Multi-Level Marketing Business Opportunities:
Analyzing Net Economic Return and Avoidable Economic Loss to Distributors

by

Anne T. Coughlan*
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*Polk Bros. Chair in Retailing and Professor of Marketing, Kellogg School of Management, Northwestern University, Evanston, IL, 60208-2008.
Contact information: (847)491-2719; a-coughlan@kellogg.northwestern.edu .

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ABSTRACT

This paper analyzes the operation of multi-level marketing (MLM) distribution channels, with an eye toward analyzing Net Economic Return (NER), and the possibility of Avoidable Economic Losses (AEL), to individuals from joining as MLM distributors. The analysis takes account of possible *ex ante* and *ex post* information sets of distributor prospects and the MLM firm. Protecting prospective and incumbent distributors has been an issue of policy importance in the many cases brought by the FTC against firms accused of operating illegal pyramid schemes and/or misleading prospective and current distributors. Accordingly, the current work posits a definition of AEL that is based on both the elements of the NER from participating, and avoidable and unavoidable informational limitations on the parts of the distributor and the firm. The paper's model allows investigation of distributors' joining decisions, work behaviors, income, and MLM profitability under these various scenarios, and informs the question of when and whether an AEL can be argued to have occurred.

The paper first examines one of the only other academic analytic modeling articles evaluating the MLM distribution channel and highlights an implicit, but crucial, assumption in this model that creates an unnecessarily aggressive criterion for distinguishing between a legitimate MLM and a suspected illegal pyramid scheme. It then develops a definition of distributor AEL that may be caused by participation as a distributor in an MLM enterprise, specifying that an AEL occurs when the MLM firm or an upline sponsor possesses information of use in evaluating the quality of the business opportunity that would cause prospects not to join the MLM, and purposefully conceals this information when it could have effectively revealed it to prospects, thus leading some to join who would otherwise not join, and resulting in their NER less than the opportunity cost of participating.

An emended modeling structure is next presented, which examines MLM business opportunities when the implicit assumption of the prior article is relaxed. The model focuses on non-business-building distributors who are likely to be the most at risk to suffer an AEL. Analysis of several sub-models of the emended model structure provides a characterization of the difference between misapprehension or imperfect information (which need not imply an AEL) and purposeful misrepresentation of the nature of the MLM business opportunity to prospective distributors (which may, but does not always, imply an AEL). Among the results of the model are that it is economically rational for a person to join the MLM as a personal-consumption-only distributor; that distributors with full information do not suffer an AEL by joining an MLM, regardless of their type; that the MLM firm may reasonably target both low and high achieving distributors in a "pooling" strategy, or only high achievers in a "separating" strategy; that a pooling strategy generally grants high-achieving distributors economic rents relative to low-achievers but that an AEL does not universally accompany this difference; and that an AEL can – but may not always – result from purposeful over-stating of the quality of the business opportunity by the MLM firm. The paper concludes with implications for MLM firm information dissemination strategies and for emended criteria for assessment of possible pyramid scheme operation.

The MLM Distribution Channel

Multi-level marketing (MLM) is a particular form of *direct selling*, a distribution channel form defined as follows[1]:

> "Direct Selling is the sale of a consumer product or service, person-to-person, away from a fixed retail location, marketed through independent sales representatives who are sometimes also referred to as consultants, distributors or other titles. Direct sellers are not employees of the company. They are independent contractors who market and sell the products or services of a company in return for a commission on those sales."

MLM firms generated an estimated $34.47 billion in retail sales, and there were 18.2 million direct selling distributors, in the U.S. in 2014. Some 75% of U.S. MLM distributors in 2014 were women, and almost 90 percent worked only part-time on their businesses.[2] A wide variety of products is sold through the MLM distribution channel form: 30% in wellness products, 23% in home/family care/home durables, 18% in services, 17% in personal care, 10% in clothing and accessories, and 2% in leisure and educational products, in 2014.[3]

The MLM firm provides for three major types of distributor compensation and utility: (1) distributors purchase products at wholesale prices, and may either use these discounted products themselves or sell the products to others for a profit; (2) distributors may earn a periodic commission based on their personal sales volume, which is the sum of the values of every product they personally buy or sell; and (3) (specific to the multilevel direct selling distribution form) distributors may earn a commission on the sales of product by and to those they recruit into the network and continue to motivate (who are called 'downline distributors').[4]

A distributor is not required to incur large costs to start his/her MLM business, because the MLM firm bears many costs that would otherwise fall on the shoulders of a small entrepreneur (*e.g.,* product branding and development, production, logistics, training, compensation management). Further, the

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[1] Source: http://www.directselling411.com/about-direct-selling/ , downloaded February 16, 2015. This website is hosted by the Direct Selling Assocation. Most direct-selling companies use the multi-level marketing (MLM) compensation structure.

