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Subcontracting in Italian industry. Labour division, firm growth and the North-South divide

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Abstract

The aim of this paper is to investigate the impact of subcontracting on Italian manufacturing firms' growth in the second half of the 1990s. The main results are: i) producing as subcontractors does not penalize firms but can be a positive determinant of growth, especially when coupled with the propensity to innovate; ii) since a nonlinear relationship between growth and subcontracting emerges, an organizational mode not fully specialized in either subcontracting activity or direct sales may be optimal; iii) the deep dualism of the Italian industrial structure is confirmed, as Southern subcontractors show poorer performances and slower growth.

Keywords: Subcontracting, value chain, location, firm growth

JEL Codes: D23, L23

1. Introduction

Since the 1990s, vertical disintegration in most industries and the globalization of intermediate goods' markets has led to significant changes in the pattern of international division of labour among manufacturing firms. These developments, combined with other factors (primarily increased competition from low cost producers and exchange rate constraints, precluding the introduction of a single currency) have had major consequences for the mature industrial systems in European countries, including Italy. The peculiar features of Italian industry (small average firm size, specialization in traditional industries, industrial districts, historical backwardness of firms in the South) added to the problems in the second half of the 1990s. This resulted in a serious productivity slowdown and significant reductions in export and market shares. This paper deals with the Italian manufacturing industry, with a particular focus on subcontracting firms,¹ which represent a significant portion of Italy's manufacturing sector.

What are the effects of changes in the international division of labour on the performance and growth of subcontracting firms? How can subcontracting firms successfully enter the global value chain? The answers to these questions are far from straightforward. Our working hypothesis is that the reorganization of the division of labour may have induced a change in the "nature of subcontracting" in the most dynamic suppliers. Rather than being captive suppliers, acting in a monopsonistic context, the best subcontracting firms are urged to become agents in a trans-national productive network, and to engage in complementary rather than subordinate relationships with buyers. For these firms, globalization provides the chance to evolve, and progress from local to global suppliers. However, this evolution cannot be taken for granted. As scholars in the Global Value Chain (henceforth GVC) approach maintain, it is the position and the upgrading in (rather than simply participation in) the global value chain, pursued through innovation, that yield higher returns and better growth performance for subcontracting firms. This means that subcontractors involved in only the simplest traditional manufacturing activities remain the most exposed to the increased global competition.

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In this paper we investigate the relationship between the division of labour and firm growth in Italian manufacturing industry in the second half of the 1990s. The literature on firm growth is large, and dates back at least to Gibrat's law of proportionate growth (MANSFIELD, 1962). The novelty of our approach is its focus on organizational choice as one of the keys to growth. More specifically, in this paper we: a) try to understand whether and how subcontracting affects the growth dynamics of firms; b) test whether growth of subcontracting firms might be due to stronger incentives to innovate in order to move up the value chain, which would be consistent with the predictions of the GVC approach; and c) study the joint influence of subcontracting and location on growth by testing whether the growth dynamics of Southern subcontractors are significantly different from those of North and Centre subcontracting firms.

The paper is organized as follows. Section 2 discusses what determines globalization of the intermediate goods markets, the new pattern of international division of labour among industrial firms, and the difficulties experienced by Italian manufacturing firms to adapt to these changes. Section 3 describes possible interactions between positioning and upgrading along the GVC, the propensity for innovation, and firm growth. This section relies heavily on the suggestions of GVC scholars that the firm's position in the GVC, its innovative behaviour, and the GVC pattern of governance are crucial for determining firm growth performance. Section 4, which has three subsections, focuses on the empirical investigation. It presents the data and some descriptive statistics. The micro level data are from the Capitalia surveys of Italian manufacturing firms for 1995-1997 and 1998-2000, and provide information on a stratified sample of about 5,000 firms with at least 11 employees. The second subsection describes the estimation methods, and the third one presents the main results. The explanatory variables for growth considered in the econometric investigation, beside the commonly used regressors (age, size and past growth), include some organizational variables, such as subcontracting intensity and product innovation, proposed in the GVC approach. We include also a geographic variable, "localization", which is particularly relevant

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2 to the case of Italy, in order to detect possible differences in the growth of Southern and Centre-
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4 Northern firms. Section 5 presents the main conclusions and outlines some policy issues.
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9 2. The globalization of intermediates markets and the (late) involvement of Italian manufacturing 10 industry 11

12
13 During the last two decades profound changes in the international division of labour among firms
14 have led to increasingly globalized intermediates markets.² Outsourcing and offshoring³ of (stages
15 of) production activities – mainly by (large) firms headquartered in developed countries – are major
16 features of this evolution, for most industries resulting in the development of GVCs.⁴ The reasons
17 for these changes are several and all have been widely investigated. First, the substantial reductions
18 in trade barriers, tariffs and transportation costs have favoured market integration by reducing the
19 costs of temporary exports/imports, thus including developing countries in international production
20 networks as low cost producers of intermediate inputs. Second, the development and diffusion of
21 Information and Communication Technologies (ICT) has fostered the spread of international
22 outsourcing/subcontracting networks by: a) reducing the coordination costs among agents in the
23 network and making geographic proximity less of a constraint; and b) making the different tasks
24 and activities that constitute the production process separable in time and space (MILGROM and
25 ROBERTS, 1990; NORDÅS, 2004, 2005). Third, the disintegration of multinational enterprises
26 (MNE) (GEREFFI et al., 2005) means that subcontractors from different countries increasingly are
27 included in these firms' international production networks,⁵ a process described by SALIOLA and
28 ZANFEI (2009) as “the changing nature of multinational enterprises”.⁶ Although the involvement
29 of independent suppliers differs across sectors and countries and is highly dependent on their
30 absorptive capacity, there is evidence that MNE outsourcing to independent local firms is growing
31 (e.g. NORDÅS, 2005). MNEs' increasing recourse to local networks allows them greater
32 bargaining power against national governments (IETTO-GILLES, 2002), better implementation of
33 just-in-time production procedures (e.g. the automotive industry - STURGEON et al., 2008), and
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2 greater competitiveness through outsourcing to low cost suppliers (especially in emerging countries;
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4 see HUMPHREY and MEMEDOVIC, 2003). Finally, improvements in the quality of institutions
5
6 induce more and more producers to trust inter-firm market relationships (ANTRAS and
7
8 HELPMAN, 2008) even in the presence of uncertainty, incomplete contracts and potential
9
10 opportunistic behaviours. Repeated collaborations, reputation and careful “selection of players”
11
12 help to reduce hold-up costs and lock-in. Taken together, these factors make the spatial and
13
14 functional reorganization of the division of labour even more valuable and offer more opportunities
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16 for larger profits for both outsourcer and subcontractor.
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21 The globalization of intermediate inputs markets, stronger competitive pressure from
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23 Eastern European and Asian producers, exchange rate constraints prior to the introduction of the
24
25 single European currency, and the development and spread of ICT, have provided powerful shocks
26
27 for Italian manufacturing firms. These shocks led to productivity slowdowns and greatly reduced
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29 export and market shares in the second half of the 1990s.⁷
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33 Lack of a prompt and adequate response from Italian industry to the challenges of
34
35 globalization can be explained by its peculiarities. The traditional prevalence of small sized firms,
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37 became even more pronounced in the 1970s and 1980s. In those years a post-Fordist fragmentation
38
39 of production combined with a rediscovery of the virtues of Marshallian industrial districts in
40
41 North-East and Central Italy (BECATTINI, 1978, 1979)⁸ resulted in district firms becoming the
42
43 most powerful drivers (MENGHINELLO, 2004) of Italian manufacturing industry performance.
44
45 The competitive advantage of this organizational model was founded on: territorially bounded, deep
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47 division of labour among small and medium sized specialized firms; local specialization in a
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49 particular industry (especially “made in Italy” merchandise and mechanical engineering); low
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51 transaction costs based on high levels of trust and cooperation among agents; locally embedded
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53 practical and tacit knowledge; and pools of specialized labour.
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59 Globalization is a major blow to this industrial district economy, and turns many traditional
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strengths into weaknesses. International low-cost competition renders specialization in traditional

