper" effect of unemployment stimulating self-employment. They try to reconcile the ambiguities found in the relationship between unemployment and self-employment by introducing a two-equation model where changes in unemployment and in the number of business owners are linked to subsequent changes in those variables for a panel of 23 OECD countries over the period 1974-1998. The existence of two distinct and separate relationships between unemployment and self-employment is identified including significant "Schumpeter" and "refugee" effects. See Carree, van Stel, Thurik and Wennekers (2002) for a survey of the dual causality between self-employment and economic development at the country level.

Recent statistical evidence points at a reversal of the negative relationship between real income and self-employment occurring at an advanced level of economic development. On the demand side, the employment share of manufacturing declines while that of the services sector increases with rising per capita income, providing more opportunities for business ownership. Moreover, from a certain level of economic development onwards, increasing income and wealth enhance consumer demand for variety (Jackson 1984) creating new market niches where small firms thrive. At the supply side there is a hierarchy of human motivations, ranging from physical needs at the bottom to self-realization at the top (Maslow 1954). Once the main material needs have been satisfied, higher levels of prosperity will give prominence to immaterial needs such as a growing need for self-realization. Because it provides more autonomy, entrepreneurship then may become more highly valued as an occupational choice than

at lower income levels. Carree, van Stel, Thurik and Wennekers (2002) summarize these arguments and hypothesize a U-shaped relationship between per capita income and the rate of self-employment (business ownership) in the labor force. In a three-equation regression analysis, using data for 23 OECD countries in the period 1976-1996, they find empirical support for this hypothesis. The above arguments with respect to the self-employment rate also apply with respect to the (potential) inflow to self-employment. Following this approach, one may expect a U-shaped relationship between per capita income and total entrepreneurial activity. See Wennekers, van Stel, Thurik and Reynolds (2005) for empirical evidence.

In Hofstede, Noorderhaven, Thurik, Uhlaner, Wennekers and Wildeman (2004) a detailed justification is provided of the use of prosperity, female labor share, earning differentials, unemployment and population density when explaining the level of self-employment. They use these economic variables for 23 OECD countries in the period 1974-1994 in their analysis of whether macro indicators of dissatisfaction influence the level of self-employment.

2.3. Culture and entrepreneurship

Though the economic factors influencing entrepreneurship are clearly important, they do not address the possible impact of culture either directly on entrepreneurship or indirectly as an influence on these economic factors. Moreover, there remains a high level of unexplained variation across countries when only economic variables are taken into account. Thus, more recently, researchers have also looked toward cultural factors to explain this variation. This section reviews the basic terminology used with respect to culture, how it has been applied to entrepreneurship research, and finally how the variable of post-materialism is thought to influence entrepreneurial activity.

2.3.1. Definition of culture

Kroeber and Parsons (1958, p. 583) define culture as “patterns of values, ideas and other symbolic-meaningful systems as factors in the shaping of human behavior.” Barnouw (1979, p. 5) defines culture as configurations of “stereotyped patterns of learned behavior which are handed down from one generation to the next.” Hofstede (1980, p. 25) refers to culture as “the collective programming of the mind which distinguishes the members of one human group from another and includes systems and values.” Since values are typically determined early in life (Hofstede, 1980; Barnouw, 1979) they tend to be “programmed” into individuals resulting in behavior patterns consistent with the cultural context and enduring over time (Hofstede, 1980; Mueller and Thomas, 2000). Since extensive research at the psychological level shows a link between values, beliefs and behavior, it is plausible that differences in culture, in which these values and beliefs are imbedded, may influence a wide range of behaviors including the decision to become self-employed rather than to work for others (Mueller and Thomas, 2000).

Culture can be defined for a variety of levels or systems in society with potential interactions between levels. Ulijn and Weggeman (2001) identify four different cultures: occupational or professional culture (PC), organizational or corporate culture, branch or industry culture (BC) and national culture (NC). Then there are those that argue that due to shifting national borders, at least as important if not more important is the concept of culture as defined by a civilization. Huntington (1993) identifies five or six contemporary civilizations: Sinic, Japanese, Hindu, Islamic, Orthodox, Western, and African (possibly), with Western further subdivided into three components: Europe, North America, and Latin America. At each level of culture, one can identify distinct values, norms, language and symbols. Though all these layers are important, differences in cultures may be explained in turn by variations in influences from ancient and modern civilizations from which these national cultures derive (Huntington, 1993).

Since extensive research at the psychological level shows a link between values, beliefs and behavior, it is plausible that differences in national culture, in which these values and beliefs are imbedded, may influence a wide range of behaviors including the decision to become self-employed rather than to work for others (Mueller and Thomas, 2000). Using this logic, several past studies explore the relationship between various aspects of culture and entrepreneurial behavior across cultures (Busenitz, Gómez and Spencer, 2000; Davidsson, 1995; Huisman, 1985; Lee and Peterson, 2000; McGrath and MacMillan, 1992; Mueller and Thomas, 2000; Tiessen, 1997; Wennekers, Thurik, van Stel and Noorderhaven, 2005).

2.3.2. Views regarding the relationships between cultural values and entrepreneurial behavior

Hypotheses on the relationship between cultural indicators and entrepreneurship differ, depending upon whether one chooses to view the relationship from the *aggregate psychological traits* perspective, the *dissatisfaction* perspective, or the *social legitimation* perspective (Davidsson, 1995; Noorderhaven, Wennekers, Thurik and van Stel, 2004; Hofstede, Noorderhaven, Thurik, Uhlaner, Wennekers and Wildeman, 2004). The *aggregate psychological trait* explanation of entrepreneurship is based on the view that if there are more people with entrepreneurial values in a country, there will be an increased number of people displaying entrepreneurial behaviors (Davidsson, 1995: 42; also see Shane, 1993: 67). Davidsson notes that this is essentially the perspective also taken by McClelland (1975) and other proponents of the individualistic view of culture.

Consistent with the push factors described earlier, another explanation for entrepreneurship at the macro level assumes that variation in entrepreneurship is based upon differences in values and beliefs between the population as a whole and potential entrepreneurs. Thus, in a predominantly non-entrepreneurial culture, a clash of values between groups may drive would-be entrepreneurs into self-employment (Baum et al., 1993: 505; and Noorderhaven, Thurik, Wennekers and van Stel, 2004). Based on this view, variation in entrepreneurship is thus based upon *differences* rather than similarities (in contrast to the aggregate psychological traits perspective) between the values and beliefs of potential entrepreneurs and the population as whole. Thus, for instance, countries with larger power distance, stronger uncertainty avoidance, lower masculinity and lower individualism appear to be characterized by more entrepreneurship (see Baum et al., 1993; Etzioni, 1987; Noorderhaven, Thurik, Wennekers and van Stel, 2004; Hofstede, Noorderhaven, Thurik, Uhlaner, Wennekers and Wildeman 2004). Based on the push explanation, referred to in some literature as the *dissatisfaction hypothesis*, the predicted relationship between the cultural indicators and entrepreneurship is thus the opposite to that which might be expected according to the aggregate psychological trait view (Wennekers, Thurik, van Stel and Noorderhaven, 2005; Hofstede, Noorderhaven, Thurik, Uhlaner, Wennekers and Wildeman, 2004).