[2] Source: http://www.dsa.org/about/channel , downloaded June 28, 2016. Meanwhile, worldwide, 103 million direct selling distributors generated MLM retail sales of almost US$184 billion in 2015. Source: http://www.wfdsa.org/press/index.cfm?fa=show_release&Document_id=836, downloaded June 27, 2016.

[3] Source: Direct Selling Association (July 2015), *2015 Growth & Outlook Report, U.S. Direct Selling in 2014.* U.S. direct-selling sales rose further to $36.12 billion, and the number of direct sellers rose to 20.2 million, in 2015 (source: press release, "Direct Selling's Economic Footprint Continues to Expand in United States, According to New National Survey," downloaded from http://www.dsa.org/news/individual-press-release/direct-selling-s-economic-footprint-continues-to-expand-in-united-states-according-to-new-national-and-bloomberg-government-survey on June 27, 2016).

[4] This is adapted from the definitions used in Coughlan, Anne T. et al. (2006), *Marketing Channels*, 7th Edition, Prentice-Hall, p. 456, and Coughlan, Anne T. and Kent Grayson (1998), "Network Marketing Organizations: Compensation Plans, Retail Network Growth, and Profitability," *International Journal of Research in Marketing*, vol. 15 (5, December), p. 402. A similar definition and characterization is presented in the *Federal Trade Commission*'s *"Consumer Information: Multilevel Marketing,"* (downloaded June 28, 2016 from https://www.consumer.ftc.gov/articles/0065-multilevel-marketing): "In multilevel or network marketing, individuals sell products to the public — often by word of mouth and direct sales. Typically, distributors earn commissions, not only for their own sales, but also for sales made by the people they recruit." Some firms however pay commissions only on sales of downline distributors and not on one's own purchases.

initial registration fee and inventory-holding or other business expenses at a legitimate MLM are typically low. In addition, the distributor need not acquire certification or advanced education to join. S/he can operate out of the home, avoiding office rental expenses, and s/he can start the business part-time if unsure about whether or not to quit a full-time job right away.

Distributors list a variety of reasons for joining an MLM. A substantial proportion joins only, or primarily, for the right to buy and personally consume the MLM's products at a discount off retail prices. This ability to buy products at a wholesale price, as well as lifestyle flexibility and long-term and short-term income supplementation, were top motivators to become a distributor in a recent study, while just under one-fourth of joiners cited a full-time career goal for enrolling.[5] Similarly, non-distributor consumers buy from MLM firms for many different reasons; in one study, the top three reasons for buying were (a) convenience, (b) personal attention, and (c) the ability to examine products before buying.[6]

The above observations suggest that an MLM business does not create automatic income, although it can be rewarding for those who work hard, are good personal sellers, and can motivate and manage downline distributors. Of course, not everyone has these characteristics,[7] so most distributors do not make their living as direct sellers. Substantial turnover is also common in MLM businesses: the recruitment rate (calculated as the number of new recruits in the year as a percentage of the number of incumbent distributors) of new distributors was 40.7 percent in 2014, and the dropout rate was 33.5 percent, suggesting a large influx of new participants each year on average.[8] MLM distributor turnover occurs for many reasons: discovering that one is not suited to sales, meeting a one-time short-term goal, or working the business sporadically to meet seasonal income goals.

In summary, many different types of products are sold through the MLM distribution channel form. MLM distributors mainly sell on a part-time basis, and most neither spend the required time nor make enough money to treat it as their primary income source. High earners work significantly longer hours at the business than do lower earners. MLM distributors enter the business for various reasons, but always near the top of the list is enjoyment of the firm's products, along with the obvious desire to earn income and enjoy the benefits of an entrepreneurial work style. Finally, apparently high turnover rates in MLM businesses are not proof of distributor failure, given the many non-career goals voiced for joining as a distributor.

Pyramid Schemes, Commentary on a Proposed Test, and Distributor Protections as a Mitigator

There is a broad concern in policy and business circles about the distinction between a legitimate MLM and an illegal pyramid scheme. Many actions have been brought by the FTC against direct selling companies, some notable examples including Koscot Interplanetary (1975), Amway (1979) (found not to

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[5] Source: Source: Direct Selling Association (July 2015), *2015 Growth & Outlook Report, U.S. Direct Selling in 2014*, citing the Direct Selling Association's 2014 National Salesforce Study.