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2 goods no longer sustainable, while the Maastricht constraints inhibit “competitive devaluation” of
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4 the Lira, the solution often resorted to in previous decades. The spread of ICT means codified and
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6 transmittable knowledge and information begin to supersede the tacit and informal knowledge in
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8 industrial district firms. Small size and low human capital endowments make adjustment to this new
9
10 technological regime difficult for industrial district firms.⁹
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14 These difficulties are worse for firms in Southern Italy. The South of the country is
15
16 characterized by a historical lag of local manufacturing firms in terms of performance, productivity,
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18 market penetration and international openness. Several investigations (GIANNOLA and
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20 SCALERA, 1998; GUERRIERI and IAMMARINO, 2001) unambiguously confirm the persistence
21
22 in the mid 1990s of a substantial gap between South and Centre-North of Italy industry. Southern
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24 manufacturing firms also are more vertically integrated due to higher transaction costs (GIUNTA
25
26 and SCALERA, 2007) and thus are less able to profit from a reorganization of the domestic and
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28 international division of labour.
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33 Nevertheless, eventually a share of Italian manufacturing firms manages to enter the GVC.
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35 Large firms, usually assemblers/buyers located in the downstream sections of the supply chains,
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37 progressively reduce their dependence on local suppliers by exploiting lower cost sources abroad,
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39 thus crowding out some Italian subcontractors. At the same time, some small and medium sized
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41 firms move from subcontracting to direct sales to final markets, or change from being local to
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43 becoming global suppliers (CAMUFFO et al., 2007). In order to face the mounting commercial
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45 pressure from low labour cost countries and to achieve better positions in the international value
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47 chain, firms abandon districts in search of lower costs, and engage in international outsourcing –
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49 mainly in Central and Eastern Europe, the Balkans, the Mediterranean basin and South-East Asia.
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54 General industry statistics do not capture the intensity of this phenomenon, but a number of
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56 case studies (e.g. TATTARA et al., 2006) and more systematic investigations (COSTA and FERRI,
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58 2007; DAVERI and JONA-LASINIO, 2007; FALZONI and TAJOLI, 2008) have provided
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60 evidence of the increasing involvement of Italian firms in the GVC. However, this process affects

1
2 the Mezzogiorno only marginally.¹⁰ According to UNIONCAMERE (2006), while quite a large
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4 number of firms (some 65% in 2000) in the Northern, Central and Eastern regions of Italy make use
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6 of subcontractors outside the region and/or abroad, in Southern Italy the subcontracting network is
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8 organized mainly on a local basis, with about 65% of firms relying on provincial suppliers. From
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10 the point of view of subcontractors, this implies that suppliers located in the Mezzogiorno mostly
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12 serve a few customers in local markets, are in peripheral and weak positions in the value chain, and
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14 are involved in the least profitable stages of production. According to the few studies on this topic
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16 (e.g. CAMUFFO et al., 2007), Centre-North firms differ in that they exploit the chances offered by
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18 the international division of labour to reinforce their roles as specialized suppliers, while market
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20 globalization provides a strong incentive for greater openness to international markets and more
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22 innovative activity. Although they may not be industry leaders, these firms occupy more secure and
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24 more lucrative positions in the value chain. They frequently combine subcontracting activity with
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26 production for final markets, and perform the roles of both outsourcer and subcontractor. In Section
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28 4 of this paper, we investigate whether these kinds of firms have productivity or growth gaps
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30 compared to non-subcontracting firms, or whether their participation and role in the GVC is
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32 enabling productivity and growth performance equal to or even greater than that of other firms.
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42 3. GVC and firm growth: the role of product innovation

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44 In a global scenario, as production processes are increasingly decomposed, commissioning firms
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46 abandon or reduce their positions at the core of manufacturing production to focus on more
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48 profitable activities (design, engineering, marketing). Consequently, the markets for intermediate
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50 goods get thicker, hold-up costs decrease, and suppliers are able to benefit from more intensive
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52 specialization (MCLAREN, 2000). The nature of subcontracting activities evolves, and more
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54 qualified and more specialized suppliers of intermediates emerge to serve not a single customer, but
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56 rather many final firms within a network of complementary relationships. Subcontracting firms are
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58 directly involved in more activities designed to offer differentiated, innovative products and
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1
2 services to a wider array of customers, and in becoming more autonomous in the global arena. They
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4 are faced with increasingly complex tasks, including the governance and policy of their own supply
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6 networks.
7

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9 The theoretical and empirical literature discusses the features and effects of outsourcing and
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11 offshoring for firms' productivity, at some length¹¹ (see, e.g., AMITI and WEI, 2006; OLSEN,
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13 2006, GÖRG et al., 2008). However, the issue of the impact on firm performance of being a
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15 subcontracting firm has been rather overlooked. A few exceptions are KIMURA (2002) and
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17 RAZZOLINI and VANNONI (2009) which deal respectively with Japanese and Italian industrial
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19 firms. KIMURA (2002) concludes that subcontractors' profits are not higher than those of other
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21 firms, while RAZZOLINI and VANNONI (2009) find that the total factor productivity of
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23 subcontractors exporting to foreign markets is lower compared to direct exporters. In both studies,
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25 that particular organizational choice seems to be subject to a "subcontracting discount". Neither of
26
27 these studies considers the link between the firm's organizational choice (i.e. being a subcontracting
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29 firm or selling directly to final markets) and the propensity to innovate, a link that may be crucial
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31 for at least two reasons. One concerns the impact of innovation on the rate of firm growth, based on
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33 the seminal contribution of MANSFIELD (1962), and widely empirically tested (GEROSKI et al.,
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35 1997, DEL MONTE and PAPAGNI, 2003; LOOF and HESHMATT, 2006, CORSINO and
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37 GABRIELE, 2010). The second reason is related to firms' participation in the global chain, which
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39 provides opportunities for the development of a set of innovative subcontractors. This aspect, which
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41 is a major issue of the GVC literature, was first analyzed by GEREFFI (1994) and then developed
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43 in a number of contributions, such as GEREFFI and KORZENIEWICZ (1994), KAPLINSKY
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45 (2000)¹² HENDERSON et al. (2002) and HUMPHREY and SCHMITZ (2002).
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54 According to the GVC approach, the positioning of a firm and its upgrading along the chain
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56 and the GVC pattern of governance,¹³ are crucial for determining growth performance. GEREFFI
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58 (1999) outlines a distinction between two types of production chains: a buyer driven commodity
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60 chain – common in labour intensive industries such as textiles and shoes, and a producer driven