Finally a third view, which focuses more on the impact of social norms and institutions, refers to the *“legitimation”* or *“moral approval”* or entrepreneurship within the culture at large (Etzioni, 1987: 182-183). This view claims that greater rate of entrepreneurship are found in societies where the entrepreneur is viewed with higher social status, attention to entrepreneurship is paid within the educational system and more tax incentives exist to encourage business start-ups. This results in higher demand for and supply of entrepreneurship (Etzioni, 1987: 175). Although the predictions are in the same direction of that for the aggregate psychological traits view, it is thus due to the impact of institutions rather than the aggregated effects of individual characteristics, although of course the two may be related. (For instance, more individuals may value entrepreneurship as a result of the social status of entrepreneurs in society). In reality, it may be difficult, especially at the macro level, to tease these first and third explanations apart, although they provide a different basis for explaining similar results.

2.3.3. *Post materialism and the cultural dimension*

Though perhaps less well known within the small business and entrepreneurial economics literature than the cultural indices developed by Hofstede (1980), Inglehart's work on post-materialism as a cultural attribute is very well established within the field of political science (1977; 1990; 1992; 1997; 2000). Inglehart uses the concept of post-materialism to help to explain observed changes in values in modern societies. The post-materialism hypothesis describes the transformation in many countries from a culture dominated by more materialistic-oriented individuals to a society in which an increasing proportion of the population favors non-materialistic life-goals over materialistic ones. The hypothesis of post-materialism is based in turn on two subhypotheses, that of *socialization* and that of *scarcity*. The socialization hypothesis assumes that someone's values reflect to a great extent the prevailing circumstances during his or her formative years. The scarcity hypothesis assumes that someone's priorities reflect his or her socio-economic circumstances; therefore (s)he attaches the greatest value to relatively scarce goods. Taken together these two hypotheses imply that, as a consequence of the unprecedented prosperity and the absence of war on the direct soil of Western countries since 1945, younger birth cohorts attach less importance to economic and physical security (materialistic values) than older birth cohorts who experienced poverty (and/or other ravages associated with war) in their early years. Instead, younger birth cohorts give higher priorities to non-material goals such as esteem, self-realization and quality of life (post-materialistic values) often referred to in the psychology literature as Maslow's "higher order needs" (Maslow, 1954).

In his research, Inglehart's findings also support the conclusion that due to intergenerational replacement a gradual shift takes place from materialistic priorities to post-materialistic goals in western countries. A consequence of this shift is a declining emphasis on economic growth in these countries, together with an increasing emphasis on the protection of the environment and the quality of life. Other research on post-materialism shows that in countries with a prevailing post-materialist climate, the emphasis on income attainment is smaller than in materialistic countries (de Graaf, 1988), supporting Inglehart's description of post-materialists as "economic underachievers". The assumption of stability of post-materialist value-orientations within a culture over relatively long periods of time is supported by extensive empirical research from De Graaf using panel-data for the period 1974-1985 (de Graaf, 1988; de Graaf and de Graaf, 1988), as well as others (Dalton 1984; de Graaf, Hagenaaers en Luijkx 1989; Niehof, 1992; Van Deth, 1984). More recent research does show that the trend toward post-materialism is slowing (de Graaf, 1996) or even declining (Van Deth, 1995). Nevertheless, the bulk of the research shows that these values are very slow to change within particular cultures.

3. Model and hypotheses

3.1. Post-materialism and entrepreneurial activity

The underlying premise of this research study is that, nonmaterial motives notwithstanding: a) material gains are central or crucial to entrepreneurship; and b) since those gains, by definition, are of less value to post-materialist individuals, a society that is more post-materialistic is likely to be less entrepreneurial, other things being equal. This premise is closely linked to the psychological aggregate perspective, in that it assumes that in the aggregate, a society with fewer materialistic individuals will also have fewer entrepreneurs. Of course, there is a growing literature that asserts that many nonmaterial factors may also lead to entrepreneurship, such as need for autonomy as a motive for nascent entrepreneurs (van Gelderen, 2004) or dissatisfaction with the previous work itself (Brockhaus, 1982). However, the focus here is still on the link between evidence that entrepreneurs are motivated, at least in part by material

gain. This premise has not been tested previously at the macro-level of analysis but research aggregating individual responses provides some support. For instance, research by McGrath, MacMillan and Scheinberg (1992) shows that individual business owners from a wide variety of countries are more likely to have materialistic values. Entrepreneurs in their study are more likely to define success as ‘making lots of money’, for instance, than their non-entrepreneur counterparts. However, McGrath, MacMillan and Scheinberg (1992) do not test for country differences. Blais and Toulouse (1998) do make such comparisons and conclude that entrepreneurs across countries tend to have similar motivations. In another study of individual entrepreneurs, Robichaud, McGraw and Roger (2001) find a positive correlation between extrinsic motivation of the entrepreneur and sales performance whereas they find negative relationships between the independent variables, intrinsic motivation and autonomy and independence on the one hand and the dependent variable, sales performance, on the other. These findings are interesting because at the micro-level they correspond to the thesis that business owners, especially successful ones, are more materialistic than their counterparts. Lacking comparable research at the macro-level of analysis, we can only draw on these studies for our hypotheses. In particular, assuming that trends from the micro level can be aggregated to the societal level, we predict that the relationship between post-materialism and rate of entrepreneurship is also negative, i.e., the more materialistic the culture, the higher the rate of entrepreneurial activity. Or, stated in reverse:

Hypothesis 1: The more post-materialistic the culture, the lower the rate of entrepreneurial activity.

3.2. Per capita income as a control variable and rate of entrepreneurial activity

The influence of economic factors on entrepreneurship is complex. Past research shows that low levels of prosperity (as measured by gross domestic product) and unemployment are push factors toward self-employment. Low wages in the regular work force often provide an incentive to establish one's own business as a way to increase material wealth (Wennekers, Thurik, van Stel and Noorderhaven, 2005). For instance, an increase in wealth is often accompanied by technological development and an increase in the service sector, developments that – in turn – influence entrepreneurship. At the micro level rising real wages raise the opportunity costs of self-employment making wage employment more attractive (EIM/ENSR, 1996). Several studies show a negative effect of economic development on self-employment (Kuznets, 1966; Schultz, 1990; Bregger, 1996). At the macro level there appears to be a U-shaped relationship between per capita income (economic development) and entrepreneurship (Carree, van Stel, Thurik and Wennekers, 2002). In most developed countries per capita income has been observed to positively impact self-employment since the 1970s (Storey, 1999; Carree, van Stel, Thurik and Wennekers, 2002).

Thus, to understand better the separate impact of post-materialism on rate of total entrepreneurial activity, it is important to control for economic factors. High co-variation does not negate the importance of post-materialism, but a joint regression analysis allows a test of whether post-materialism may contribute independently to an explanation of variation of rate of total entrepreneurial activity. A recent study by Wennekers, van Stel, Thurik and Reynolds (2005) finds that a dominant economic predictor of nascent entrepreneurship is the per capita income. Thus, this variable is chosen as a control in the current study. We state the second hypothesis as follows:

Hypothesis 2: Controlling for per capita income, there exists an independent influence of post-materialism on rate of entrepreneurial activity.

Because of evidence from recent research (Wennekers, van Stel, Thurik and Reynolds, 2005), linear as well as curvilinear effects of per capita income will be examined.