[6] As reported in Peterson, Robert A.; Gerald Albaum; and Nancy M. Ridgway (1989), "Consumers Who Buy From Direct Sales Companies," *Journal of Retailing*, Vol. 65 (2, Summer), pp. 273-286, specifically p. 281.

[7] In a 1993 survey of 31 MLM firms, top distributors were found to spend about 2.2 times as many hours per month working on their MLM business as their above-average counterparts; and similarly, above average distributors spent about 2.2 times as much time per month working on the MLM business as did average performers. Source: Coughlan, Anne T. and Kent Grayson (1993), "1993 Multi-Level Marketing Executives Industry Survey Summary Report."

[8] Source: Direct Selling Association (July 2015), *2015 Growth & Outlook Report, U.S. Direct Selling in 2014*.

be a pyramid scheme), and more recent cases against BurnLounge (2014), Fortune Hi-Tech Marketing (2014), and Vemma (2016). The FTC is currently (as of this writing) engaged in a Civil Investigative Demand investigation of Herbalife as well.

A pyramid scheme was defined in the Koscot case: "Such schemes are characterized by the payment by participants of money to the company in return for which they receive (1) the right to sell a product *and* (2) the right to receive in return for recruiting other participants into the program rewards which are unrelated to sale of the product to ultimate users."[9] Of core importance in this definition is the notion that an enrollee in a pyramid scheme buys the right (through his/her registration fee and/or mandatory upfront payments including non-refundable inventory purchases) to earn money primarily from the enrollment of other participants, without the primary focus of income-earning being on the sale of products of real value for ultimate consumption – be it personal consumption by distributors or non-distributor end-user consumption.

A pyramid scheme could be virtually devoid of any products for sale; such schemes resemble Ponzi schemes or chain-letters. But some pyramid schemes sell products of minimal or no value separate from the pyramid payout opportunity. When such products are offered along with the abovementioned large initial non-refundable expenditures, and compensation is primarily based on finding new recruits rather than on retail sales and voluntary consumption, many or most participants at any point in time do not enjoy a positive net economic return for their inputs and efforts. Ultimately, such a scheme is expected to collapse, because eventually a generation of new recruits is expected to be mathematically unable to ever earn back their initial payments through the enrollment of new recruits. Those who join the scheme at that point are destined never to make back their cost of entry, and since the products are of minimal value at best, at that time the only way new recruits can be induced to enter would be by misleading them about the real prospects and value for the opportunity.

In one paper built on testimony against an alleged pyramid scheme operator, Vander Nat and Keep[10] (VK) propose a model of direct selling that they claim produces a rule by which to assess whether such a business is a legitimate direct selling company or an illegal pyramid scheme. They argue that when the fraction of company sales made to distributors for their own personal consumption is too high, the business may be a pyramid scheme.

However, this proposed metric can be contrasted with a more recent FTC staff advisory opinion on pyramid scheme analysis in 2004, which stated[11]:

> "Much has been made of the personal, or internal, consumption issue in recent years. In fact, the amount of internal consumption in any multi-level compensation business does not determine whether or not the FTC will consider the plan a pyramid scheme. The critical question for the FTC is whether the revenues that primarily support the commissions paid to all participants are generated from purchases of goods and services that are not simply incidental to the purchase of the right to participate in a money-making scheme. A multi-level compensation system funded primarily by such non-incidental revenues does not depend on continued recruitment of new participants, and therefore, does not guarantee financial failure for the majority of participants. In contrast, a multi-level compensation system funded primarily by payments made for the right to participate in the venture is an illegal pyramid scheme."

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[9] In The Matter of Koscot Interplanetary, Inc., *et al.*, 86 F.T.C. 1106 (1975), at *59.
[10] Vander Nat, Peter J. and William W. Keep (2002), "Marketing Fraud: an Approach for Differentiating Multilevel Marketing from Pyramid Schemes," *Journal of Public Policy & Marketing*, 21 (1, Spring), 139-151.
[11] Letter of James A. Kohm, Acting Director of Marketing Practices at the U.S. Federal Trade Commission, addressed to Neil H. Offen, President of the Direct Selling Association, January 14, 2004.