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2 commodity chain – typical of industries such as automotive, electronics and civil aviation. In both
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4 these types of chains, the key players directly carry out the most innovation-intensive, highest return
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6 activities, both upward (design, engineering) and downward (marketing, retail). These activities
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8 yield high rents, while the simplest traditional manufacturing activities are the most exposed to the
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10 increasing global competition.
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14 With regard to growth paths, the GVC approach identifies four, not mutually exclusive,
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16 paths of expansion for subcontracting firms:
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- 18 a) increasing technical efficiency;
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20 b) strengthening inter-firm connections with partners to build a more consistent and
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22 cooperative network than that of rivals;
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24 c) improving the quality of their function along the chain, or moving to higher quality
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26 functions (e.g. from production to design);
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28 d) introducing new products or increasing the range of products offered.
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33 While a) and b) seem to be essential requirements for participation in the value chain, but do
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35 not warrant *per se* upgrading in the value chain or insure against the risk of future decline, strategies
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37 c) and d) are the keys to higher returns and growth. In relation to innovation, in particular,
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39 GEREFFI (1999) points out that the motivation for product innovation stems primarily from foreign
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41 buyers and global assemblers, the key GVC actors, which push subcontracting firms to satisfy their
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43 demand for more value added and more sophisticated products. Along these lines, several empirical
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45 studies (e.g. DOLAN and HUMPHREY, 2000; BAIR and GEREFFI, 2001; BAZAN and NAVAS-
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47 ALEMAN, 2004; GIULIANI et al., 2005) find that integration in GVCs is a major stimulus to
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49 product innovation – especially for firms most able to meet foreign buyers' and global assemblers'
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51 demands.
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56 In relation to the Italian experience, the GVC approach provides a rationale for the
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58 functional upgrading of many subcontracting firms located in the Northern and Central regions of
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60 Italy (see, e.g., AMIGHINI and RABELLOTTI, 2003 for the Veneto region, and CORÒ and

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2 GRANDINETTI, 1999 for the Marche region), or changes to the specialization of some industrial
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4 district firms from production of final commodities to the manufacture of machinery and equipment
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6 (DE ARCANGELIS and FERRI, 2005). HUMPHREY and SCHMITZ (2002) refer to this activity
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8 as inter-sectoral upgrading.
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11 The major limitation of this line of analysis is that results are usually based on case study
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13 and/or anecdotal evidence, rather than on econometric investigation. This is probably because
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15 reliable data are scarce. The investigation in Section 4 is intended to overcome some of these
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17 limitations. Although our data do not allow us to test more broadly the ability of functional or inter-
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19 sectoral upgrading to explain subcontracting firms' growth, they do enable a focus on the role of
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21 product innovation as a determinant of firm growth in the GVC.
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28 4. The empirical investigation

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30 The empirical investigation has three main objectives. First, we study the relationship between
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32 subcontracting and firm growth (relative increases in sales or employees). Our working hypothesis
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34 is that subcontracting firms, when emancipated from their traditional inferior position with respect
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36 to customers, may perform comparably to or even better than other firms. This idea is consistent
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38 with the considerations discussed above and with empirical investigations that provide evidence of
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40 significant positive relationships between subcontracting and, respectively, survival rates
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42 (MAZZOLA and BRUNI, 2000), financial ratios (ROE - Return on Equity, and ROI - Return on
43
44 Investment), (INNOCENTI, 2003) and input productivity and returns (GIUNTA and SCALERA,
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46 2007, for Central and Northern Italy firms).¹⁴ Second, we test whether growth among
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48 subcontracting firms is based on the ability to innovate and upgrade in the GVC, which would be
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50 consistent with the predictions of the GVC approach. Third, we evaluate possible geographic
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52 differences in the relationship between subcontracting and growth.
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59 We also test for the relevance of the neutrality result or "Gibrat's law of proportionate
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growth". According to Gibrat's law, firm growth rate is stochastic and, therefore, independent of

1 size, uncorrelated to past growth, and not linked to other explanatory variables. There is a large
2 theoretical and empirical literature on Gibrat's law, dating back to MANSFIELD (1962). The most
3
4 theoretical and empirical literature on Gibrat's law, dating back to MANSFIELD (1962). The most
5 relevant criticism comes from models of firm learning inspired by the seminal work of
6
7 JOVANOVIĆ (1982), showing a negative relationship between the rate of firm growth, and age.
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9 Other contributions, such as SUTTON (1997) and HART (2000), refute the hypothesis of no serial
10 correlation in growth rates by showing the strong persistence of growth. Several other empirical
11 studies (e.g. EVANS, 1987a and 1987b for the US, and DUNNE and HUGHES, 1994 and
12
13 VARIYAM and KRAYBILL, 1992 for the UK) show that there is a clear inverse relationship
14 between growth rate and size, and/or age, in manufacturing and services firms. These results are
15 confirmed substantially by AUDRETSCH et al. (1997; 1999) for Dutch firms operating in different
16 industrial sectors, and wholesale trade, by HARHOFF et al. (1998) for a sample of German firms,
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18 by MACPHERSON (1996) for South Africa, and by YASUDA (2005) who shows the existence of
19 a strong negative correlation between growth rate and age or initial size for a sample of 14,000
20 Japanese manufacturing firms.
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38 4.1. The data

39 Before proceeding to the econometric analysis, we highlight some features of our data and provide a
40 short descriptive analysis of the growth performance of our sample firms. Our investigation uses a
41 unique dataset based on the 7th and 8th waves of the Capitalia "Survey on manufacturing firms",
42 which is carried out every three years.¹⁵ Capitalia collects data on a large number of variables from
43 a stratified representative sample of around 5,000 Italian manufacturing firms with at least 11
44 employees. The 7th wave, covering the period 1995-1997, has 4,497 observations; the 8th wave
45 (1998-2000) has 4,680 observations; 1,299 firms are sampled in both waves. The sample includes
46 the whole population of large firms (at least 500 employees), while for the 11-499 employees class,
47 the firms included in the sample, in terms of employment, represent about 12% of the population.
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60 The detailed questionnaire that is administered to all the firms asks about the values of a large

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2 number of organizational, structural and performance variables for the current year and, in some
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4 cases, for the previous one or two years. For example, there is a question about subcontracting
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6 intensity in the current year. Also, each firm surveyed is asked to provide a 10 year time series for a
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8 selected number of balance sheet variables. Capitalia does not release information about non-
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10 responding firms.
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14 The A panels in Tables 1 and 2 show the firm size distributions for classes of employees and
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16 real sales (billion Liras at year 2000 values); the B panels record annual average growth rates for
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18 employees and real sales for 1995-1997 and 1998-2000. Both tables provide separate information
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20 for:
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23 a) Centre-North, and Mezzogiorno firms;
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26 b) non-subcontractors (NOSUB, firms producing exclusively for direct sale); weak subcontractors
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28 (LOSUB, i.e. up to 50% of total sales due to subcontracting); strong subcontractors (HISUB, i.e.
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30 more than 50% of total sales due to subcontracting); and absolute subcontractors (ONSUB, i.e.
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32 firms producing only as subcontractors);
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35 c) five size classes (i.e. according to the conventional European standard classification, 11-50, 51-
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37 100, 101-250, 251-500 and over 500 employees).
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40 [Table 1 here]

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42 [Table 2 here]
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45 Our sample reflects the population size distribution of Italian manufacturing firms and
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47 includes a large number of small firms. Table 1 panel A shows that over 70% of firms employ up to
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49 50 workers, but only 8.6% have more than 250 employees. In terms of annual sales (Table 2, panel
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51 A), 56% of the sample have revenues of less than 10 billion Lira (around €5.16 million) and 88%
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53 have revenues of less than 50 billion Lira (€25.8 million). The majority of firms (about 86%) in the
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55 sample are in the Central and Northern regions of Italy with medium-large firms (more than 250
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57 employees) making up 9.2% of the sample in the Centre-North and 4.6% in Southern Italy. The
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59 smallest firms (less than 50 employees) are more often subcontractors: 41.4% are exclusive
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subcontractors, while 39.2% never do subcontracting work. The corresponding shares for other firms are 24.9% (exclusive subcontractors) and 55.5% (non-subcontractors).