3.3. Education as a control variable and rate of entrepreneurial activity

The importance of education in prediction of occupation has long been recognized in sociological research. For instance, in an extensive study on the American occupational structure, Blau and Duncan (1967) conclude that educational attainment is a more important predictor of someone's occupation than background characteristics such as the father's occupation or education. They also conclude that the intergenerational mobility within business families increases and increasingly, as a result, children of business owners choose to pursue a different career than their parents. More recent research at the individual as unit of observation, suggests that both nascent entrepreneurship (Delmar and Davidsson, 2000; Davidsson and Honig, 2003) and self-employment¹ (Robinson and Sexton, 1994; Cooper and Dunkelberg, 1987) are influenced positively by educational attainment. However, macro research tends to show the opposite effects. Thus, a study at the macro level by Uhlaner, Thurik and Hutjes (2002) shows that a higher level of education in a country is accompanied by a lower self-employment rate. This might be explained by the high covariation in that study, between overall education of the labor force and other economic indicators. Higher educational attainment is highly correlated with the per capita income, for instance. One explanation for this finding is as follows: the growing importance of knowledge and rising educational levels also require organizations to arrange (the way of) production in conformity with the supply of individualistic human capital (Audretsch and Thurik, 2000). Individuals with more education thus often have the chance to achieve as much (or even more) social status when employed by others. Thus entrepreneurship is no longer the only path leading away from lower socio-economic positions. Other research also supports the notion that education may be indirectly linked to a lower rate of entrepreneurship due to its inverse relationship to unemployment (Audretsch, Thurik, Verheul and Wennekers, 2002). Thus, more highly educated people are less likely to become unemployed, which, as stated earlier, is a push factor towards business ownership.

Coupled with this research are other findings that show a fairly strong positive relationship between levels of education and post-materialism (Inglehart, 1997). That is, rising levels of education lead to rising levels of post-materialist values. These findings together with those (negatively) linking education and business ownership lead us to suggest that post-materialist values may mediate the relationship between education and total entrepreneurial activity. We thus state Hypothesis 3 as follows:

Hypothesis 3: Controlling for education, post-materialism still has an independent effect on rate of entrepreneurial activity.

3.4. Life satisfaction as a control variable and entrepreneurial activity

Certain social factors may also influence the rate of entrepreneurial activity. A major factor pushing people toward self-employment is job dissatisfaction. Vroom (1995) reviews literature that shows that life satisfaction is often positively related to job satisfaction. Hence, people who are satisfied with their job may also be expected to be satisfied with life. Brockhaus (1982) finds the self-employed to be relatively strongly dissatisfied with their (previous) work itself, with supervision and with opportunities for promotion (but more satisfied with actual pay). More generally, the state of being out of place or between things (Shapiro and Sokol, 1982, p. 81) often precedes the formation of a company. Dissatisfaction as a motive at the micro level has often been confirmed in survey studies with respect to both job mobility and business start-ups (Noorderhaven, Thurik, Wennekers and van Stel, 2004; Wennekers, Thurik, van Stel and Noorderhaven, 2005). So at the level of the individual, a strong dissatisfaction with life in general is probably associated with a stronger propensity to become self-

¹ Self-employed people here refer to people who have moved beyond the nascent entrepreneurship stage.

employed. What exists at the micro level appears also to exist at the macro level. In a study by Noorderhaven, Thurik, Wennekers and van Stel, (2004), life dissatisfaction is found to be positively correlated with self-employment. On the other hand, Verheul, Thurik and van Stel (2004) find a positive link between life satisfaction and entrepreneurship, especially for women. Thus, the direction of life satisfaction may be either positive or negative. Either way, reviewing these studies, we consider life satisfaction an important control variable.

We thus state Hypothesis 4 as follows:

Hypothesis 4: Controlling for the social factor, life satisfaction, there exists an independent influence of post-materialism on rate of entrepreneurial activity.

4. Research method

4.1. Data and variables

In order to test our central hypothesis about the influence of post-materialism on entrepreneurial activity, data is used from different sources including the GEM and World Value Surveys (Inter-University Consortium for Political and Social Research, 1994), and the World Development Indicators database of the World Bank (2001 and 2002). Because of the known interactions between economic, social, demographic and cultural factors found in previous research, a set of control variables is also included to investigate the independent role post-materialism plays in prediction of rate of entrepreneurial activity. Details on the different variables used in the research are presented in Appendix 1. The measure for post-materialism is based upon Inglehart's four-item post-materialism index. Control variables include per capita income and per capita income squared, percentage of the population in the appropriate age range in secondary education, percentage of the population in the appropriate age range in tertiary education and life satisfaction. Entrepreneurial activity is examined in three ways: nascent entrepreneurship, new business formation, and total entrepreneurial activity. Similar tests were also run for other combinations of business activity, including the established business rate and total business ownership (which combines new business formation and established business rate but not nascent entrepreneurship), the latter being similar to the self-employment rate used in previous research.

4.2. The sample

A database is created from an intersection of available data from several sources, including the Global Entrepreneurship Monitor, the World Values Survey, and the World Bank (See Appendix 1). Although up to 37 countries are available in total, based on the fact that there is only partial overlap between these databases, 27 countries are identified for which complete data is available, including Argentina, Belgium, Brazil, Canada, Chile, China, Denmark, Finland, France, Germany (Western), Hungary, India, Ireland, Italy, Japan, Korea, Mexico, Norway, Poland, South Africa, Slovenia, Spain, Sweden, Switzerland, the Netherlands, the United Kingdom and the United States.

4.3. Data analysis

Initially, bivariate correlations are computed to examine the effects of individual variables on the dependent variable of total entrepreneurial activity. In order to clarify further the construct of post-materialism in relationship to other macro indicators commonly used in the entrepreneurship literature to measure culture, we also include in this table the relationships between post-materialism and the cultural indices measured by Hofstede.

To test Hypotheses 2 to 4, in each case, the control variable is entered in a first model. The significance of the change in R-squared is computed in a second model when post-

materialism is added to the model. In addition, a linear multiple regression is computed with post-materialism and all the control variables together. For the per capita income variable, past research suggests a curvilinear effect with entrepreneurial activity. Thus, preliminary analyses include both the linear and squared term for per capita income. However, since the squared term adds nothing to the overall models, it is excluded from more detailed analyses.

Initial analyses are carried out with both total entrepreneurial activity and starter rates. Similar regressions are also run, substituting each of the Hofstede indices, one by one, for the postmaterialism index. To bring further clarity to the model, different measurements of the dependent variable were substituted for one another (e.g. total entrepreneurial activity, nascent entrepreneurship and new business formation) (See Appendix for definitions). For all regressions, a VIF statistic and tolerance were computed to test for multicollinearity effects. A tolerance greater than .10 was used as a determinant of significance of multicollinearity effects. The VIF statistics are not reported here, but all tolerances were above .10 with the exception of per capita income and per capita income squared, when included together in the same model, as might be expected.

4.4 Tests for robustness

To test for robustness of the primary model (all variable model in Table 2), two tests were carried out. First, the all-variable multiple regression models were calculated for prediction of total entrepreneurial activity for each of 27 subsamples, omitting one of the countries each time.

In a second test of robustness, other postmaterialism indices (including the ten item measures for 1990 and 1995-1997, and the four item measure for 1995-1997) were substituted in prediction of new business formation and total entrepreneurial activity.

5. Results

5.1. Initial test of Hypothesis 1: Bivariate tests and other Bivariate relationships

In an initial test of hypothesis 1, using the Pearson Product-Moment Correlation coefficient, post-materialism is negatively related to total entrepreneurial activity, consistent with the prediction made in Hypothesis 1 ($r = -.37$, $p < .05$, $n = 29$). Examining the subcomponents of entrepreneurial activity separately, however, it appears that post-materialism is more strongly linked to new business formation ($r = -.45$, $p < .05$) than to nascent entrepreneurship ($r = -.23$, ns). Results of other bivariate tests for independent, control, and dependent variables are also presented in Table 1. Postmaterialism is positively associated with per capita income ($r = .70$, $p < .01$), life satisfaction ($r = .68$, $p < .01$), secondary education ($r = .59$, $p < .01$) and tertiary education ($r = .62$, $p < .01$). Regarding the Hofstede indices, post materialism is positively associated with individualism ($r = .43$; $p < .01$) and negatively correlated with power distance ($r = -.54$; $p < .01$). The relationship with masculinity and uncertainty avoidance are negative but nonsignificant.

