Informality, Size, and Regulation: Theory and an Application to Egypt

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Abstract

The paper shows how, when the enforceability of regulations is size-sensitive, price competition can lock firms into informality and, thus, smallness, depending on the form of the production function. In that context, exogenous "help" packages targeted to informal firms "promote" micro and small enterprises (i.e., increase their numbers) but do not "develop" them (i.e., foster their growth). The "help" only generates a short-term span of abnormal profits for existing informal firms, and a long-term income transfer toward informal-market consumers. The model is tested in the context of Egypt's micro and small enterprise sector.

Keywords: Informality, Size, Regulation, Egypt, Hide-outs.

JEL Classification: O17, L11, L51.

Introduction and Rationale

In the developing world, micro and small enterprises (MSE) are commonly seen as a key to, among other things, output growth, employment generation, poverty alleviation, and women empowerment. They have thus been, over the last three decades, the target of major development funding from public institutions, donor agencies, and non-government organizations. Simultaneously, a vast, mostly empirical literature has developed covering several aspects of their behavior and actual anatomy. Their access to formal credit (as well as the efficiency and sustainability of purpose-built financial institutions that facilitate that access) has attracted a good deal of research attention [see, for instance, Otero and Rhyne (1994), Webster (1991), and Yunnus (1989)]. Substantial research has also been done on MSE's access to physical inputs [Levy (1993)]; activity-specific performance [Little, Mazumdar, and Page (1987)]; informality [De Soto (1989)]; institutional needs [Carr (1989)]; management [Miller and Clarke (1990)]; region-specific characteristics [Ghate (1992); Page and Steel (1984); Tokman (1992)]; regulation [Stone, Levy and Paredes (1991)]; training [Harper (1989)]; and transaction costs and linkages [Levy (1991)]. In virtually all cases, the literature (and the policy-makers) has focussed on the relaxation of *single* constraints as a means to help MSE growth.

This paper builds a simple analytical framework to highlight the *joint* role of two key factors in a firm's decision to remain small (and in the effectiveness of policy interventions meant to alter that decision): regulation and economies of scale. It explains 'smallness' as a competitive equilibrium outcome of individual firms facing a tradeoff between the cost of regulation and the cost reductions associated with economies of scale. In a partial equilibrium model, it is shown how, when the enforceability of regulations is size-sensitive, price competition can lock firms into informality and, thus, smallness, depending on the form of the production function. One central policy conclusion of the model is that exogenous 'help' packages targeted to informal firms 'promote' MSE (i.e., increase

their numbers) but do not 'develop' them (i.e., foster their growth). In fact, contrary to their usually stated goals, those packages perpetuate and encourage smallness, as they increase the relative attraction of informality. In the end, the 'help' only generates a short-term span of abnormal profits for existing informal firms, and a long-term income transfer toward the consumers of goods and services produced in informality.

The model is then tested in the context of Egypt's MSE sector, and is shown to be consistent with reality. For that purpose, a comprehensive 1994 survey of some two hundred urban Egyptian MSE operating in the carpentry, garment, leather and metal sectors, is used. Measures of absolute and relative informality and size, as well as proxies for the firms' pattern of economies of scale, for their business maturity, and for their owner-managers' educational attainment, are developed and their relationships are econometrically explored.

The paper is organized in three sections. In Section I, the model is built and its main policy implications are analyzed. This is followed by the empirical tests and findings in Section II. Concluding remarks are presented in Section III.

I. A Partial Equilibrium Model of Informality and Regulation

This section is based on two premises. First, informality (i.e., the systematic non-compliance with laws and regulations) reduces firm-level costs. Second, firms can remain informal as long as they remain small (i.e., within a size at which laws and regulations are in practice no longer enforceable). Both propositions bear important implications for those firms' growth, as well as for policy initiatives meant to foster their growth. Below, a geometrical presentation of a one-period, partial equilibrium model is used to analyze those implications.

a) The Basic Model

In the distortion-free, textbook case of perfect competition, long-run equilibrium is achieved at a market price that equals the minimum Long Run Average Cost (LRAC), a point at which the representative firm (all firms being identical) finds its optimal plant size (i.e., the one that allows it to produce, and sell, at the minimum possible cost). No firm makes abnormal profits, all possible economies of scale have been achieved, and consumers get the maximum consumer surplus that is technologically possible. All this happens at point A in Figure 1.

Assume now that a costly regulatory burden is imposed on the representative firm; in reality, that burden could take the form of taxation, forced above-market labor compensation, compulsory plant location, compliance to an array of bureaucratic formalities, etc.. Assume also that the regulatory burden does not affect the pattern of long-term economies of scale (i.e., neither the shape nor the horizontal position of the LRAC curve are affected); in geometrical terms, the LRAC shifts vertically by an additive constant.[1] And, finally, assume that firms cannot avoid the regulatory burden (full

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1/ In practice, regulatory economies of scale may be important, and both the shape and horizontal position of the LRAC may change.

enforcement). In that set-up, the new long-run equilibrium is represented by point B; prices have gone up (by the full cost of regulation), consumer surplus has been lost (area $p_A p_B B'A'$), and the number of firms in the market has shrunk (the representative firm's size, and its production level, is the same but the effective market supply has decreased from q_A to q_B).