The B panels show that, with one exception, the sampled firms are characterized by positive (and in some cases fairly high) average growth rates. At this stage, there does not seem to be a clear relationship between growth rate and firm size. In terms of geographic differences, with the exception of non-subcontractors (NOSUB) and weak subcontractors (LOSUB), Centre-North firms show higher rates of growth for employees and sales. If we focus in more detail on the relationship between subcontracting intensity and growth, the evidence is mixed. In brief, the groups of exclusive subcontractors (ONSUB) and strong subcontractors (HISUB) show the highest growth rates in real sales while the other two groups show on average higher employment growth. Of more interest is that, in almost all cases, each of the middle groups (LOSUB and HISUB) show higher rates of growth of sales and employees than the extreme groups (i.e. LOSUB grow more than NOSUB and HISUB more than ONSUB). This suggests a non-monotonic (i.e. increasing and then decreasing) relationship between growth rate and subcontracting intensity. The rows in Tables 1 and 2 show that this pattern applies to all firm sizes and to the overall group of Centre-North firms. Instead, in Southern firms growth rates tend to decrease with subcontracting intensity.¹⁶ This result is confirmed by the econometric analysis; interpretations are provided in Section 4.3.

To assess the statistical significance of differences among groups, we performed ANOVA tests (Table 3) on the differences, which in most cases are statistically significant.

[Table 3 here]

4.2. The estimation method

We estimate the following three equations for growth in real sales and employees.

$$\Delta y_{it} = \alpha + \theta_1 y_{it-1} + \theta_2 \Delta y_{it-1} + \theta_3 AGE_{it} + \gamma_1 SOU_{it} + \gamma_2 SUB_{it} + \beta_1 AVK_{it} + \beta_2 ICT_{it} + \beta_3 INP_{it} + u_{it} \quad (1)$$

$$\Delta y_{it} = \alpha + \theta_1 y_{it-1} + \theta_2 \Delta y_{it-1} + \theta_3 AGE_{it} + \gamma_1 SOU_{it} + \gamma_2 SUB_{it} + \beta_1 AVK_{it} + \beta_2 ICT_{it} + \beta_3 INP_{it} + \beta_4 IXS_{it} + u_{it} \quad (2)$$

1
2 and

$$\begin{aligned} \Delta y_{it} = & \alpha + \theta_1 y_{it-1} + \theta_2 \Delta y_{it-1} + \theta_3 AGE_{it} + \gamma_1 SOU_{it} + \gamma_2 SUB_{it} + \gamma_3 SUB_{it}^2 + \gamma_4 SXS_{it} + \gamma_5 SXS_{it}^2 + \\ & + \beta_1 AVK_{it} + \beta_2 ICT_{it} + \beta_3 INP_{it} + u_{it} \end{aligned} \quad (3)$$

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10 where i is the firm, $t=1,2$ the 1998 or 2001 survey, y_{it} is the log of real sales SAL or the log of
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12 number of employees EMP; AGE is the log of firm age (years); SOU is a dummy taking the value 1
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14 if the firm is localized in the Southern region; SUB is subcontracting intensity; and AVK (the ratio
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16 of added value over capital) is a typical indicator of productivity. ICT and INP are two dummies
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18 used as proxies for attitude to innovation; they take the value 1 if during the last three years the firm
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20 has respectively invested in ICT and introduced a product innovation. The definition of these
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22 variables and the main descriptive statistics are reported in Table 4. Finally, Δy_{it} is the first
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24 difference $y_{it} - y_{it-1}$. Significance of parameter θ_1 would indicate dependence of growth rates on
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26 the initial value y_{it-1} , while significance of θ_2 would imply growth persistence. According to
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Gibrat's law, neither of these parameters should be significantly different from zero.

[Table 4 here]

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The interaction terms IXS and SXS respectively are the products of INP and SUB and SOU and SUB. IXS is introduced to assess the impact of innovation on the sensitivity of growth to subcontracting intensity. As we pointed out above, within the set of subcontractors, the GVC approach distinguishes a group of innovative firms able to upgrade along the value chain and to grow more than other firms. This means that the subcontracting firm should benefit substantially from innovation since it enables a better position in the value chain. Thus, the expected sign of the IXS parameter β_4 is positive. Specification (2) allows us to make separate evaluations of the marginal effect of innovation on growth, for non-subcontractors (the parameter β_3) and for absolute subcontractors (the sum $\beta_3 + \beta_4$).

The product SXS and the squared term in equation (3) test the hypotheses that the relationship between subcontracting intensity and firm growth is: a) structurally different for the

1
2 South and the Centre-North; and b) non-linear. From (3), we can show that the marginal effect of
3
4 subcontracting on growth rate is $\gamma_2 + 2\gamma_3SUB$ for Centre-North and $\gamma_2 + \gamma_4 + 2(\gamma_3 + \gamma_5)SUB$ for
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6 Mezzogiorno. This means we can test the hypothesis of geographical structural differences in the
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8 relationship between subcontracting and growth by checking the statistical significance of γ_4 and
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10 γ_5 , which, in turn, correspond to the differences $(\gamma_2^S - \gamma_2^{CN})$ and $(\gamma_3^S - \gamma_3^{CN})$, where *S* and *CN*
11
12 respectively denote the parameters of the regressions on the sub-samples relative to Southern and
13
14 Centre-North firms. We test for non-linearity by considering the statistical significance of γ_3 and
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16 γ_5 . Finally, in equation (3), the marginal effect of localization (i.e. the difference in average growth
17
18 between South and Centre-North) is equal to $\gamma_1 + \gamma_4SUB + 2\gamma_5SUB^2$. Using specification (3), we
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20 can run regressions on the whole sample, without the need for separate estimates for the two sub-
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22 samples.
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30 Concerning the estimation method, our choices are strongly constrained by the nature of the
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32 available data. In particular, since firms are asked to indicate the value of subcontracting intensity
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34 for one year only, our data seem more suited to pool than to panel treatment, for at least two
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36 reasons. First, the number of firms sampled in both waves of the survey is just slightly more than
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38 25% of cases, which would make a panel strongly unbalanced with a minor informational
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40 advantage with respect to pooled data, or alternatively would exclude many observations (almost all
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42 Southern firms). Second, and more important, a panel would not allow (at least in a fixed effects
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44 specification) the use of the time invariant dummy variable *SOU*, which is crucial for our analysis.
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49 Also, we consider the possibility of reverse causation, i.e. that organizational mode might be
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51 influenced by growth prospects. In this case, the variable *SUB* would be affected by endogeneity,
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53 thus making OLS (ordinary least squares) estimates biased and inconsistent. Therefore, as well as
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55 OLS, we run instrumental variables regressions (GIV) following a two stage procedure. In the first
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57 stage, we regress *SUB* on the instruments included among the right hand side variables in equations
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59 (1), (2), and (3), plus some excluded instruments. In the second stage, we substitute the fitted values
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for *SUB* from the first stage regression and estimate (1), (2) and (3). The unavailability of lagged