The above statement means that assessing the legality of an MLM relies not on measuring what amount of product is consumed by distributors, but rather on verifying whether the compensation plan structure rewards distributors primarily with monies collected in new recruit registration and any mandatory inventory purchase fees. Indeed, legitimate direct selling businesses do not rely on high registration and renewal fees, mandatory non-refundable product purchases, or sales of products of dubious value to their distributors (ostensibly for personal consumption), to fuel the commissions of distributors who are upline in the direct selling network. Instead, they are characterized by the offer of products of real value; by a lack of compensation for recruitment without regard to or unrelated to sales; by robust purchases of products by distributors driven by market forces for consumption and resale; and by a set of consumer and distributor protections including one or more of the following[12]:

- Registration fees and annual renewal fees are not credited to a distributor's upline sponsor and do not result in any monetary award to the sponsoring upline distributor; that is, there are no rewards merely for recruiting new distributors.
- Distributor purchases of product from the direct selling firm – whether for personal consumption or for resale to non-distributor end-users – are voluntary, with no minimum required purchase volumes, either at initial registration or on an ongoing basis.
- The direct selling firm selling physical products offers a return policy to both non-distributor end-users and distributors.[13] This allows either type of individual to reconsider his/her decision to purchase the company's products and to receive his/her money back if s/he decides not to keep them.[14] It further eliminates any pressure by upline sponsors to induce downlines to buy excess products, and eliminates a distributor's loss from having purchased excessive inventory. Together, these imply that the direct selling firm can only survive by offering products of value for sale.
- Initial registration fees are not significantly higher than the cost of the contents of a registration kit, plus the cost to enroll and support the registrant in the MLM's system. Such fees logically therefore would not be a sufficient source of money to fund commissions to incumbent distributors.
- A newly joining distributor can reconsider his/her decision to join and get a refund of initial registration fees within a reasonable period, limiting the ability of the MLM firm or sponsoring upline distributors to financially benefit from duping prospects into joining an ephemeral scheme.[15]

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[12] These are all part of the Code of Ethics of the U.S. Direct Selling Association, the trade association of direct-selling companies. If a member company is found to be in violation of any of the provisions of the Code of Ethics, its membership in the DSA is revoked. Member firms' own Rules of Conduct typically explicitly include these provisions. See http://www.dsa.org/code-of-ethics/overview for details and the complete DSA Code of Ethics.

[13] Allowing distributors the same, or similar, product return rights accorded to non-distributor end-users implies logically that any purchases by a distributor which are not returned are either for sale to others or for voluntary personal consumption. The distributor return policy is sometimes restricted to the time of resignation.

[14] Sometimes a restocking fee is charged; the U.S. Direct Selling Association (DSA) recommends that this be no higher than 10 percent of the purchase price. Research on product returns and restocking fees shows that this is a reasonable fee that helps cover the non-trivial reverse logistics costs of product returns (see, for example, Shulman, Jeffrey D.; Anne T. Coughlan; and R. Canan Savaskan (2009), "Optimal Restocking Fees and Information Provision in an Integrated Demand-Supply Model of Product Returns," *Manufacturing & Service Operations Management*, 11 (4, Fall), 577-594, which provides information on some firms' restocking fee charges).

[15] For example, Amway Canada offers a 90-day 100% money-back guarantee on the $67 registration fee to join as a distributor. Source: http://www.amway.ca/start-a-business/low-cost-startup , downloaded February 16, 2015. Herbalife offers the same guarantee on the cost of its Membership Pack (its registration fee); source: http://www.herbalife.com/terms-of-use , downloaded February 16, 2015.

- The direct selling firm advises its distributors not to load up on inventory and states and enforces a policy that prevents an inventory-loading distributor from making extra commissions from doing so, without being able to show personal consumption and non-distributor end-user sales that justify the large order of wholesale product.

Consider the implications of these provisions. If a direct selling distributor's wholesale purchases are voluntary, not forced; if there are no minimum requirements on purchase volumes; if a return policy is offered; and if the direct selling firm discourages inventory loading, then the logical inference is that wholesale product purchases by the distributor are made voluntarily and that personal consumption by a distributor is similarly voluntary. If personal consumption is voluntary, then such a sale by the direct selling company should logically be counted as a retail sale, that is, a sale for ultimate end-user consumption. And if no compensation is offered for the act of recruitment without regard for product sales, incumbent distributors' business-building efforts bear fruit only when recruiting is accompanied by the mentoring of new downline distributors that itself produces sales.