Now, suppose that, for some technological reason, regulations become unenforceable if the firm is smaller than a certain size, that is, if there is a maximum 'hide-out' production level that companies can turn out without being 'caught' by the regulator (for instance, *ceteris paribus*, firms with a relatively small long-run production level can keep a limited employment roll, and, thus, can get away with ignoring social security contributions). Say that such a 'hide-out' production quantity is given by point H in Figure 1. At the regulation-burdened price (p_B), any firm choosing to reduce its size and produce the 'hide-out' quantity H could make abnormal profits (area CDEF), a better proposition than the normal break-even situation obtained when abiding to regulation (point B).[2] Since all firms are identical, long-run equilibrium happens when all firms hide but make normal profits (point C). Here prices are lower and consumer surplus is larger than under regulation (p_C and differential area $p_B p_C C'B'$, respectively). In effect, the regulator ends up regulating nobody but still imposes a cost to the economy in terms of lost consumer surplus vis-a-vis the regulation-free world (area $p_C p_A C'A'$). Remarkably, the existence of an ineffective regulatory burden actually translates into informal, and smaller, firms.

2/ This assumes that formality is perfectly reversible, something that may not hold true in practice. For instance, firms that are already registered and paying taxes may find difficulties in going back into informality. By the same token, currently informal firms may delay their decision to formalize, since they would then forego the ability to avoid future increases in regulatory costs.

b) Economies of Scale, Hide-outs, and Policy

There is one major force at play in that outcome: the trade-off between the cost saving implicit in dodging regulations (and producing no more than the maximum 'hide-out' quantity) and the cost saving implicit in achieving economies of scale. Firms save money by avoiding regulations but, because they cannot produce more than the 'hide-out' quantity, they give up economies of scale. Figure 2 illustrates the point by comparing technologies which imply different patterns of economies of scale (to avoid cluttering the figure, only the relevant portions of the LRAC are shown). For presentational purposes, the representative firm is assumed to produce the same initial quantity, at the same long-run average cost (point A in Figure 2), for both technologies. Suppose that a regulatory burden is imposed; geometrically, the LRAC curve of both technologies shift upward by the same additive constant (segment R). If the regulation is fully enforced, regardless of what technology is being used, the firm will keep its initial size (producing Q^*), prices will go up by the full cost of the regulation, there will be less firms in the market (each firm will produce the same level of output, but the market supply will have shrunk), and the same quantity of consumer surplus will have been lost ($p_A p_B B'A'$).

Assume now that the representative firm can dodge the regulatory burden as long as their output remains within a certain 'hide-out' level, and that this 'hide-out' quantity is the same for both technologies (point H). Under Technology I, which entails a relatively shallow pattern of economies of scale, the firm will prefer to contract their plant and production size and go informal: the foregone economies of scale (segment S_I) implicit in that contraction is more than offset by their avoiding the cost of regulation (R). In turn, under Technology II, which allows for relatively larger economies of scale, the firm will find informality too expensive: the regulatory cost saved by producing at

maximum 'hide-out' level (R) is outweighed by the cost increase implicit in the loss of economies of scale (S_{II}). Because firms under Technology II will not dodge the burden of regulation, the industry's prices will go up by more (up to p_B) and consumers will lose more surplus ($p_A p_B B'A'$) than when Technology I is operative (p_C and $p_A p_C C'A'$, respectively). In the end, Technology I brings about informal and smaller firms vis-a-vis a lower number of formal and larger ones under Technology II.

That result has one important policy implication: *ceteris paribus*, the more pronounced an industry's pattern of economies of scale, the worse the effect of regulation in terms of lost consumer surplus. *At the margin*, deregulation produces relatively more significant welfare improvements when applied to industries with large economies of scale. Deregulating an industry where, because of the lack of economies of scale, all firms are informal anyway, brings about relatively less welfare gain as there is less of a decline in market prices. Although, in theory, deregulation across *all* industries is called for, in practice, the marginal differential impact of deregulation may be important, as doing away with complicated regulatory bodies usually requires revising an array of sector-specific legislation, a process that is resource- and time-consuming and cannot be done simultaneously across sectors[3]. The message in Figure 2 is that the prioritization of deregulation efforts needs to take into account not only the importance of the targeted sector (in terms, say, of the pecuniary value of its turnover in relation to the overall economy) but also the technology with which firms operate in that sector.

Another key factor determining the welfare cost of regulation is its actual enforceability throughout the spectrum of output levels, that is, the relative position of the maximum 'hide-out' output (H) vis-a-vis the regulation-free optimal production level (Q^*). Figure 3 illustrates the point. The

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3/ Typically, doing away with regulation requires drafting of new laws, discussions with relevant interest groups, parliamentary debates, adapting capabilities of enforcing institutions, setting-up of special sector arrangements, etc..

representative firm will chose to dodge the regulatory burden as long as the output it can produce in informality implies a long-run average cost lower than the one in post-regulation formality. However, if the maximum 'hide-out' quantity is not large enough (i.e., output levels smaller than H_o in Figure 3), the firm would price itself out by going informal *vis-a-vis* regulation-abiding competitors, as its LRAC would be higher than the formal firms'.