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2 data on subcontracting introduces the problem that we have to choose the excluded instruments
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4 from the other variables surveyed by Capitalia. The diagnostics on exogeneity and relevance of
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6 instruments allow us to select the three variables ROI, AVL (the ratio between added value and
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8 employed) and HUM (an indicator of human capital measured by the share of workers with
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10 secondary schooling) as appropriate excluded instruments.¹⁷
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16 4.3. The results

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18 Tables 5 and 6 present the results of the OLS and GIV estimations of equations (1), (2) and (3),
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20 respectively for rates of growth in real sales and employees. Our first finding is related to the
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22 dependence of growth rates on the initial values of real sales and employment. In all cases, growth
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24 rates are negatively related to the initial value with a significance level not lower than 5%.
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26 Theoretical growth rates are considerable for the lowest size (growth rate of employment is higher
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28 than 30% for firms with 11 employees), but much lower as firm size increases (17% for 31
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30 employees, 9% for 51 employees and 4% for 100 employees). Estimates of parameter θ_2 indicate
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32 negative statistically significant growth persistence for employees (not for real sales), which is in
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34 line with the literature on Italy (CONTINI and REVELLI, 1989). The overall conclusion is that the
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36 results of Tables 5 and 6 support the findings in most of literature, of empirical lack of validity for
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38 Gibrat's law.
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44 [Table 5 here]

45 [Table 6 here]

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50 In almost all cases, the control variables AGE, AVK, ICT and INP show a relationship with
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52 growth rates that is consistent with the theoretical predictions. In particular, the regressions confirm
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54 that firm age negatively affects the propensity to grow (but the link is statistically significant only
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56 for sales), while, in most cases, capital productivity, attitude to innovation and propensity to invest
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58 in ICT have a positive impact on growth rates. The latter results, although theoretically not
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2 surprising, are important since they contradict some of the findings in the literature (e.g. DEL
3 MONTE and PAPAGNI, 2003; OLIVEIRA and FORTUNATO, 2006).
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7 Moving on to the results connected more closely with subcontracting, we notice that in the
8 estimation of equation (1) neither subcontracting intensity nor geographic location have a
9 statistically significant effect on firm growth. In equation (2) the estimated parameters of the control
10 variables are mostly unaltered, with the exception of age, which loses significance in three out of
11 four cases. More important is that the introduction of the interaction factor IXS between innovation
12 (INP) and subcontracting intensity (SUB), confirms that, on the one hand, innovation is crucial for
13 growth for subcontractors, and on the other hand, an increase in subcontracting intensity leads to
14 higher growth in innovating firms. These results are obtained simply by noting that the estimated
15 coefficient of the variable IXS β_4 is positive and statistically significant (slightly above 5% for
16 employee growth), while β_3 and γ_2 are not significantly different from zero. Estimation of
17 equation (2) shows that it is innovative subcontracting (rather than just subcontracting activity) that
18 is positively related to growth, which is consistent with the view that product innovation and good
19 positioning in the value chain are linked to growth.
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38 In the non-linear specification (3), the effect of subcontracting on growth is definitely
39 greater. In this case, the parameters of the control variables are substantially unaltered but the
40 estimates of the γ parameters become statistically significant. In addition, the results show that there
41 is strong geographic differentiation. The estimation of equation (3) suggests that location in the
42 South negatively affects firms' growth performance. Moreover, the relationship between
43 subcontracting and growth varies over the geographic areas considered. In the case of Centre-North,
44 the relation shows a reversed U-shape with the highest value around 51% of subcontracting
45 intensity for both employees and real sales. The marginal effect at the average value for
46 subcontracting is always positive, between 0.22 and 0.31 for sales growth (1% increase in
47 subcontracting intensity provides about 0.25% increase in growth of real sales) and between 0.02
48 and 1.35 for the growth in employment. The theoretical forecast of sales growth varies from -4% for
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2 non subcontractors, +18% for firms with subcontracting intensity equal to 0.51, and +3% for
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4 absolute subcontractors. For employment growth, the theoretical forecast varies from -9% for non-
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6 subcontractors and absolute subcontractors to +33% for intermediate subcontractors. The reverse U-
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8 shaped relation does not hold for the Mezzogiorno, where the impact of subcontracting is always
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10 negative at any value for subcontracting. At average subcontracting intensity, the marginal effect is
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12 between -0.18 and -0.57 for sales growth, and between -0.09 and -0.14 for employee growth. The
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14 theoretical forecasts of growth of both sales and employment are between +8% for non-
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16 subcontracting firms and +1% for absolute subcontractors.
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21 To summarize, the estimation of equation (3) seems to confirm the indications from
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23 equation (2). In the advanced areas of Italy, producing as subcontractors does not penalize firms but
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25 is a rather successful organizational choice and a crucial positive determinant of growth. However,
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27 this result does not hold for Southern firms, most likely because the nature of subcontracting in that
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29 area is still relatively underdeveloped and the firms involved in these activities are less productive.
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34 As a robustness check, we estimated equations (1), (2) and (3) using alternative proxies for
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36 firm productivity, returns and attitude to innovation. Compared to the results presented in Tables 5
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38 and 6, these changes produce only minor effects on the coefficient estimates, and on the signs and
39
40 intensity of the relationships between growth and subcontracting.
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43 Thus, our econometric investigation allows us to draw the following main conclusions. First,
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45 in accordance with most of the literature, Gibrat's law is rejected, as current growth rate does not
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47 seem to be independent of variables such as age, initial size and past growth rates. Second,
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49 subcontracting intensity turns out to be a determinant of growth when coupled with the propensity
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51 to innovate: within the subsample of subcontracting firms, we can confirm that innovative firms
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53 grow faster. This finding seems to be consistent with the GVC view on the crucial nexus between
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55 product innovation, upgrading along the value chain, and firm growth. Third, the non-linear
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57 relationship identified between subcontracting and growth in the Centre-North regions highlights
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59 that an organizational mode not fully specialized in either subcontracting activity or direct sales
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2 may be optimal. This means that subcontracting cannot be considered a marginal choice for less
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4 productive firms to access the market, but rather should be seen as an avenue to growth. Finally, for
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6 Southern firms the relationship between subcontracting and growth is peculiarly monotonically
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8 decreasing, which hints at the possibly different nature of subcontracting in this area, which retains
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10 traditional traits and is therefore negatively related to growth.
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13 14 15 16 5. Concluding remarks and policy issues 17

18 The global disintegration of production and the expansion of the GVC with its peculiar nature of
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20 “trade in tasks” (GROSSMAN and ROSSI-HANSBERG, 2006) have attracted much scholarly
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22 attention in recent years.
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25 However, while there are a large number of studies on outsourcing, i.e. the optimal
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27 allocation of firm’s sourcing across different sites, little attention has been paid to subcontracting,
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29 i.e. to firms producing for outsourcers and, thus, being complementary to international production
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31 sharing in global networks. Some evidence on subcontracting choice and performance is provided
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33 by authors inspired by the GVC approach proposed by GEREFFI and KORZENIEWICZ (1994),
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35 which considers the positioning of a firm and its upgrading along the GVC.
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39 This paper contributes to this stream of literature by focusing on subcontracting to explain
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41 firm growth in Italy in the second half of the 1990s, following changes in the pattern of the
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43 international division of labour and the development of GVCs. The peculiar features of Italian
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45 manufacturing industry, i.e. small average size of firms, large proportion of subcontracting firms in
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47 total firms, the industrial district model characterizing the Centre-North regions, the historical
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49 backwardness of firms in the South, make Italy particularly suitable for an investigation of
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51 industrial firm subcontracting. We exploited a detailed micro-level data set that enabled
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53 econometric investigation of a representative sample of almost 5,000 Italian manufacturing firms,
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55 between 1995-2000. Estimating regression equations marks a significant difference from most
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57 contributions to the GVC stream of research, which is mainly based on case studies and descriptive
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2 analysis.