The notion that all product revenues to the direct selling firm (whether leading to consumption by non-distributors or by distributors) should be classified as retail sales when these protections are observed suggests a re-evaluation of the VK model. VK assume that only sales to non-distributor end-users can be classified as true retail sales and thus, if the MLM firm cannot cover all of its costs (including the costs of units made for personal consumption) from the fraction of revenues earned on non-distributor end-user sales, the MLM should be considered a potential pyramid scheme. But this argument relies crucially on the implicit assumption that the abovementioned protections (such as those against inventory loading) are not in place. When those protections are in fact in place, there is no reason to artificially partition an MLM business' sales that are ultimately consumed by non-distributor end-users from those that are ultimately personally consumed by distributors. All are sales for end-user consumption. This leads to the following Proposition:

> **Proposition 1.** VK's analysis over-classifies MLM firms as possible pyramid scheme operators. When the firm offers distributor protections, distributor losses due to saturation and collapse are avoided, and a standard financial criterion that the firm's revenues exceed the sum of distributor compensation, production, marketing and associated costs is sufficient to verify that the firm is not destined for inevitable collapse as a pyramid scheme.[16]

This conclusion invites an analysis of an emended model that takes account of distributor protections implying that all sales – not just non-distributor end-user sales – are legitimate, sustainable sales, to examine the resulting implications for distributors and for the profitability and viability of a direct selling firm. I propose such a model below.

An Emended Model

Consider an MLM firm that offers the protections described in the Introduction section above, so that all product volume (personal consumption as well as sales to non-distributor end-users) is properly categorized as sales for end-user consumption. A participating distributor enjoys a Net Economic Return (NER) equal to the sum of the following set of benefits and costs:

Benefits:
- Consumption utility from voluntary personal consumption of the MLM's products bought at wholesale prices

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[16] See Appendix A for a discussion of the VK (2002) model, leading to Proposition 1.

- Wholesale-to-retail markup income earned on units sold to non-distributor end-users
- Income earned from and paid by the MLM company (typically commissions or bonuses)

Costs:
- Registration fee (typically charged annually)
- Wholesale prices paid for units bought from the MLM firm (cost of goods sold, or COGS)
- Cost of selling effort[17]

A prospective MLM distributor joins if his/her *ex ante* NER is at least as large as his/her opportunity cost of time, defined as W_0. This analysis is then concerned with the conditions under which a distributor could be said to suffer an "avoidable economic loss" (AEL) from participating in the MLM business opportunity. AEL is defined as follows:

Definition: An MLM distributor is defined as having suffered an AEL from participating under the following joint set of conditions:
  (a) Before registering, s/he is uninformed about some information which would be useful in estimating his/her *a priori* NER; and
  (b) The relevant information is known by some other member of the channel responsible for communicating to the prospect about the business opportunity (*e.g.*, the MLM firm or the distributor's upline sponsor); and
  (c) Had s/he had access to, and had used, this information, his/her revised *ex ante* NER would be less than W_0, and s/he would not have enrolled as a distributor; and
  (d) If s/he does not have access to the relevant information and therefore enrolls as a distributor, s/he accrues an *ex post* NER less than W_0 from participating.

The resulting negative value of [*ex post* NER – W_0], when all of the above conditions jointly hold, is the amount of AEL under this definition. The emphasis here on prospect or distributor information about the value of the business opportunity may seem to be a sideline to the fundamental pyramid scheme definition stated in the *Koscot* case, but the knowability (and timing thereof) of relevant information is core to characterization as a legitimate MLM versus as a pyramid scheme. Were the world a full-information marketplace, potential registrants in a pyramid scheme would be able to see forward to the ultimate inability to be "made whole" on one's initial investment in the scheme – and by a simple economic recursion argument, none would be expected to enroll in the first place, and AEL would not occur. Misrepresentation of the actual opportunity being offered is therefore important to the perpetuation of such schemes, as noted by a Federal Trade Commission speaker in an address at the Direct Selling Association's 2015 Global Strategies summit. She noted that a company could "masquerade as a legitimate MLM," yet still operate a pyramid scheme in reality, observing "that closely related [to pyramid scheme law] is the law on deception regarding earnings representations. Though these are legally distinct, the interplay between them is considerable. In the Commission's law enforcement experience, all of its pyramid cases against purportedly legitimate MLMs allege that the defendants made false earnings representations, every single one" (Vaca 2015).