In practice, the size of the maximum 'hide-out' output is likely to be determined by the lumpiness of the output menu; the type of production technology; the kind of regulatory burden to be dodged; and the relationship between the probability of being caught dodging, the effective penalty for dodging, and the risk preferences of the dodger. For instance, *ceteris paribus*, construction companies are less likely to be informal than tent-making ones; highly-mechanized operations may be more difficult to hide than hand-based ones; taxes may be more difficult to avoid than fire safety standards; and little-to-lose poor individual producers may be more prone to risk dodging regulations than reputation-conscious corporations. Those characteristics may then be relevant to prioritize deregulation efforts. Controlling for other welfare-relevant factors, the lifting of difficult-to-avoid regulations on corporatized sectors with lumpy outputs and sophisticated technology is likely to produce, *in the margin*, a relatively greater welfare improvement, as those sectors are more likely to have already abided to the regulatory system.

It is worth emphasizing that the arguments above do not imply that deregulation in sectors with high incidence of informality is unnecessary. For two reasons. First, those sectors could account (and in developing countries usually account) for the lion share of the economy's value added; hence, their deregulation, albeit relatively innocuous within the sectors, could produce the highest absolute welfare gain in the economy as a whole. Second, firms that have decided to dodge regulation are more

likely to experience internal growth (that is, to enlarge their *individual* output and size in the long-run) than firms that, after abiding to the regulatory burden, have expanded their output and size to their minimum LRAC.

However, for a given sector, *market* output will increase more by lifting regulations if the sector in question is highly formalized, as this will bring about a relatively deeper long-run fall in market prices. Figure 2, which controls for the size of the regulatory burden and for the market demand, can be used again to provide an illustration of this point. In long-run equilibrium, and under Technology I, companies dodge the regulatory burden and produce at the maximum hide-out level (point H) while, under Technology II, they abide to the regulations and produce at their minimum LRAC quantity (point Q*). If regulations were to be completely lifted in the informality scenario, prices would fall (from p_C to p_A), the consumer surplus would be expanded (by area $p_A p_C C'A'$), market output would increase (from q_C to q_A), and each individual firm's output (and size) would expand (from H to Q*). However, lifting the regulatory burden if firms are formal (i.e., Technology II is operative) would produce a larger price fall (p_B to p_A), a larger increase in consumer surplus (area $p_A p_B B'A'$), and a higher output increase (from q_B to q_A), albeit no change in the individual firm's size would take place. In brief, deregulation in informal industries brings about *individual firm* growth but relatively less *market* growth as compared to regulation-abiding industries, where the individual firm's size is unaffected.

c) Informality and Policy Intervention

The framework presented in this section is also useful to assess the impact of policy intervention in favor of informal micro and small enterprises. Because the latter are a major source of employment in the developing world, policy-makers usually resort to *ad-hoc* 'help' programs in order to foster their *development*. Yet, it will be argued here, as long as deregulation does not take place, those programs *promote* informal micro and small enterprises but do not *develop* them. Put differently, existing enterprises will not grow, only the number of them in the market will. Moreover, the 'help' package will amount, in the short-run, to an income transfer toward existing enterprises and, in the long-run (assuming the package is sustainable in the long-run), to an income transfer toward consumers.

In effect, what those 'help' packages do is to reduce the LRAC of informal firms. As an example, it is useful to focus on a common constraint to informal micro and small enterprises: lack of access to formal credit mechanisms. Being informal, those enterprises usually cannot meet the legal requirements of bank lending (most notably, in terms of enforceable collateralized contracts), and are confined to more expensive informal credit markets. Thus, special lending programs for informal micro and small enterprises are frequently put in place; collateral and institutional requirements are eliminated and firms are allowed to borrow even if they cannot prove to be in compliance with existing regulations[4]. This reduces those firms' borrowing cost as they can now access credit at interest rates below those of the informal credit market. However, this does not change the system of incentives toward expanding output (and, presumably, employment) at the *individual* firm's level

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4/ Notice that the credit 'help' program need not carry a subsidy component as the program's interest rate, albeit below informal market levels, may be set on a cost-recovery or even profit-maximizing basis.

simply because it does not reduce the relative appeal of being informal and, therefore, small. Actually, it has the opposite effect.