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4 Our underlying research hypothesis is that the “nature of subcontracting” changed over the
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6 time span considered. In the presence of firm heterogeneity, the development of GVCs allowed the
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8 best subcontractors to achieve better performance, higher profits and growth. They took the risks,
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10 bore the sunk costs, took on more responsibilities in the GVCs, undertook more complex tasks than
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12 in the past, and accordingly can enjoy the advantages accruing from international production
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14 fragmentation.

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17 Our specific aim in this paper was to understand whether and how the choice to be a
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19 subcontractor affects firm growth. We tested whether subcontracting firms’ growth could be due to
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21 greater incentives to innovate for a subset of subcontracting firms keen to move up the value chain,
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23 in line with the predictions of the GVC approach. Moreover, we studied the joint influence of
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25 subcontracting and location on growth, by testing whether in Italy the growth pattern among
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27 Southern subcontractors is significantly different from that experienced by North and Centre
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29 subcontracting firms.

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32 The central and novel conclusions of this paper are several. First, in the current scenario of
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34 global fragmentation of production, subcontracting cannot be considered just to be a marginal and
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36 residual choice of *ex ante* less productive firms, but should be seen as a growth strategy; second,
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38 subcontracting, when coupled with the propensity to innovate, turns out to be a determinant of firm
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40 growth. This finding provides econometric support to the GVC view of the importance of the nexus
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42 between product innovation, upgrading along the value chain, and firm growth. Third, we find that
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44 the current pattern of international division of labour exacerbates the dualism in the Italian
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46 industrial structure. The relationship between subcontracting and growth of Southern firms is
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48 peculiarly monotonically decreasing, which suggests the possibly different “nature” of
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50 subcontracting in the South, which has retained its traditional traits and, therefore, is negatively
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52 related to growth. As Southern subcontractors grow less than final producers and less than Centre-
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2 North subcontractors, they seem doomed to be increasingly exposed to the risk of being crowded
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4 out and being the losers in the competition with subcontracting firms from the emerging countries.
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6 The findings in this paper have some implications for policy. OECD (2007b) has stated that
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8 the globalization of value chains poses major policy challenges to the OECD countries, as well as
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10 new opportunities. The findings in this paper support these claims and underline the importance of
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12 policy interventions to address the backwardness of Southern firms in Italy.
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16 Two requirements seem to be essential and interdependent to allow subcontracting firms to
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18 move up the value chain: penetrating foreign markets and sustaining a process of continuous
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20 innovation. In terms of the former requirement, several studies (IACOVONE and JAVORCIK,
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22 2010; KOENIG et al., 2010) point out that, among other factors, uncertainty and information
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24 asymmetries about export markets are serious obstacles for small and medium sized enterprises.
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26 Operating in a globally competitive market may, however, force firms to become more engaged in
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28 innovation activities. As we argue in the paper, this pressure may arise from coming in relation with
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30 large and multinational firms. The latter, acting as foreign buyers and global assemblers in the
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32 GVCs, provide strong incentives for product innovation.
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37 Both requirements point to the need for public intervention. Public policy aimed at
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39 facilitating the flow of export-specific information and supporting the diffusion of knowledge on
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41 export markets may have a positive impact on export performance – KOENIG et al. (2010)
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43 document the case of French firms. A complementary policy would be to provide financial or fiscal
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45 incentives for small and medium sized firms to cooperate – for example, through consortia – which
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47 would allow achievement of the critical mass needed to bear the sunk costs of foreign market
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49 penetration. At the same time, policies to attract foreign direct investment would be profitable in the
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51 light of the role played by multinationals in GVCs.
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56 With regard to Southern subcontracting firms, it is not an overstatement to say that, since the
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58 late 1990s, there has been no coherent, stable, and sound regional policy for the South of Italy. As
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60 many studies show (ROSSI, 2005; CANNARI et al., 2009; GIUNTA, 2010; SCALERA and

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2 ZAZZARO, 2010) the New Regional Policy, introduced at the end of the 1990s, has proven
3
4 disappointing in terms of results. Policies to attract foreign investment have been subject to frequent
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6 “stop and go” and to inefficient performance of the institutional actors. Moreover, inefficient policy
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8 making has resulted in the failure for the policy designed to encourage the setting of consortia to
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10 sustain foreign market penetration of small and medium sized enterprises. Such a policy has not
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12 been sufficiently rigorous due to poor ex ante evaluation of financed projects, which has enabled
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14 opportunistic behaviour in the form of coalitions of entrepreneurs establishing consortia in order to
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16 acquire public money but without any intention or capacity to generate those collective goods – for
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18 instance, a common export trademark, outlets for foreign fairs and so on – which were the real
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20 targets of public intervention.
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26 While the failure of New Regional Policy may provide grounds for the complaints of those
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28 who claim that regional policies do not work, the firm level evidence in this paper shows that
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30 globalization is likely to deepen the divide between the Centre-North and the South of Italy. This
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32 calls for a policy debate on how to complement necessary (and probably no longer sufficient)
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34 policies to improve the functioning of labour and product markets with efficient policies to support
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36 firms in less advantaged areas to move up the value chain.
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Notes

¹ Subcontracting firms are firms that sign contracts with client firms to supply intermediate products (specific components and services or more complex inputs). In what follows, the term “subcontracting intensity” is used to refer to the share of sales related to subcontracting over total sales.

² Several studies provide evidence of this phenomenon, e.g. OECD (2007a); MARIN (2006); HAVIK and MCMORROW (2006). In particular, HAVIK and MCMORROW (2006) estimate that between 1992 and 2000 the world average share of intermediate imports in total imports rose by some 4 percentage points, with increases of 6 percentage points for Europe, 3 for USA, 5 for South East Asia and 9 for China. JONES and KIERZKOWSKI (1990) wrote a seminal piece on the emergence of a new trend in globalization, based on advances in the technologies of transportation and communication and the decomposition of the production process across borders.

³ There are no clear cut definitions in the literature of outsourcing and offshoring (and their relative measures); see OECD (2007a). In the present paper, outsourcing and offshoring mean respectively the relocation of activities outside the firm to an independent input supplier (subcontractor) and the relocation of activities to a different country within a structure belonging to or external to the firm.

⁴ The value chain is the set of activities involved in the production and sale of commodities. It is global when activities are allocated across firms localized in several different countries. For a survey of industrial subcontracting networks, see SACCHETTI and SUGDEN (2003).

⁵ However, a substantial part of international vertical specialization among MNEs also takes place through these firms’ intra-industry trade in intermediate inputs (BORGA and ZEILE, 2004). See also ANTRAS (2003) which underlines that capital-intensive intermediate goods tend to be imported within the boundaries of multinational firms, and HANSON et al. (2003) which documents equally impressive growth in trade in MNEs.