Table 1 about here

5.2. Tests of Hypotheses 2-4 using Total Entrepreneurial Activity as dependent variable

Table 2 presents a summary of the multiple regression analyses carried out on Total Entrepreneurial Activity for the 27 countries for which comparable data is available. When controlling separately first for per capita income and per capita income squared, post-materialism does

not contribute a significant added R squared to the model (Hypothesis 2). The same is true for education (Hypothesis 3). However, when post-materialism is added to a model with life satisfaction, the added R squared is significant, suggesting that post-materialism adds independent effects to the overall model (Hypothesis 4). Furthermore, when all three control variables are combined with post-materialism (see column five), post-materialism once again makes an added independent contribution to the model ($\Delta R^2 = .07$, $p < .05$). Adding the per capita income-squared term does not substantially change the remaining effects, except, as would be expected, the linear per capita income term. Thus, Post-materialism contributes to the explanation of the variation in total entrepreneurial activity, even when other variables are included. Controlling for economic (per capita income), demographic (education) and social (life satisfaction) factors, there is still a clear residual significant effect of post-materialism. In particular, the findings suggest that societies with a higher level of post-materialism tend to have a lower rate of total entrepreneurial activity.

Table 2 about here

Table 3 presents a series of additional regressions, with the same control variables, but with different definitions of the dependent variable. It would appear from these results, for instance, that although the total R is roughly the same, the contribution of post-materialism to explanation of overall variance is much stronger for new business formation ($B = -9.77$, $t = -4.45$, $p < .001$) than for the nascent entrepreneurship rate, which is nonsignificant ($B = -1.13$, $t = -.45$, ns). Neither postmaterialism nor the overall set of variables predicts the rate of established businesses. The final model, which shows the prediction of total business ownership, once again shows the predictive power of post-materialism, but this is probably only due to the fact that one component of total business ownership is indeed, new business formation (which was previously shown to be predicted by post-materialism). This interpretation is supported by the finding that the other subcomponent of total business ownership, (i.e. established businesses) is not predicted by the post-materialism scale.

Table 3 about here

Because of the differences found between the models predicting nascent entrepreneurship and new business formation, more detailed analyses, (similar to those shown for total entrepreneurial activity, in Table 2) are presented in Tables 4 and 5 respectively.

Tables 4 and 5 about here

Comparing in particular, the all variable model (without the squared per capita term), postmaterialism is clearly more predictive of new business formation than nascent entrepreneurship. The sign ranges from negative to positive depending upon other variables in the model to predict nascent entrepreneurship. For both dependent variables, secondary education has a significant negative effect and life satisfaction has a positive effect. However, the positive effect of tertiary education is only evident in the all-variable model o predict new business formation. Per capita income has no effect on new business formation whereas it has a negative effect on nascent entrepreneurship.

5.3. The Hofstede indices and entrepreneurial activity

Finally, similar regressions are calculated to the overall model, but replacing the postmaterialism index, in turn, by each of the Hofstede indices, in prediction of TEA (see Table 6). In spite of the correlation between postmaterialism and individualism and power distance, in particular, when substituting each of these indices into the model, no significant effect of either index is found in prediction of Total entrepreneurial activity.

Table 6 about here

5.4. Prediction of Established Business Rate

Table 7 summarizes multiple regression analyses using established business rate as the dependent variable. As with nascent entrepreneurship, the only model in which post materialism contributes significant added variance to the model is in the test of Hypothesis 4, with life satisfaction used as control variable. When combined with all the variables, the significance of the B value drops but the direction of the sign remains the same.

Table 7 about here

5.5 Results of tests for robustness

To test for robustness of the primary model (all variable model in Table 2), two tests were carried out. First, the regressions were repeated for 27 subsamples, omitting one of the countries each time. The resulting adjusted R squared ranges from .74 to .82. Though minor fluctuations occur, the model remains fairly stable. With Korea omitted, the model is somewhat weaker (only a trend of $p < .10$ rather than significance level of $p < .05$ for the change in R squared of postmaterialism when added to the other variables in prediction of total entrepreneurial activity) but the fluctuations are minor.

In a second test of robustness, other postmaterialism indices (including the ten item measures for 1990 and 1995-1997, and the four item measure for 1995-1997) were substituted in prediction of total entrepreneurial activity (see Table 8) and new business formation (See Table 9). Similar patterns of results were given, although due to much small sample sizes, the results did not always hold at the same level of statistical significance (See Table 8). In comparing the models, the 1995-7 models are fairly similar, especially using the 4 item index. However, the significance level is less, partly due perhaps to the fact that fewer countries (20 vs. 27) are included in the sample. The B value for the 1981 postmaterialism index is nonsignificant.

Tables 8 and 9 about here

6. Discussion

6.1. Initial discussion of results

In reviewing the four hypotheses as initially stated in this paper, there does appear to be support for Hypothesis 1, predicting a negative relationship between post-materialism and entre-

preneurial activity. This hypothesis is supported for the dependent variable, total entrepreneurial activity and new business formation, but not for nascent entrepreneurship rate. Nor does post materialism predict the total rate of established businesses by country. First, when reviewing results for controls entered separately, Hypothesis 2 is not well supported. For instance, Table 2 shows that when combined in the same equation, the effects explained by per capita income and per capita income-squared appear to remove the explanatory value of postmaterialism in predicting Total entrepreneurial activity. However, when all control variables are included together in the model, the B values and t values for both per capita income and postmaterialism become statistically significant, and in the same direction as predicted. Thus, it is also not clear that Hypothesis 2 should be rejected, on the basis of these results. With respect to education, secondary education has a consistently negative effect on total entrepreneurial activity, as well as the two components, of nascent entrepreneurship and new business formation. When included alone with the postmaterialism and secondary education variables, tertiary education has a positive but nonsignificant B value. However, when included in the all variable model for both TEA and new business formation, the B value for tertiary education becomes positive and statistically significant for both the new business formation and overall TEA model. (A positive trend at the $p < .1$ level is also found for nascent entrepreneurship but not for established businesses). Although the direction of education is not predicted, based on the discussion of the model, we thus find a clear distinction between the effect of secondary education on entrepreneurship (which is negative) and the effect of higher education (which is positive). Regarding the support for Hypothesis 3 as stated, support for independent effects of post-materialism, controlling for education, are found only for the new business formation rate.

Finally Hypothesis 4 tests for the independent effects of postmaterialism, controlling for life satisfaction. This result appears most consistent, across the entrepreneurship and business dependent variables. Thus, post materialism contributes a significant added amount to the models predicting TEA, nascent entrepreneurship, new business formation and established business.

And finally, in the all variable model, post materialism adds significant variation explained to the overall model for new business formation and total entrepreneurial activity but not for nascent entrepreneurship nor for established business rate.

6.2. Further discussion of results

This study corrects the shortcoming of previous studies that use self-employment as a substitute for entrepreneurship activity (Uhlener, Thurik and Hutjes, 2002). This research confirms the importance of post-materialism when explaining total entrepreneurial activity, but especially new business formation. Preliminary regression analyses check for the possibility of a curvilinear effect of per capita income on total entrepreneurial activity. See Carree, van Stel, Thurik and Wennekers (2002) and Wennekers, Van Stel, Thurik and Reynolds (2005). However, it does not provide an added explanation of the dependent variable when postmaterialism, life satisfaction, per capita income, secondary education and tertiary education are included in the model.