Figure 4 illustrates the point. After the initial regulatory burden is imposed, the representative firm chooses informality and produces at its 'hide-out' quantity (point H); its LRAC is given by point C. An exogenous cheaper-credit help package is then introduced which brings the LRAC down (by, say, an additive constant). Assume that the package is open to all firms independently of their formality, albeit only informal firms populate the market. The representative firm's long-run alternatives are now: remain informal, keep output (and size) unchanged at point H, with a LRAC at point D; or become formal to be able to expand output (and size) to point Q^* with a higher LRAC at E. The former alternative dominates, as it implies a lower LRAC. In the end, all firms remain informal with the same production size. However, because long-run prices have gone down and the effective *market* supply has increased, the *number* of informal firms has expanded. The 'help' package has *promoted* informal firms (and, indeed, informality), not *developed* them. Also, since in long-run equilibrium all firms break even once again, the actual beneficiaries of the 'help' package are consumers: their surplus has been enlarged by the decline in prices (area $p_D p_C C'D'$). Firms that were in the market before the 'help' package was introduced achieve only transitional abnormal profits, which are subsequently diluted by new market entrants. In the end, the 'help' package makes little developmental difference for the original firms it was targeting.

Now, suppose that the 'help' packages were to be given *exclusively* to firms that abide to regulations, even though the market is initially populated with informal firms only. In that case, the representative firm's LRAC curve in informality will not change; only the LRAC curve of firms that abide by regulations would fall. This could, as in Figure 4, allow for firms that turn formal and

expand to underprice informal competitors; in the long-run, the representative firm would produce at the minimum level of the regulation-cum-help LRAC curve (point E), rather than at the 'hide-out' quantity on the no-regulation-no-help curve (point C). The 'help' package has altered the cost trade-off between formality and informality: the economies of scale implicit in expanding production *plus* the 'help' package have become more appealing than the saving made by remaining small to dodge regulations. Previously informal firms have now *developed* (that is, they have grown in size to produce $\hat{Q}$), and have not necessarily been *promoted* (that is, the final number of firms in the market will depend on the increase in effective market supply relative to the representative firm's expansion). Of course, that result crucially depends on the size of the 'help' package: it will only lead firms toward formality if it can fully offset the cost differential in favor of hiding-out in informality. The more pronounced the economies of scale in the industry, the more likely that is to happen. If the for-formals-only package were not big enough, it will have no effect whatsoever, as the representative firm will remain informal and, thus, will be unable to benefit from it.

In brief, and *short of deregulation*, if the target of policy intervention is to *develop* currently-informal firms, exogenous 'help' packages should be made available to formal firms only, and should be designed after careful quantification of the cost implications of existing regulations. In this event, those packages stand a better chance of success in sectors that exhibit larger potential for economies of scale.

Finally, the analysis of the effect of 'help' packages on firm size is also useful to highlight the role of *partial* deregulation. In fact, *full* deregulation is not a necessary condition to attract firms out of informality. Removing a limited set of regulations could tilt the cost saving balance between informality and formality in favor of the latter, as the cost saving implicit in dodging the remaining

regulations may become offset by the cost saving arising from available economies of scale. Resorting again to Figure 4, partial deregulation could have the same effect as a 'help' package: informal firms initially operating at point C shift into abiding to the remaining regulations, and expand to produce at point E. In terms of practical policy-making, the issue is again one of prioritization: if full simultaneous deregulation is not feasible within a certain industry, a hierarchy of regulations according to their firm-level cost implication seems the best guide to direct marginal deregulation efforts.

d) Limitations of the Basic Model

It is worth emphasizing that this section's analytical model is a partial equilibrium one and, as such, it ignores both the broader welfare-related rationale for the existence of a regulatory burden and the economy-wide effects of price changes in the market under consideration. It further ignores other mathematical ways (beyond an additive constant) in which regulation and 'help' enter into a long-run average costs. It also assumes that market segmentation is not possible and, thus, formal and informal firms cannot co-exist in the same sector. More importantly, the analysis is based on the premise that informality is cheaper and categorical; models in which formality entails cost reductions (e.g., through access to subsidies) or is treated as a continuous variable (e.g., firms can affect the level of enforcement and, thus, can choose an optimal degree of formality) could also be considered. Those factors are important, and may in special cases invalidate this section's conclusions. However, the core messages of this section remain powerful ones; in general: (i) deregulation is likely to produce *relatively* better *marginal* results when applied to formal industries; and (ii) in the absence of deregulation, *ad hoc* 'help' packages only foster the growth of informal enterprises when they are *both* given on condition of becoming formal *and* dimensioned to at least make up for the cost of regulation net of economies of scale.[5]

5/ The 'help' package could be designed to, in effect, compensate the firm for the cost of meeting regulatory requirements.

II. An Application To Egypt.

The theory developed above predicts that, *for a given regulatory framework*, the higher a firm's degree of informality, and the less the economies of scale available to it, the smaller its size. In this section, those predictions are tested in (and are shown to be consistent with) the Egyptian environment.

a) Methodology.

Egypt presents a very suitable case to analyze the links between regulation, formality and size: it has had, until very recently, a centrally-planned, public-sector-driven economic system in which heavy regulation was used as a tool to confine private business activity to sectors where it would not compete with public enterprises. This has translated into a highly atomized private industrial structure: 98 percent of all private establishments have less than 10 employees, and two thirds have one or two [World Bank (1994)].