A distinction between misrepresentation and misapprehension can well be drawn here. Misrepresentation implies that relevant information is available, but is suppressed or incorrectly stated in a misleading way to the prospect. In contrast, misapprehension implies that even if accurate information is communicated, the listener may not perceive it correctly or may disregard it. Thus, in assessing when a distributor can be characterized as having suffered an AEL, consider that the relevant information that the prospective distributor lacks may be known (a) by the MLM firm, or (b) by the prospect's sponsor who is recruiting

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[17] As an independent contractor, an MLM distributor is not obligated to work any particular number of hours on the business, as MLM registration forms make clear. The firm is therefore not contractually responsible to compensate the distributor or his/her work time, although it is included in the utility models below as a sales driver.

him/her, or (c) by neither. The case where the MLM firm knows the relevant information (and either shares it, or does not) is explicitly considered in the model scenarios below, as is a discussion of types of relevant information that are in *no one's* hands (and hence *unknowable*) before the prospect makes his/her enrollment decision. The possibility that the prospective distributor to whom accurate information is conveyed does not heed that information is also considered.

It is also possible that a sponsoring upline distributor may choose to opportunistically suppress (or even misrepresent) known and relevant information to the prospect without the knowledge of the MLM firm, because the upline distributor's communications are not instantaneously and continuously observable by the firm. This creates the possibility that a distributor suffers an AEL due to an upline sponsor's failure to reveal accurate and relevant information about the MLM business opportunity. However, it is a common practice for the MLM firm to state that such misrepresentations are prohibited, and to invest not only in stating these policies but in monitoring and enforcing them. Perfect enforcement is impossible, begging the question of how much monitoring and enforcement of distributor representations by the MLM firm should be considered sufficient. The models examined here do not resolve this issue[18]; I will assume that a reasonable amount of monitoring and enforcement is in place, but that this may not fully deter misrepresentation by an opportunistic upline distributor, in the model analyses following.

Misrepresentation of relevant information may thus be a precursor to an outcome where *ex post* NER is less than W_0 and the distributor suffers an AEL. However, the converse is not true: not all instances where *ex post* NER is less than W_0 imply that an AEL has been suffered.

For example, a prospective distributor may not know his/her selling productivity or skill before joining. It is extraordinarily likely that the MLM firm and the prospect's sponsor share this ignorance; most MLMs place few restrictions on joining, and they do not engage in pre-screening or testing of prospects to gauge their skills as a direct seller. Such information is thus unknowable at the time of the enrollment decision and therefore does not imply an AEL in the event that *ex post* NER is less than W_0, because the information could not have been imparted to the prospect to improve his/her *a priori* evaluation of the business opportunity (violating condition (b) of the definition). Many MLM firms try to mitigate this ignorance by publishing information on the average earnings of distributors, as well as information that conveys the likelihood of successful sales outcomes such as the number of commission-earners in the prior year. Of course, this does not inform a specific prospective distributor of his/her specific skill or productivity and therefore leaves some still-unknowable information in the enrollment decision.

Further, if an entity such as the MLM firm or an upline sponsor knows and publicizes a relevant piece of information – but the distributor does not pay attention to the communication – then an *ex post* NER less than W_0 is not an AEL, because the prospect chose to disregard some available information in making his/her enrollment decision (violating condition (c) of the definition). For example, the MLM firm may have posted the relevant information online, promoted the information to prospects, and may have even required registrants to sign a statement verifying that they have read and understood the information – all things that MLM firms routinely and widely do.[19] Yet, some distributors may not heed the communications and later on may complain (erroneously) that the MLM firm did not tell them about the true income opportunity. Such a situation is not properly construed as evidence that the MLM firm inflicted an AEL on the distributor.

The above discussion builds on the facts that the prospect's *ex ante* and *ex post* values of NER need not (and may only rarely) be equal, and that the enrollment decision is based on the *ex ante* assessment

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[18] The literature on the economics of crime and punishment is relevant to develop insights on this issue, but is left for future research.

[19] See Appendix B for examples of such disclosures by Amway, Herbalife, and Nu Skin, three major MLM firms.

relative to W_0 while the ultimate outcome depends on the *ex post* realization of NER relative to W_0. Consider the following simplified representation of the set of possibilities for the distributor prospect:

	ex ante **assessment of NER:**	
ex post **realization of NER:**	$> W_0$	$< W_0$
$> W_0$	A	B
$< W_0$	C	D

Suppose that any prospect whose *ex ante* assessment of NER is less than W_0 in fact does not enroll as a distributor. Then no prospect in cells "B" or "D" above will enroll.[20] Meanwhile, suppose that any prospect with an *ex ante* assessment that NER is greater than W_0 does in fact enroll. Then cell "A" denotes the situation where the prospect's *ex ante* favorable expectations are matched by a favorable *ex post* outcome – and therefore poses no policy concern. However, cell "C" depicts a distributor whose *ex ante* assessment is favorable, but whose *ex post* realization involves NER less than W_0.