Some of the signs are in the expected direction, based on past research, whereas others are not. For instance, as predicted, post-materialism has a negative overall effect on total entrepreneurial activity (as well as new business formation rates). Per capita income also has a negative effect, whether included alone or with the rest of the variables in the model. And secondary education, as predicted, covaries with post-materialism, but still contributes a significant added negative effect when included in the overall regression.

The effects for life satisfaction is more consistent with the findings of Verheul, Thurik and van Stel (2004) than earlier research showing a negative relationship with self-employment rates by Wennekers, Thurik, van Stel, and Noorderhaven, (2005). This is logical since the Verheul, Thurik and van Stel (2004) used the same sources for TEA (GEM data) and life satisfaction (from the world values survey). The Wennekers, Thurik, van Stel and Noorderhaven (2005) study, on the other hand uses self-employment data from the COMPENDIUM source and life satisfaction from the Eurobarometer data, and is based only on countries within the OECD. More specifically, contrary to extensive research carried out by Wennekers, Thurik, van Stel and Noorderhaven, (2005), we find no significant (though slightly positive) effect between life satisfaction and any of the entrepreneurship and business ownership indicators in bivariate analyses, and a significant positive effect when controlling for other factors—not only in a model alone with post-materialism, but even in the all variables model. This is difficult to explain in that this direction holds true even for the total business ownership dependent variable, which is supposed to be comparable to the self-employment variable used in their study. This result would suggest that it may be worth exploring curvilinear contributions of life satisfaction in future research. It could be that different parts of the U-shaped curve may be studied depending upon the time lag and the countries under study. Only three lags were examined in this study (by holding the dependent variable year constant and varying the year in which the postmaterialism index was measured), whereas the self-employment data allows for much more extensive opportunity to test for time lags. However, as new data from the Global Entrepreneurship Monitor accumulates, additional lags can be tested with the entrepreneurial activity rate variable as well. To summarize, there are three possible explanations for the differences in these results: a) different sources of data were used in our study versus that of Wennekers, Thurik, van Stel and Noorderhaven (2005), for both life satisfaction and entrepreneurship; b) different samples of countries were used in the two studies, in particular their study limited only to OECD countries whereas our sample includes poor countries; and finally, our study is primarily a cross sectional rather than panel study. Wennekers, Thurik, van Stel and Noorderhaven (2005) include a panel analysis from 1978 to 2000.

Also interesting is the positive contribution of tertiary education when included with the rest of the variables (though it is nonsignificant when included by itself in a regression model). This is perhaps easier to explain in that a greater pool of university students may provide more impetus to 'high-tech' entrepreneurship initiatives.

Attempting to build theory on the limited number of countries available for this research has its limitations of course. Nevertheless, it is interesting that the models for nascent entrepreneurship, new business formation and established business clearly vary from one another. One might consider that prediction of nascent entrepreneurship is influenced by individual motivation factors. Thus, in countries with higher rates of secondary education, there is a smaller push factor toward self-employment. Other research supports the negative relationship for instance between secondary education and unemployment. Thus, people don't need to start a firm to create a livelihood. On the other hand, the positive effect of tertiary education on new business formation (and to a lesser extent, tertiary education, especially when curvilinear economic effects are controlled for), suggests that higher level education may provide a larger pool of would-be entrepreneurs attracted to the nonmaterial rewards of entrepreneurship, such as greater autonomy (van Gelderen, 2004) or achievement (McClelland, 1975). Another way of looking at the tertiary education variable is that it might replace the upper end of the per capita income curve. Thus the per capita income squared term is replaced by tertiary education, in the all variable model including per capita income squared. By contrast, the secondary education variable may reflect the linear per capita income term at the lower end of the income curve. Certainly more research is warranted that examines different

levels of education as separate dummy variables rather than assuming a linear relationship between education and entrepreneurial activity.

Finally, with respect to life satisfaction, the results are rather puzzling in that they contradict past research. However, the consistency and positive direction of the life satisfaction variable in this study is unequivocal (even when life satisfaction is examined separately with the per capita income variable). Thus, in our study, we find that in contrast to post-materialism, life satisfaction is associated with greater entrepreneurial activity. This contradicts previously cited research that suggests a negative or push effect of dissatisfaction (especially with one's job). There are several possible explanations, once again, although further research will be needed to tease them apart. First, life satisfaction is not the same as work satisfaction. It may be that in this particular sample of countries, life and work satisfaction function more independently as variables than in previous research. This could be a function of country culture, i.e. the extent to which one's work governs one's satisfaction with life in general, the two perhaps being more strongly linked in more distinctly western cultures. Future research that can more closely measure work satisfaction for its separate effects might be able to tease this apart.

6.2. Further discussion: limitations and directions for future research

This study is limited by its small sample size (twenty-seven countries) and by its particular period of time (2002). For clarity regarding time lags, all variables reflect a measurement in one point in time. Sometimes the year chosen was more for practical reasons (more countries available for instance for 1990 than for 1998 for the post-materialism index). However, it is possible that the relationships may alter if data is examined from different periods of time and/or different sets of countries. The relatively small number of cases also leaves open some unresolved questions of robustness. For instance, omitting one or two countries modifies the statistical significance of the postmaterialism index somewhat for TEA (from .05 to .10 level of significance for the delta R-squared) although the signs remain the same. The effect of Korea, in particular, on the model, suggests the need to sample from a more diverse group of countries, and in particular, to represent Asian countries more broadly. (Korea and Japan are the only two Asian countries with data available from both GEM and the World Values Survey.) In short, the conclusions drawn from this study should be tentative, at best. However, the strength and size of the findings, with respect to their significance levels and amount of variation explained, suggest the possible benefits of pursuing the impact of post-materialism on rate of total entrepreneurial activity, and new business formation, in particular. One aspect that needs to be further taken into account is the relative stability of post-materialism. Although earlier research (de Graaf, 1988) pointed to the stability of this cultural characteristic, more recent research suggests that it may be declining. However, examination of individual country data shows decline in some countries and increase in others. Thus further research is needed to determine whether change is unidirectional.

The results regarding the Hofstede indices may be in part due to the time lags. The Hofstede data used in this study is from the early 1970's. The effect of the 1981 postmaterialism index was also nonsignificant. Future work thus needs to include different types of cultural indices collected from more recent periods.

In summary, future research should further explore the construct validity of the different cultural indices used in the past and present research in entrepreneurial economics. Furthermore, longitudinal effects would be helpful although this is hampered somewhat by erratic data collection for many of the key social and cultural variables. The present work does suggest that it may be worth the effort to continue exploring these effects and how they interact with one another and with economic and demographic variables at the country level. Regional effects might also be explored, for instance, by clustering countries based on different super-

categories as identified by Hofstede and others (Hofstede, Noorderhaven, Thurik, Uhlaner, Wennekers and Wildeman, 2004).

6.3. Future theoretical considerations

In reviewing the results of this study, it may be useful to consider more carefully the differences in the factors predicting nascent entrepreneurship, starter behavior and overall established business rate. For instance, for nascent entrepreneurs, factors that predict motivation and intentions may be more important than those that determine actual skill levels. Thus, the push factors, such as secondary education, may trigger feelings of job security and act as a brake on self-employment.

Regarding postmaterialism, Robichaud, McGraw and Roger (2001) find a positive correlation between extrinsic motivation of the entrepreneur and sales performance. It would seem that the strong negative relationship between postmaterialism and success at starting a firm may best be interpreted by the aggregated psychological traits view. That is, less postmaterialistic cultures may have a larger proportion of individuals motivated by money, and in turn, successful at making (their first) sales. This of course, still leads to the puzzle of why postmaterialism does not predict a larger portion of established businesses, however.