The findings of this paper are based on a purpose-built 1994 sample survey of some two hundred private, manufacturing Egyptian firms, operating in the carpentry, garment, leather and metal sectors, and located in major cities[6]. Although the actual selection of firms within a certain geographical area was done at random, size criteria were used to only allow MSE into the sample (those criteria included number of employees; square footage of workshop; apparent turnover; etc.).

Two measures of informality were constructed for each firm (and subsequently aggregated across sectors): an absolute informality index (I_a), defined as the proportion of regulatory requirements a

6/ The survey was part of a wider effort to compile socio-economic, financial, and managerial information on small and micro Egyptian enterprises.

firm does not comply with, and a relative informality index (I_r), defined also as the proportion of non-compliance but weighting each regulation by the industry's tendency to comply with it[7]. In other words, I_a measures how informal a firm is as compared to existing legal requirements, while I_r describes how informal a firm is in respect to its industry's actual compliance with those requirements. Thus, I_r controls for the overall compliance standard (and actual enforcement levels) within the industry in question. The individual firm's relative size (Z) was proxied by its gross revenue taken as a proportion of the industry's average firm's gross revenue (hence, partially correcting for the under-reporting common to this kind of survey). Finally, the relative pattern of economies of scale available to each firm (E) was proxied by the ratio of total cost to employment, rather than to variable cost, in order to eliminate a certain degree of cost misclassification detected in the survey[8].

7/ The mathematical formulation of those indexes is as follows:

Absolute Informality Index of firm "ij" $\equiv I_a^{ij} \equiv 1 - [(\Sigma^{nj}_{s=1}\ r_{sij})/n_j]$

where i = firm subscript
j = industry subscript
r = regulation dummy (1 if complied, 0 of not complied)
s = regulation subscript
n_j = number of regulations in industry j

Relative Informality Index of firm "ij" $\equiv I_r^{ij} \equiv 1 - (\Sigma^{nj}_{s=1}\ r_{sij} \cdot w_{sj})$

where $w_{sj} \equiv \Sigma^{fj}_{i=1}\ r_{sij} / \Sigma^{nj}_{s=1}\ \Sigma^{fj}_{i=1}\ r_{sij}$

f_j = number of firms in industry j

8/ Three components made up our calculation of total cost: reported variable costs, reported fixed costs, and 'imputed' fixed costs (the latter computed on the basis of estimated rental value of owned shops, and of estimated depreciation of tools). However, overlapping between reported fixed and reported variable costs was detected in the sample. For instance, rent payments for leased shops, an otherwise fixed cost, are commonly suspended when sales decline, thus becoming a 'quasi-variable' cost. Similarly, in a number of observations, the reported cost of raw materials included outlays meant to maintain basic input inventories, even when production is stalled, raising the firm's fixed financial costs. Finally, reported social security contributions, which would normally vary with output and employment, included in many cases the owners' own subscription which is paid independently of the business' output performance.

It is worth noting that the series mentioned above were designed to capture and explain size dispersion even though the population of firms (from which our sample was randomly selected) is made up entirely of MSE. By focussing on firm size *as a proportion of the industry's average*, the tests can account for the impact of informality and economies of scale on a firm's 'degree of smallness' within a sample of 'smalls'.

b) Empirical Results.

Table 1 presents the basic characteristics of the computed series. The average firm in the sample only abides by a quarter of the regulations, and by half when those regulations are weighted by their relative, industry-specific observance rate. And, if informality is assumed to be normally distributed, ninety-five percent of the firms would ignore at least forty percent of the unweighted regulatory environment.

Econometric results are reported in Table 2. The basic relationship is postulated as follows[9]:

$$\log Z = \alpha + \beta I_{a,r} + \gamma E + \xi \qquad (1)$$

where the regression coefficients of $I_{a,r}$ and E are expected to be negative and positive, respectively. The empirical results shown in the first half of Table 2 confirm those sign expectations, as well as the statistical significance of the relevant parameters, both for absolute and relative measurements of informality. These results appear strong, having in mind the dampening effect that the expected

9/ The postulated exponential form (i.e., the logarithmic transformation of the dependent variable) proved slightly better fitting than a simple linear definition .

colinearity between informality and economies of scale has on the t-statistics of the regression coefficients.

The explanatory power of the regressions is not high (adjusted R^2 around 0.40). This is probably due to the fact that, in the Egyptian context, size may also be explained by other factors not fully captured by the perfect competition model used in this paper. Two such factors were tested here: education and age of the business[10]. In practice, for a given level of informality and pattern of economies of scale, the capacity to absorb growth-fostering information and know-how varies greatly across firms in line with their owner-managers' educational attainment (an impossibility in the perfect competition world where enterprises are assumed identical). However, for a given capacity for knowledge absorption, the model predicts that the firm's own age will be irrelevant to its size; that is, faced with the same regulatory and technological mix, two equally educated owner-managers will chose the same firm size independently of how long each of them has been in business (e.g., heavy permanent regulation could keep a firm at its maximum hide-out production level permanently). Those propositions are tested, and confirmed, in Table 2. When included in the basic relationship (1), the owner-manager's education level appears positively correlated with size, and statistically significant, while the age of the firm is shown to be statistically irrelevant.