Note that it is possible for a distributor's experience to be classified into cell "A" (NER>W_0 in both the *ex ante* and *ex post* time frames) even with no income earned from the MLM firm. For example, the distributor may enjoy sufficient consumption utility and earn enough markups on sales to non-distributor end-users to more than cover the MLM registration fee and COGS. Indeed, many MLM firms' income disclosure statements clearly state that a majority of distributors do not earn a check from the firm, but enjoy personal consumption of the firm's products and may engage in modest retail selling.[21] It is therefore important to consider all sources of economic benefit from participating as an MLM distributor, not just the income paid out by the MLM firm. Failing to do so may lead to erroneous categorization of a distributor into cell "C" when in fact s/he enjoys an *ex post* NER greater than W_0.

Indeed, policy concern about potential harm to MLM distributors is generally focused on outcomes represented by cell "C," where the prospective distributor's *ex ante* assessment of the MLM business opportunity is favorable, but the *ex post* NER outcome is less than W_0. One might be tempted to jump to the conclusion that all such cases also involve an AEL for which the firm is responsible. However, such an interpretation fails to account for the many drivers of a "cell 'C'" situation.

As noted above, a "cell 'C'" outcome can result from the fact that an MLM distributorship is an entrepreneurial business opportunity rather than a guaranteed, salaried job. As such, the comparison of *ex ante* NER with the opportunity cost of time, W_0, is naturally used by the prospective distributor to evaluate the MLM business opportunity, because the *ex post* NER is unknowable before taking on the opportunity. The idea that even a promising entrepreneurial business can produce disappointing returns is natural, because it is understood that an entrepreneurial business (whether a franchise, an independent insurance agency, a product startup, or an MLM distributorship) typically does not offer a guaranteed minimum payout. Those who voluntarily choose to take on the business opportunity have the duty to investigate the opportunity and make a considered judgment of the expected return.

Further, a "cell 'C'" outcome could occur because the prospective distributor may not make a correct *a priori* assessment of his/her own direct-selling talents and skills. It is generally understood that entrepreneurial success factors, such as salesmanship abilities, interpersonal skills, or financial acumen vary considerably across the population. Further, it is impossible for the MLM firm or upline sponsor to assess these underlying skills in prospective distributors, given that they are likely to be unknown to the

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[20] There is often little concern for cell "B," even though the prospect's incorrect expectations (leading him/her *not* to enroll) actually result in his/her missing what turns out to be an outcome where NER>W_0. While interesting, I will however not focus on the "B" case in the models that follow.

[21] Herbalife's Income Disclosure Statement in Appendix B shows an example of such a statement.

prospect him/herself and that enrollment is open to most who wish to register as a distributor. Even if it were possible to assess these skills, MLM distributors are independent contractors, and as such they set their own hours, effort levels, and business investments. As a result, while the MLM firm can offer the same *opportunity* (product line, compensation plan, and all accompanying support) to all who enroll, it is essentially impossible for the MLM firm to guarantee any particular *ex post* NER to a prospect, since *ex post* NER is dependent upon the individual's effort exertion choices as well as inherent skill – neither of which is observable by the MLM firm *a priori* and on neither of which can there be *a priori* contracting between the firm and the prospect.

The models developed below therefore establish conditions under which NER in both the *ex ante* and *ex post* time frames are either greater than, or less than, W_0. They account for various *ex ante* information sets (in some cases, augmented by information provided by the MLM firm or an upline sponsor); a set of benefits and costs from participating that includes consumption utility, income elements, and costs of participating; and the distributor's and firm's decisions that affect *ex post* NER. These analyses lead to discussion of the drivers of an *ex post* NER level less than W_0 and when and whether such an outcome could be mitigated by disclosures or other actions by the MLM firm. These analyses inform the discussion of when an *ex post* NER less than W_0 can be classified as an AEL as well, and when it should not be so classified.

The analysis uses a one-period model, and focuses on distributors who personally consume and may sell to non-distributor end-users, but who are not "business builders" who sponsor and mentor other distributors.[22] The one-period time horizon for the distributors and the firm is chosen because attrition by the end of the first year as an MLM distributor is higher than for longer-tenured distributors.[23] It is this population for whom it is most likely that *ex post* NER is less than W_0, and who might therefore possibly experience an AEL, because its members do not stay in the MLM business opportunity long enough to build up a sales and network base. Further, the one-period horizon is the strictest situation in which to examine viability of the MLM firm (versus the promulgation of a pyramid scheme whereby future enrollees' registration fees may be used to fund current distributors' commission earnings).