Social and demographic factors that might predict skills and capabilities may be more important for the post-nascent firm, thus explaining the result that tertiary education predicts new business formation levels (e.g. the larger proportion of the population with tertiary education, controlling for secondary education rates).

The lack of predictive power of any of the factors to predict the rate of established firms is indeed puzzling although the signs are in the same direction. Future research is needed to tease apart the differences, which might include, for instance, government policies or other institutional differences that may explain the long-term success of start-up firms. For instance, one might examine differences in support networks for small businesses across countries. Differences in taxation policies, population density, investment in infrastructure (for roads, schools, etc.) are other factors that have been shown to lead to regional differences in incorporation rates across U.S. states, for instance, in past research.

7. Conclusion and Practical Implications of the Research

Audretsch, Carree, van Stel and Thurik (2002) propose that a process of industrial restructuring, in which large corporations account for less economic activity and small firms accounting for a greater share of economic activity, is transforming developed economies. Not all countries, however, experience the same shift in their industrial structures. Audretsch, Carree, van Stel and Thurik (2002) provide empirical evidence to support the proposition that there may be a cost, measured in terms of forgone growth, of impeding this restructuring process. This cost is measured by linking growth rates of European countries to deviations from the "optimal" industrial structure. The important role that entrepreneurship plays in economic growth leads to the subsequent research question: What are its determinants, in turn? Much of the past research in this area has been dominated by investigation of economic factors. This study is not intended to discount the role that governmental policies play in stimulating self-employment and entrepreneurship. However, the results of this study provide added support for the role of cultural, social and demographic factors. One implication of these results is to suggest that the effectiveness of various policy responses may be limited partially by cultural factors beyond the control of policy makers. Alternatively, policies to stimulate entrepreneurship in the future might be customized toward the cultural biases present in a particular society. Thus for instance, in a more post-materialistic culture, it may be important to emphasize

the nonmaterial benefits of launching one's own firm (autonomy, creativity, etc.) rather than on the economic benefits.

Two caveats are appropriate here. First, even if the relationship between post-materialism and rate of total entrepreneurial activity holds across nations, it may not hold true for individuals within countries. The extent of materialist values at the individual level may play a role in predicting entrepreneurship behavior within countries but this cannot be concluded from this cross-national study. Secondly, one must be prudent in extrapolating the conclusions found in this study to worldwide relationships. This study is based on a range of countries on four continents (North and South America, Europe, and Asia). However, it is limited to only twenty-seven countries. But this limitation does not disqualify important findings from this study, which show that for the countries under study, national culture may have powerful effects on rate of entrepreneurial activity, especially the rate of new business formation.

In summary, the primary purpose of the present study is to test the relationship between post-materialism and levels of nation-wide entrepreneurial activity. The findings clearly confirm a negative relationship between post-materialism and entrepreneurial activity: countries marked by less materialistic values tend to have lower total (nascent and new business formation combined) entrepreneurial activity as a proportion of the adult population. Further, per capita income and the proportion of the population enrolled in secondary level education are both negatively associated with total entrepreneurial activity, whereas life satisfaction and tertiary education levels have the opposite effect, when other variables are controlled for. Other than the linear and squared term of per capita income, in spite of relatively high intercorrelation among the variables of the present study, multicollinearity is not a problem, and it appears that each variable also appears to contribute a unique and fairly consistent portion of the variance explained for the dependent variable of total entrepreneurial activity. However, further research should be done to confirm the stability of this relationship in a broader sample of countries and where available, with longitudinal data.

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Appendix: Details regarding measurement of variables

Dependent Variables

Data on the entrepreneurial activity variables below are taken from the Global Entrepreneurship Monitor (GEM) 2002 Adult Population Survey. This database contains various entrepreneurial measures that are constructed on the basis of surveys of –on average- some 3,000 respondents per country (37 countries in total).

Total Entrepreneurial Activity 2002

Total entrepreneurial activity is measured as a combination of nascent entrepreneurship (the percentage of people in the age group of 18 to 64 years who are actively engaged in the start-up process) or new business formation (those owning and managing a business less than 42 months old in 2002) (expressed in % of adults in the same age group). *Source: Global Entrepreneurship Monitor*

Nascent entrepreneurship 2002

The nascent entrepreneurship rate is defined as the number of people that are actively involved in starting a new venture, as a percentage of adult population (18-64 years old). An individual may be considered a nascent entrepreneur if the following three conditions are met: if he or she has taken action to create a new business in the past year, if he or she expects to share ownership of the new firm, and if the firm has not yet paid salaries or wages for more than three months (Reynolds et al., 2002, p. 38). *Source: Global Entrepreneurship Monitor*

New business Formation 2002

New business activity is measured as the percentage of people in age group of 18 to 64 years who are managing a business less than 42 months old in 2002 (expressed in %). A firm is defined as a ‘new business’ if the firm has paid salaries and wages for more than three months but for less than 42 months. *Source: Global Entrepreneurship Monitor*

Established businesses 2002

This variable is computed as a percentage of adult population (18-64 years old) with an ‘established business’. A firm is defined as an ‘established business’ if the firm has paid salaries and wages for more than 42 months (Reynolds et al., 2002, p. 38). *Source: Global Entrepreneurship Monitor*

Total business ownership 2002

This variable is computed as the sum of ‘new businesses’ and ‘established businesses’, both measured as a percentage of adult population (18-64 years old), taken from the GEM 2002 Adult Population Survey. A firm is defined as a ‘new business’ if the firm has paid salaries and wages for more than three months but for less than 42 months, and as an ‘established business’ if the firm has paid salaries and wages for more than 42 months (Reynolds et al., 2002, p. 38). The business ownership variable thus measures the stock of incumbent business owners. *Source: Global Entrepreneurship Monitor*

Independent Variables

Per capita income

Gross national income per capita 2001 is expressed in purchasing power parities per US\$, and these data are taken from the 2002 World Development Indicators database of the World Bank. We do not use GDP per capita from the GEM database because this variable is measured at exchange rates. We do not want fluctuations in exchange rates to impact the ranking of countries with respect to their level of economic development.

Participation in education (1997).

We have included gross enrollment ratios in secondary education and tertiary education. Gross enrollment ratios are defined as the total number of students enrolled divided by the total number of people in the appropriate age range. These data are taken from Table 2.12 of the 2001 World Development Indicators database from the World Bank. *Source: World Bank*

Post-materialism

The source of the post-materialism data is the World Values Survey, 1990-1993 (ICPSR, 1994). Scores for individual respondents are computed on the basis of their rankings of certain items. For the 4-item post-materialism index, respondents were asked to select the most important and second important goal a country should have from the following four items: a) Maintaining order in the nation, b) Giving people more to say in important government decisions, c) Fighting rising prices and d) Protecting freedom of speech. The post-materialism index is constructed as follows:

1= Materialist: first choice item a, second choice item c or first choice item c and second choice item a.

2= Mixed: first choice item a or c and second choice item b or d or first choice item b or d and second choice item a or c.

3= Post-materialist: first choice item b and second choice item d or first choice item d and second choice item b.

The country scores were aggregates of the individual respondent scores, thus also ranging between 1 and 3. A similar methodology was used for the 10-item indices, again with an eventual scale ranging between 1 and 3. *Source: World Values Survey and European Values Surveys, cumulative data: 1990-1993.*

Life Satisfaction

Life satisfaction is also derived from the World Values Survey, 1990-1993 (ICPSR, 1994). The score for this variable is constructed as the average score of the inhabitants of a country rating life as a whole (life satisfaction) on a scale ranging from 1 (completely dissatisfied) to 10 (completely satisfied). *Source: World Values Survey and European Values Surveys, cumulative data: 1990-1993*

Hofstede's cultural indices

Hofstede's indices were collected by two different groups of researchers. The original data was collected from 1973 and 1976 and was available for 22 of the countries. See Hofstede (1980; 2001).