10/ The owner-manager's gender is another potentially important characteristic that may affect a firm's size in the Egyptian cultural context. Since only 7 out of 205 completed questionnaires corresponded to firms with female owner-managers (and those are exclusively concentrated in the garments sector), our survey results are of limited use in testing the relationship between size and gender. In a separate exercise, a gender-related dummy variable was added to the expanded relationship of Table 2 within the garments subsample; female ownership-management of firms appeared negatively correlated to size but statistically insignificant (likely due to women's poor representation in the subsample).

III. Conclusions

This paper explains a firm's decision to remain 'small' as the competitive outcome of a trade-off between the cost of abiding by regulations and the cost saving associated with economies of scale. In a simple partial equilibrium model, it is shown how size-dependent enforceability of regulations can lock competitive firms into a maximum 'hide-out' plant size, at and below which regulations are no longer enforceable or abided by. In the long-run, the market is populated by small, informal firms, and the only effect of the otherwise ignored regulations is to raise long-term prices (and to reduce consumer surplus).

The fact that, because of the form of their production function and of the cost of regulation, firms are locked into informality at their maximum 'hide-out' plant size has at least two important implications for policy intervention. First, deregulation has a larger *relative* effect in terms of increasing consumer surplus, and a smaller one in terms of increasing individual firms' size, when applied to highly formalized industries. Second, exogenous growth assistance targeted to 'informals' (say, in the form of access to cheaper formal credit) is ineffective in developing them, as it only generates a larger number of similarly-sized informal firms, but it does not help them grow. Beyond a temporary span of abnormal profits for the incumbent informals, the assistance (if sustained over time) becomes an income transfer toward the industry's consumers.

Those implications are not enough, however, to render assistance packages for informal microenterprises either unnecessary or undesirable. By enhancing, albeit temporarily, the income of existing microentrepreneurs the packages could effectively achieve *social*, rather than economic, objectives (e.g., welfare support for the ultra-poor of a certain geographical region). However, this paper's findings do suggest that, even when socially motivated, informal microenterprise promotion

schemes are effective as long as their benefits have a limited outreach: as the cost reductions associated with the schemes reach an increasing number of microenterprises, price-cutting competition passes those benefits to the consumers.

Finally, our empirical testing shows this paper's model to be consistent with reality (at least in the Egyptian context). However, the model's limitations open avenues for further research. First, the way in which specific regulations enter the cost function in practice could provide a hierarchy for deregulation efforts and for growth-oriented microenterprise assistance packages: removing, or defraying the cost of, a certain regulation or subgroup of regulations could be enough to tilt the size decision toward economies-of-scale-capturing expansion. Second, a general equilibrium approach (i.e., one that takes into account cross price elasticities) could better account for the overall effect of regulation-driven informality and smallness when the output of the industry in question is an important component in the consumers' budget (e.g., staple food in some developing countries). And, third, this paper assumes away the benefits of regulation (e.g., in internalizing the social cost of private decisions) and of formality (e.g., in qualifying entrepreneurs to obtain subsidies), both key determinants of the optimal size structure of an industry.

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Figure 1: Informality and Firm Size