⁶ Worthwhile to mention here is the eclectic paradigm of international production proposed in DUNNING (1993). For a more recent appraisal of OLI (Ownership, Location, International

1
2 Advantage) theory in light of the changing characteristics of MNEs activity and the global
3
4 economic scenario, see DUNNING (2001). The impact of MNEs investments on local
5
6 subcontracting networks has been documented, e.g. by DRIES and SWINNEN (2004).
7

8
9 ⁷ From 1994 to 2005, annual labour productivity growth was 0.5% on average. In the same period,
10
11 the share of Italian exports on total world exports decreased from 4.5% to 2.9%; see ROSSI (2006).
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13
14 ⁸ A comprehensive analysis of industrial districts is provided by BECATTINI et al. (2009). On the
15
16 geography of Italian industrial districts, see SFORZI (2002).
17

18
19 ⁹ Several authors argue that the gains in productivity associated with ICT investment are conditional
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21 on the micro-complementarities among ICT adoption, internal reorganization processes and high
22
23 levels of human capital (see BRYNJOLFSSON and HITT, 2000; BRESNAHAN et al., 2002;
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25 FALK, 2002; HUR et al., 2005 and, with specific reference to Italy, TRENTO and WARGLIEN,
26
27 2003, BUGAMELLI and PAGANO, 2004, LUCCHETTI and STERLACCHINI, 2004).
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31 ¹⁰ Mezzogiorno is the term used to denote the South of the country; in the literature it refers to the
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33 mainland regions of Abruzzo, Molise, Campania, Basilicata, Apulia and Calabria plus the islands of
34
35 Sicily and Sardinia.
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37
38 ¹¹ Other possible effects of outsourcing have also been investigated. E.g. there has been intense
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40 discussion of the impact on wages and employment; see HEGGER and KREICKEMEIER (2008)
41
42 and KOHLER (2009).
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44
45 ¹² GEREFFI and KORZENIEWICZ (1994) use the term “global commodity chain”, rather than
46
47 GVC. The word “commodity” implies the production of undifferentiated products in processes with
48
49 low barriers to entry, whereas, according to KAPLINSKY (2000: p. 9), “the search for sustainable
50
51 income growth requires producers to position themselves precisely in non-commodity, high barriers
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53 to entry activities in the value chain”. HUMPHREY and SCHMITZ (2002) report that Gereffi and
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55 other researchers, at a workshop held in Bellagio (Italy) in September 2000, agreed to use the term
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57 GVC to refer to firms’ linkages in global chains.
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¹³ HUMPHREY and SCHMITZ (2002) suggest that four types of value chain relationships can be distinguished: arm's length relations; networks; quasi hierarchies; hierarchies. Among others, GIULIANI et al. (2005) deal with the relationship between value chain governance and firm upgrading.

¹⁴ Note, however, that some studies (e.g. GEROSKI, 1998) find poor correlation between performance indicators based on accounting measures and growth rates.

¹⁵ The statistics in Tables 1 to 4 are calculated from CAPITALIA (1998; 2001) data; Tables 5 and 6 present the results of the econometric estimations carried out using data from the same sources. Where necessary, data are deflated by the ISTAT price index NIC.

¹⁶ The same conclusions hold if we consider median growth rates (in parentheses in Tables 1 and 2). Especially for employment growth (Table 1), median values are considerably lower than mean values, indicating that high average growth rates are presumably due to a relatively small number of firms growing very quickly.

¹⁷ The Sargan tests reported in Tables 5 and 6 do not reject the hypothesis that over-identification constraints hold. Secondly, the F test on the joint significance of excluded instruments in the first stage regression always rejects the null hypothesis of joint insignificance, even though in two out of six cases – equations (2) and (3) for growth of real sales – the F statistic does not reach the Stock and Yogo (2005) strong instrument critical value.

1
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3

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Table 1 – Employees					
Panel A – Size distribution (number of observations)					
Employees	11-50	51-100	101-250	251-500	Over 500
Centre-North	5588	991	621	425	306
Mezzogiorno	880	180	115	35	22
NOSUB	2524	534	368	235	186
LOSUB	625	114	91	51	43
HISUB	621	94	66	36	19
ONSUB	2666	425	206	119	70
Panel B – Average yearly growth rates. Mean and median (in parentheses) values					
	NOSUB	LOSUB	HISUB	ONSUB	Overall
11-50 employees	19.14 (9.09)	23.98 (11.11)	9.80 (5.19)	9.40 (2.27)	14.67 (7.98)
51-100 employees	17.78 (8.62)	32.30 (23.43)	11.11 (10.42)	9.41 (7.27)	15.61 (8.76)
101-250 employees	17.24 (12.22)	28.17 (20.00)	9.17 (4.94)	9.49 (4.73)	15.69 (9.93)
251-500 employees	13.32 (10.30)	13.83 (9.17)	15.01 (4.38)	8.76 (3.23)	12.29 (6.71)
Over 500 employees	19.74 (16.65)	19.53 (23.13)	14.87 (8.68)	9.22 (0.83)	17.10 (10.60)
Centre-North	18.80 (9.61)	25.82 (18.14)	10.30 (7.56)	9.55 (2.52)	14.97 (9.19)
Mezzogiorno	17.73 (14.19)	13.81 (5.88)	8.87 (3.51)	8.45 (1.61)	12.04 (6.14)
Overall	18.44 (9.72)	24.65 (13.26)	10.24 (5.63)	9.38 (2.40)	14.84 (7.84)

Table 2 – Real sales					
Panel A – Size distribution (number of observations)					
Billions Liras (prices of year 2000)	Up to 10	10 to 50	50 to 200	200 to 500	Over 500
Centre-North	4400	2473	743	198	87
Mezzogiorno	766	373	68	14	12
NOSUB	1911	1302	450	122	56
LOSUB	490	310	82	29	12
HISUB	491	261	58	16	6
ONSUB	2251	959	202	36	22
Panel B – Average yearly growth rates. Mean and median (in parentheses) values					
	NOSUB	LOSUB	HISUB	ONSUB	Overall
11-50 employees	4.82 (3.04)	4.36 (2.90)	7.86 (5.10)	5.91 (3.05)	5.52 (3.04)
51-100 employees	-1.36 (0.60)	1.83 (1.16)	2.38 (1.38)	6.13 (3.12)	1.98 (1.45)
101-250 employees	4.92 (3.99)	5.54 (3.86)	7.23 (5.02)	5.80 (3.75)	5.45 (3.80)
251-500 employees	3.66 (3.14)	4.57 (3.03)	6.83 (4.44)	5.42 (3.88)	4.50 (3.21)
>500 employees	5.06 (4.00)	9.19 (6.41)	6.53 (0.30)	5.32 (3.83)	5.76 (3.83)
Centre-North	3.77 (2.71)	4.28 (2.30)	7.23 (4.14)	5.86 (3.40)	5.50 (3.03)
Mezzogiorno	7.24 (3.29)	6.53 (2.70)	0.15 (1.08)	4.02 (0.90)	5.22 (1.76)
Overall	3.91 (2.87)	4.40 (2.54)	7.12 (4.53)	5.90 (3.20)	5.02 (3.01)

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Table 3 – ANOVA tests of mean equality (t and F values)				
Panel A – Growth of employees				
	NOSUB	LOSUB	HISUB	ONSUB
NOSUB	–			
LOSUB	7.216*** 52.069***	–		
HISUB	16.256*** 264.249***	8.380*** 70.224***	–	
ONSUB	29.075*** 845.331***	11.933*** 142.387***	0.174 0.030	–
Test on mean equality over all groups: F=318.641***				
Panel B – Growth of real sales				
	NOSUB	LOSUB	HISUB	ONSUB
NOSUB	–			
LOSUB	0.086 0.007	–		
HISUB	3.873*** 14.997***	2.989*** 8.936***	–	
ONSUB	5.109*** 26.105***	3.059*** 9.359***	3.537*** 12.289***	–
Test on mean equality over all groups: F=11.709***				