Table 1: Pearson Product-Moment Correlations among the independent, dependent and control variables¹

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Total entrepreneurial activity (%)	1.00													
2. Nascent entrepreneurship (%)	.93**	1.00												
3. New business Formation (%)	.89**	.66**	1.00											
4. Established business (%)	.56**	.35	.70**	1.00										
5. Total business ownership (%)	.76**	.53**	.90**	.94**	1.00									
6. Per capita income	-.57**	-.52**	-.46*	-.22	-.35	1.00								
7. Post-materialism	-.45*	-.31	-.52**	-.28	-.41*	.71**	1.00							
8. Life satisfaction	-.04	-.02	.01	.01	-.00	.58**	.69**	1.00						
9. Education-secondary	-.75**	-.76**	-.58**	-.33	-.47*	.75**	.59**	.39*	1.00					
10. Education-tertiary	-.32	-.31	-.22	-.07	-.15	.79**	.64**	.43*	.63**	1.00				
11. Power distance (Hofstede)	.34	.35	.20	-.02	-.08	-.67**	-.59**	-.63**	-.60**	-.49*	1.00			
12. Individualism (Hofstede)	-.50*	-.42*	-.46*	-.36	-.44*	.69**	.63**	.47*	.60**	.46*	-.67**	1.00		
13. Masculinity (Hofstede)	.04	.10	-.04	-.12	-.09	-.05	-.15	-.24	-.32	-.22	.19	.05	1.00	
14. Uncertainty avoidance (Hofstede)	-.00	-.01	-.03	-.09	-.07	-.26	-.22	-.40*	-.26	-.13	.69**	-.60**	.22	1.00
Mean	7.99	4.73	3.64	6.15	9.78	20.12	1.91	7.26	101.33	42.70	49.17	59.83	47.42	63.58
SD	4.39	2.63	2.36	3.00	4.95	9.32	.20	.65	24.25	21.20	17.68	20.93	23.45	22.43

** Correlation is significant at the .01 level (two-tailed)

* Correlation is significant at the .05 level (two-tailed)

¹ Correlations are based on the 27 countries used in the multiple regression analysis, with the exception of the Hofstede indices, for which only 24 cases were available from the subset of countries included in the regression analyses.

Table 2: Regressions on Total Entrepreneurial Activity (TEA) (Nascent Entrepreneurship plus New Business Formation) across 27 Countries

Variable	Post-materialism on TEA (H1)	Post-materialism and Per capita income on TEA (H2)	Post-materialism and Education on TEA (H3)	Post-materialism and Life Satisfaction on TEA (H4)	All variables on TEA	All variables plus per capita income ² on TEA
	B (t)	B(t)	B(t)	B(t)	B(t)	B(t)
Post-materialism	-9.80 (2.55)*	.28 (.06)	-3.21 (-.84)	-17.46 (-3.57)***	-9.56 (-3.50)**	-8.61 (-2.33)*
Per Capita Income		-1.21 (-3.21)**			-.24 (-2.52)*	-.53 (-1.52)
Education-secondary			-.16 (-4.92)***		-.12 (4.58)***	-.11 (-3.50)**
Education-tertiary			.07 (1.71)		.11 (3.32)**	.12 (3.39) **
Life Satisfaction				3.49 (2.28) **	4.02 (4.36) ***	3.71 (3.73)***
Per capita income-squared		.03 (2.69)*				.01 (.86)
R	.45	.70	.78	.59	.90	.90
Adj. R2	.17	.42	.56	.29	.76	.76
F-Statistic, df	6.49* (1,25)	7.33*** (3,23)	12.18*** (3,23)	6.40** (2,24)	17.58*** (5,21)	14.59*** (6,20)
ΔR squared when Post-materialism entered last in equation	--	.00	.01	.37***	.07*	.05*

p<.10; * p<.05; ** p<.01; *** p<.001

Table 3: Comparison of Multiple Regressions (using all variable model on (TEA) and other ownership variables across 27 Countries

Variable	All variables on TEA	All variables on % nascent entrepreneurship	All variables on new business formation	All variables on established businesses	All variables on total business ownership
	B (t-value)	B (t-value)	B (t-value)	B (t-value)	B (t-value)
Post-materialism	-9.56 (-2.73)*	-1.13 (-.45)	-9.77 (-4.45) ***	-7.44 (-1.59)	-17.21 (-2.75) *
Per capita Income	-.24 (-2.52) *	-.11 (-1.58)	-.12 (-.46) #	-.07 (-.57)	-.19 (-1.10)
Education-secondary	-.12 (-4.58)***	-.09 (-4.64) ***	-.04 (-2.41) *	-.04 (-1.05)	-.08 (-1.63)
Education-tertiary	.11(3.32)**	.05 (2.02) #	.07 (3.35) **	.06 (1.42)	.13 (2.23)*
Life Satisfaction	4.02 (4.36) ***	1.67 (2.53)*	2.60 (4.50) ***	1.89 (1.54)	4.49 (2.73) *
R	.90	.85	.86	.51	.72
Adj. R2	.76	.66	.67	.09	.40
F-Statistic, df	17.58*** (5,21)	10.86 *** (5,21)	11.68 *** (5,21)	1.50 (5,21)	4.45** (5,21)

p<.10; * p<.05; ** p<.01; *** p<.001

Table 4: Detailed Multiple Regressions on Nascent Entrepreneurship (NE) Rate across 27 Countries

Variable	Post-materialism on NE (H1)	Post-materialism and Per capita income on NE (H2)	Post-materialism and Education on NE(H3)	Post-materialism and Life Satisfaction on NE (H4)	All variables on NE	All variables plus per capita income ² on NE
	B (t-value)	B (t-value)	B (t-value)	B (t-value)	B (t-value)	B (t-value)
Post-materialism	-2.98 (-1.23)	3.33 (1.15)	1.42 (.63)	-7.41 (-2.40)*	-1.13 (-.45)	-.03 (-.01)
Per Capita Income		-.86 (-3.53)**			-.11 (-1.58)	-.44 (-1.83)
Education-secondary			-.10 (-5.57) ***		-.09 (-4.64)***	-.07 (-3.38)**
Education-tertiary			.03 (1.24)		.05 (2.02)	.05 (2.26) *
Life Satisfaction				1.81 (2.12) *	1.67 (2.53)*	1.31 (1.89)
Per capita income-squared		.02 (3.08) **				.01 (1.43)
R	.23	.63	.69	.44	.85	.86
Adj. R2	.02	.33	.41	.13	.66	.67
F-Statistic, df	1.51 (1,27)	5.49** (3,25)	6.90** (3,23)	3.10 (2,26)	10.86*** (5,21)	9.84*** (6,20)
ΔR squared when Post-materialism entered last in equation	--	.03	.01	.18*	.00	.00

p<.10; * p<.05; ** p<.01; *** p<.001

Table 5: Detailed Multiple Regressions on New Business Formation (NBF) Rate across 27 Countries