A Partial–Equilibrium Framework

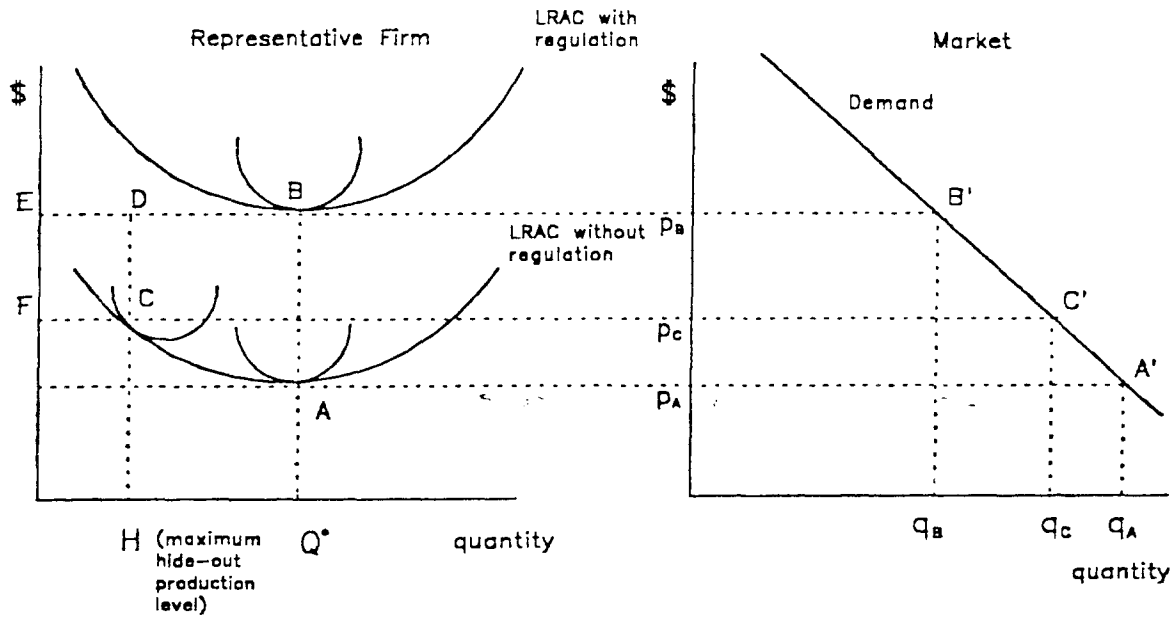

Figure 2: Informality and Economies of Scale

A Partial–Equilibrium Framework

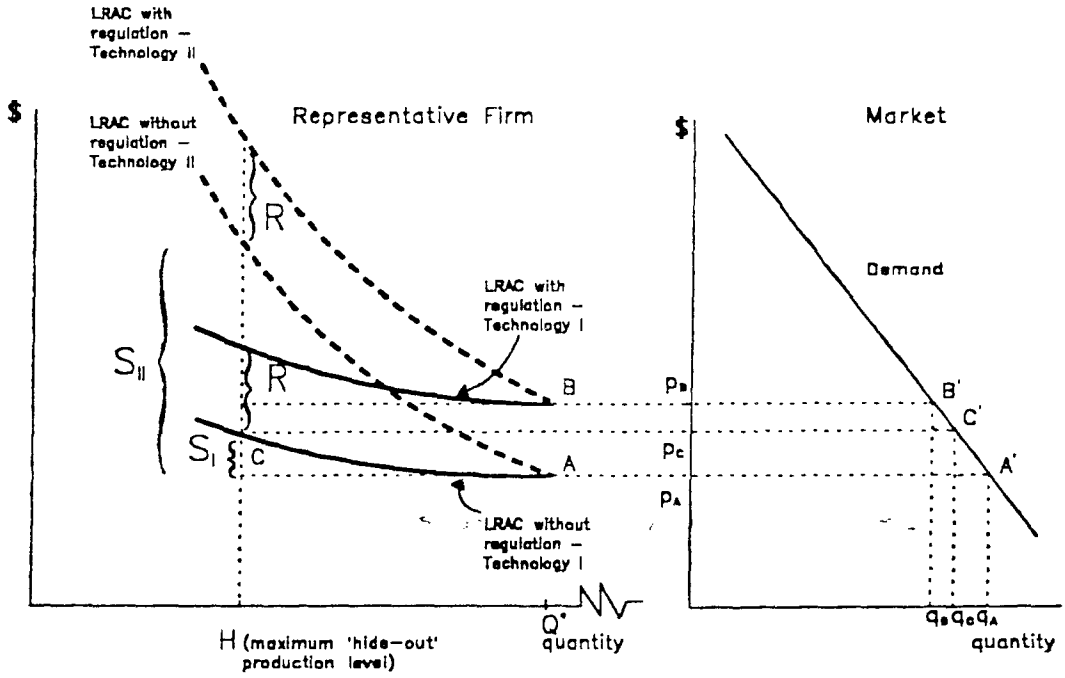

Figure 3: Informality and Hide-outs

A Partial-Equilibrium Framework

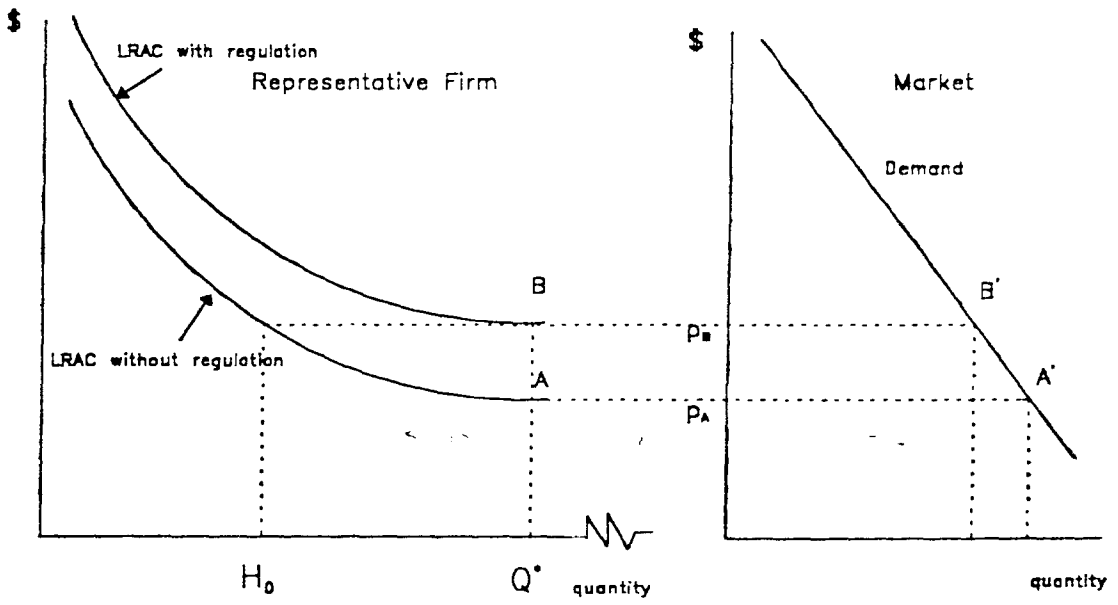

Figure 4: Informality and Exogenous "Help"
A Partial–Equilibrium Framework

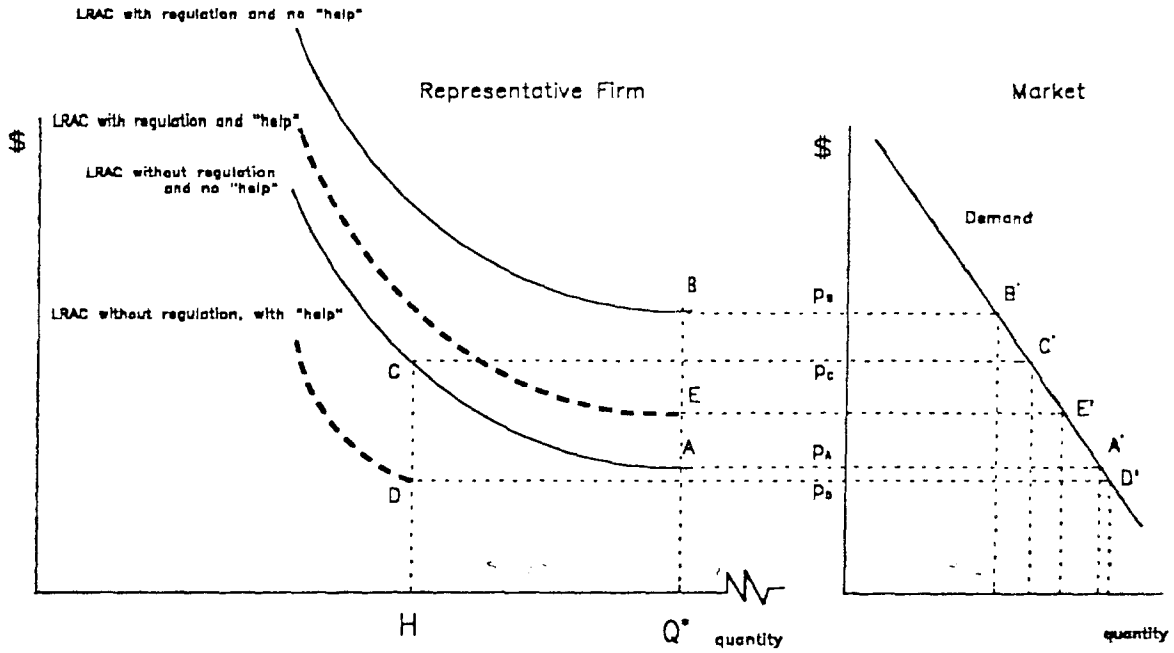

Table 1: Main Descriptive Statistics

	Mean	Standard Deviation
Absolute Informality Index (I_a) (0 = fully formal; 1 = fully informal)	0.76	0.16
Relative Informality Index (I_r) (0 = fully formal; 1 = fully informal)	0.52	0.29
Size (Z)	1.00	1.62
Economies of Scale Proxi (E)	7,459	8,909
Educational Attainment of Owner-Manager 1/	1.68	1.38
Years since business was started	11.52	9.11

Number of observations: 205

1/ 0 = illiterate; 1 = read & write; 2 = preparatory; 3 = intermediate;
4 = secondary; 5 = university

Table 2: Econometric Results
Dependent Variable: Size (Z)

Regression Coefficients and Statistics
(Heteroskedasticity-consistent t-statistics in parenthesis)

	Basic Relationship		Expanded Relationship	
Constant	-0.46 (-1.62)	-0.90 (-6.57)	-0.45 (-1.37)	-0.94 (-5.12)
Absolute Informality Index (I_a)	-0.96 (-2.81)		-1.02 (-2.97)	
Relative Informality Index (I_r)		-0.57 (-3.13)		-0.59 (-3.23)
Economies of Scale Proxi (E)	0.00007 (6.41)	0.00007 (6.54)	0.00007 (6.45)	0.00007 (6.61)
Educational Attainment of Owner-Manager			0.11 (2.30)	0.11 (2.33)
Years Since Business Started			-0.009 (-1.61)	-0.009 (-1.52)
Standard Error of Regression	0.83	0.82	0.81	0.81
F-statistic	70.08	71.06	38.9	39.3
Adjusted R^2	0.40	0.40	0.42	0.42

Number of observations: 205
Method of estimation: OLS