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	Description	Obs	Mean	Max	Min	SD
EMP	Number of employees	9163	103.85	12630	11	369.18
AGE	Age of firm (in years)	9115	23.57	182	0	18.03
AVK	Ratio added value / invested capital	7713	0.04	2.58	-0.18	0.06
AVL	Ratio added value / number of employed*	7721	24.95	550.88	-35.62	29.90
EXP	Dummy. Takes value 1 if the firm exports	9134	0.69	1	0	0.46
SAL	Real value of sales**	9134	41.30	8645.71	0	221.3
HUM	Share of workers with a with a secondary school degree	8149	0.40	1	0	0.26
ICT	Dummy. Takes value 1 if the firm makes ICT investments	8501	0.78	1	0	0.41
INP	Dummy. Takes value 1 if the firm makes product innovation	9174	0.19	1	0	0.40
ROI	Value of ROI	7721	0.20	5.52	-4.58	0.71
SUB	Subcontracting intensity	9107	0.48	1	0	0.47
SOU	Dummy. Takes value 1 if the firm is localized in a Southern region	9177	0.13	1	0	0.34

The number of observations for each estimation changes due to the different number of valid answers to the questionnaire. * values expressed in million liras; ** values in billion liras; values at prices of year 2000.

Table 5 – The determinants of growth rates (real sales)

	(1)		(2)		(3)	
	OLS	GIV	OLS	GIV	OLS	GIV
Log SAL	-0.0057** (0.0020)	-0.0205** (0.0078)	-0.0057** (0.0020)	-0.0408*** (0.0131)	-0.3420** (0.1670)	-0.0267*** (0.0049)
Δ SAL _{t-1}	3.92E-06 (2.86E-06)	4.61E-06 (3.12E-06)	3.92E-06 (2.86E-06)	4.85E-06 (12.9E-06)	-5.86E-05 (5.01E-05)	8.08E-06 (9.01E-06)
Log AGE	-0.0438*** (0.0087)	-0.0474*** (0.0107)	-0.0438*** (0.0087)	-0.0113 (0.0513)	-0.0455** (0.0177)	-0.0377*** (0.0074)
SOU	0.0148 (0.0177)	0.0075 (0.0237)	0.0148 (0.0177)	-0.0252* (0.0136)	-0.09010 (0.5230)	0.1215 (0.4209)
SUB	0.0026 (0.0104)	0.0098 (0.0123)	0.0019 (0.0121)	0.0017 (0.0208)	3.6336** (1.5141)	2.6492*** (0.8710)
SUB ²	-	-	-	-	-3.5408** (1.4119)	-2.5768*** (0.8484)
SXS	-	-	-	-	-4.6440** (2.2994)	-2.9665*** (0.8841)
SXS ²	-	-	-	-	4.0087** (1.7570)	2.7327*** (0.8671)
AVK	-4.88E-05 (10.4E-05)	-3.18E-04 (3.30E-04)	-4.90E-05 (10.4E-05)	-2.25E-04 (2.32E-04)	0.0013* (6.81E-04)	3.66E-04** (1.78E-04)
ICT	0.0421*** (0.0101)	0.0494*** (0.0157)	0.0421*** (0.0101)	0.0337** (0.0169)	0.2161** (0.0099)	0.0291* (0.0151)
INP	-3.66E-04 (0.0108)	-0.0078 (0.0136)	-0.0018 (0.0168)	-0.0688 (0.1078)	0.1451 (0.1108)	-0.0076 (0.0135)
IXS	-	-	0.0378** (0.0190)	0.1970** (0.0866)	-	-
Constant	0.2455*** (0.0517)	0.0205*** (0.0078)	0.2458*** (0.0517)	0.4582** (0.2297)	2.8972** (1.4201)	0.1033 (0.0683)
Observations	7047	6919	7047	6919	7047	6917
R ²	0.0964	-	0.0965	-	0.2521	-
Marginal effect CN	-	-	-	-	0.3052	0.2248
Marginal effect SOU	-	-	-	-	-0.5706	-0.1764
Turning point CN	-	-	-	-	0.5131	0.5145
Turning point SOU	-	-	-	-	1.0797	1.0678
Sargan test (p value)	-	0.7703	-	0.5131	-	0.4692

Table 6 – The determinants of growth rates (employees)

	(1)		(2)		(3)	
	OLS	GIV	OLS	GIV	OLS	GIV
Log EMP	-0.1499*** (0.0240)	-0.1606*** (0.0250)	-0.1501*** (0.0240)	-0.1974*** (0.0546)	-0.1508*** (0.0240)	-0.1450*** (0.0271)
Δ EMP _{t-1}	-0.8742*** (0.3197)	-0.8013** (0.3173)	-0.8744*** (0.3199)	-1.1202*** (0.1496)	-0.8738*** (0.3202)	-0.9144*** (0.3482)
Log AGE	-0.0177 (0.0137)	-0.0295* (0.0176)	-0.0179 (0.0137)	-0.0400 (0.0612)	-0.0162 (0.0138)	-0.0148 (0.0250)
SOU	0.0640 (0.0490)	0.0365 (0.0659)	0.0643 (0.0492)	0.0625 (0.1115)	0.0416 (0.0480)	0.0707 (0.1579)
SUB	0.0228 (0.0546)	0.0404 (0.0339)	0.0226 (0.0418)	0.0390 (0.1341)	0.2018* (0.1133)	16.4096*** (3.7725)
SUB ²	-	-	-	-	-0.1935* (0.1054)	-16.0162*** (3.6694)
SXS	-	-	-	-	-0.3429* (0.1943)	-16.6609*** (3.7292)
SXS ²	-	-	-	-	0.2514* (0.1382)	16.1412*** (3.6551)
AVK	0.0043*** (0.0009)	0.0033*** (0.0012)	0.0043*** (0.0009)	0.0052*** (0.0018)	0.0043*** (0.0009)	0.0068*** (0.0013)
ICT	0.1262*** (0.0233)	0.1477*** (0.0254)	0.1173*** (0.0236)	0.1731** (0.0877)	0.1239*** (0.0227)	0.0312 (0.0463)
INP	0.0995** (0.0399)	0.0792* (0.0427)	0.0558 (0.0583)	-0.1424 (0.2508)	0.0982** (0.0400)	0.0334 (0.0494)
IXS	-	-	0.5302*** (0.0675)	0.4384* (0.2562)	-	-
Constant	0.5439*** (0.0807)	0.8394*** (0.2774)	0.5517*** (0.0779)	0.6408 (0.7507)	0.5446*** (0.0794)	-0.2420 (0.1928)
Observations	7015	6889	7015	6889	7015	6889
R ²	0.1994	-	0.1995	-	0.1999	-
Marginal effect CN	-	-	-	-	0.0199	1.3544
Marginal effect SOU	-	-	-	-	-0.0867	-0.1372
Turning point CN	-	-	-	-	0.5214	0.5123
Turning point SOU	-	-	-	-	1.2185	1.0052
Sargan test (p value)	-	0.8923	-	0.8964	-	0.8759