Variable	Post-materialism on NBF (H1)	Post-materialism and Per capita income on NBF (H2)	Post-materialism and Education on NBF(H3)	Post-materialism and Life Satisfaction on NBF (H4)	All variables on NBF	All variables plus per capita income ² on NBF
	B (t)	B(t)	B(t)	B(t)	B(t)	B(t)
Post-materialism	-5.22 (-2.61) *	-3.78 (-1.34)	-5.22 (-2.17) *	-11.21 (-5.24)***	-9.77 (-4.45)***	-9.74 (-4.13)***
Per Capita Income		-.40 (-1.61)			.12 (-1.92)	-.13 (-.57)
Education-secondary			-.06 (-2.86) **		-.04 (-2.41)*	-.04 (-2.00)
Education-tertiary			.05 (2.03)		.07 (3.35)**	.07 (3.24) **
Life Satisfaction				2.44 (4.15) ***	2.60 (4.50)***	2.59 (4.07) ***
Per capita income-squared		.01 (1.69)				.00 (.05)
R	.45	.53	.69	.72	.86	.86
Adj. R2	.17	.20	.41	.48	.67	.66
F-Statistic, df	6.83* (1,27)	3.32* (3,25)	6.90** (3,23)	14.06*** (2,26)	11.68*** (5,21)	9.27 *** (6, 20)
ΔR squared when Post-materialism entered last in equation	--	.05	.11*	.51***	.25***	.23***

p<.10; * p<.05; ** p<.01; *** p<.001

Table 6: Multiple Regressions with Hofstede Indices on Total Entrepreneurial Activity (TEA) across 27 Countries

Variable	Power Dis- tance	Individualism	Masculinity	Uncertainty Avoidance
	B (t)	B (t)	B (t)	B (t)
Hofstede Index	-.03 (-.71)	-.00 (-.02)	.01 (.27)	-.04 (-1.36)
Per capita income 2001	-.33 (-2.56)*	-.30 (-2.23) *	-.32 (-2.26) *	-.31 (-2.58) *
Education-secondary	-.13 (-3.82)***	-.13 (-3.64)**	-.12 (-3.21) **	-.13 (-4.01) ***
Education-tertiary	.09 (2.11) *	.09 (2.06)	.09 (2.07)	.09 (2.30) *
Life Satisfaction	3.08 (2.68) *	3.45 (3.26) **	3.52 *3.30) **	2.96 (2.80) *
R	.85	.85	.84	.86
Adj. R2	.65	.64	.64	.67
F-Statistic, df	9.72*** (5, 19)	9.37*** (5,19)	9.42*** (5,19)	10.65*** (5,19)

p<.10; * p<.05; ** p<.01; *** p<.001

Table 7: Detailed Multiple Regressions on Established Business (EB) Rate across 27 Countries

Variable	Post-materialism on EB (H1)	Post-materialism and Per capita income on EB (H2)	Post-materialism and Education on EB (H3)	Post-materialism and Life Satisfaction on EB (H4)	All variables on EB	All variables plus per capita income ² on EB
	B (t-value)	B (t-value)	B (t-value)	B (t-value)	B (t-value)	B (t-value)
Post-materialism	-2.85 (-.97)	-3.11 (-.72)	-4.00 (-1.05)	-9.17 (-2.54)*	-7.44 (-1.59)	-7.41 (-1.48)
Per Capita Income		-.29 (-.81)			-.07(-.57)	-.08 (-.17)
Education-secondary			-.05 (-1.51)		-.04 (-1.05)	-.04 (-.87)
Education-tertiary			.05 (1.30)		.06 (1.42)	.06 (1.37)
Life Satisfaction				2.58 (2.59) *	1.89 (1.54)	1.89 (1.40)
Per capita income-squared		.01 (.93)				.00 (.02)
R	.18	.27	.42	.48	.51	.51
Adj. R2	-.00	-.04	.07	.17	.09	.04
F-Statistic, df	.94 (1,27)	.64 (3,25)	1.66 (3,23)	3.93* (2,26)	1.50 (5,21)	1.19 (6, 20)
ΔR squared when Post-materialism entered last in equation	--	.02	.04	.19*	.09	.08

p<.10; * p<.05; ** p<.01; *** p<.001

Table 8: Comparison of Multiple Regressions on Total Entrepreneurial Activity using different measures of Post-materialism

Variable	All variables on TEA using 1981 data (4 item)	All variables on TEA using 1990 data (10 item)	All variables on TEA using 1995-7 data (4 item)	All variables on TEA using 1995-7 data (10 item)	All variables on TEA using 1990 data (4 item) (same as above)
	B (t)	B (t)	B (t)	B (t)	B (t)
Post-materialism	-5.22 (-1.28)	-3.84 (-2.55)*	-5.72 (-1.72)	-2.69 (-1.35)	-9.56 (-2.73)*
Per capita Income	-.37 (-2.44) *	-.24 (-2.43)*	-.23 (-1.77)	-.24 (-1.78)	-.24 (-2.52) *
Education-secondary	-.09 (-2.24) *	-.13 (-4.71) ***	-.18 (-4.59) ***	-.19 (-4.33) ***	-.12 (-4.58)***
Education-tertiary	.09 (2.04)	.09 (2.82) **	.15 (3.11) **	.15 (2.96)*	.11(3.32)**
Life Satisfaction	3.46 (2.56) *	3.68 (4.15) ***	3.90 (3.45) **	3.87 (3.14) **	4.02 (4.36) ***
R	.82	.90	.89	.88	.90
Adj. R2	.55	.75	.71	.69	.76
F-Statistic, df	5.47** (5,13)	16.85*** (5,21)	10.48*** (5,14)	9.14 *** (5,13)	17.58*** (5,21)
ΔR squared when Post-materialism entered last in equation	.04	.06*	.04	.03	.07*

p<.10; * p<.05; ** p<.01; *** p<.001

^a Similar patterns were found for regressions with a common subset of 20 countries, for 1990 and 1995-7 with the exception of the 10 item postmaterialism scale for 1990, for which ΔR squared for the added effect of postmaterialism was nonsignificant. (Only 10 countries overlap both 1981 and the other time periods and thus all available countries were included for the 1981 period even though some of these countries did not overlap those included during other time periods).

Table 9: Comparison of Multiple Regressions on New Business Formation Rate using different measures of Post-materialism^a

Variable	All variables on NBF using 1981 data (4 item)	All variables on NBF using 1990 data (10 item)	All variables on NBF using 1995-7 data (4 item)	All variables on NBF using 1995-7 data (10 item)	All variables on NBF using 1990 data (4 item) (same as above)
	B (t)	B (t)	B (t)	B (t)	B (t)
Post-materialism	-4.26 (-1.46)	-3.79 (-3.80) ***	-6.02 (-2.60) *	-2.55 (-1.72)	-9.77 (-4.45)***
Per capita Income	-.21 (-1.90) #	-.11 (-1.75) #	-.10 (-1.07)	-.12 (-1.15)	-.12 (-1.92)
Education-secondary	-.02 (-.58)	-.05 (-2.55) *	-.08 (-2.77)*	-.08 (-2.45) *	-.04 (-2.41)*
Education-tertiary	.07 (2.35) *	.05 (2.38) *	.09 (2.68) *	.09 (2.31) *	.07 (3.35)**
Life Satisfaction	1.25 (1.30)	2.22 (3.78) ***	2.40 (3.05) **	2.33 (2.53) *	2.60 (4.50)***
R	.67	.83	.81	.77	.86
Adj. R2	.23	.62	.53	.43	.67
F-Statistic, df	2.10 (5,13)	9.60 *** (5,21)	5.31 ** (5,14)	3.73* (5,13)	11.68*** (5,21)
ΔR squared when Post-materialism entered last in equation	.09	.21***	.17*	.09	.25***

p<.10; * p<.05; ** p<.01; *** p<.001

^a Similar patterns were found for regressions with a common subset of 20 countries, for 1990 and 1995-7. (Only 10 countries overlap both 1981 and the other time periods and thus all available countries were included for the 1981 period even though some of these countries did not overlap those included during other time periods).