Model Structure, Sub-Models to be Analyzed, and a Preview of Results

A distributor is assumed to maximize his/her utility from participating in the MLM business opportunity through choices of his/her sales effort level and the marked-up retail price to charge on units sold to non-distributor end-users. An individual enrolls in the opportunity only if the expected return is at least *W0*, the minimum acceptable return (*i.e.*, the opportunity cost of the prospective distributor's time). Distributors are assumed to be risk-neutral.[24]

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[22] This analysis therefore will not focus on the question of whether and when it could be possible for an MLM firm's compensation plan to make it economically attractive to "buy a higher level" of compensation. This possibility is sometimes argued to cause some distributors to over-buy inventory without the ability to sell it or any interest in consuming it, just to reach a higher commission or bonus level in the compensation plan. Instead, the focus here is on defining and analyzing the reasons for, and implications of, NER > W_0 and AEL amongst non-business-builder distributors.

[23] An investigation of Amway in 1979 (which found that it did not operate a pyramid scheme) noted an attrition rate of about 75 percent for first-year distributors, but only about 25 percent for longer-lived distributors. Source: *In the Matter of Amway Corp.*, 93 F.T.C. 618, 1979 FTC LEXIS 390 (F.T.C. 1979).

[24] Arrow (1971, p. 100) shows that even an otherwise risk-averse individual acts in an essentially risk-neutral manner when offered a bet with low enough stakes and even only a moderately positive expected value. Given legitimate MLMs' practices of charging low registration fees, the risk neutrality assumption is warranted here because the stakes are small, there is no required minimum work time involved, and the downside risk is therefore *de minimus*. I have analyzed another version of the model in which the registration fee is set to zero, which also

The discussion starts with the case of the "intentional personal consumer" – an individual who joins the MLM with no intention of building a business, but only to personally consume the products at wholesale rather than retail prices. Following, I examine sub-models that consider two types of distributors: those with low, versus those with high, marginal productivity of sales effort (called Lows and Highs, respectively). Lows constitute a proportion μ of the distributor population, with Highs being a proportion $(1-\mu)$ of all distributors. The parameter μ is known to the MLM firm through its access to historical sales performance data for all distributors, and may be communicated to prospective distributors interested in enrolling with the MLM. The sub-model where each distributor knows his/her own type is analyzed first, followed by sub-models where no distributor knows his/her type. It is not necessary for the firm to know the type of each individual distributor in order to maximize profits in either situation; it is sufficient for it to know the parameter μ. A further possibility, in which all distributors believe themselves to be Highs, is then examined; this scenario reflects allegations that some MLM firms or sponsoring distributors encourage prospects to believe that they can all "succeed" in the business opportunity, even if some proportion μ are known to be Lows. In all the sub-models, the mass of distributors is assumed to be equal to 1 in size, to economize on model terminology.

In addition to Lows and Highs as depicted in the sub-models, some MLM distributors succeed in "business-building" efforts whereby they recruit and mentor new distributors (called "downline distributors"). Business-building distributors also engage in personal consumption and in non-distributor end-user sales. Because business-building distributors are typically the most successful but are a small proportion of most MLM distributor populations,[25] this paper does not pursue a specific analysis of the business-builder. Moreover, if the current analysis demonstrates a lack of AEL to the Intentional Personal Consumer, Lows, and Highs under various circumstances, an AEL is unlikely to be suffered by a business-building distributor. That said, the effort allocation decisions, compensation, and outcomes for a business-builder are quite interesting and some insight into the dynamics of the firm's growth and profitability with such distributors is found in Coughlan and Grayson (1998).

Meanwhile, the MLM firm is modeled as having two decision variables. The first is the size of a common lump-sum registration fee that every distributor must pay in order to participate in the MLM business opportunity for one year. Second, the MLM firm sets a commission rate on wholesale sales[26] that is awarded to the distributor on personal volume (which is the sum of personal consumption and non-distributor end-user sales).[27] The MLM firm is assumed to act as a Stackelberg leader relative to the

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supports the risk-neutral distributor characterization, and the general results concerning economic returns are unchanged (although the specific values of various aspects of the solution are of course different). Effective zero registration fees are found in various MLMs, either literally or through the provision of free product with registration that counteracts the registration fee. See Appendix B for the Amway example, in which a distributor incurs a $62.00 registration fee (with a money-back guarantee on that fee if the registrant wishes to quit within 90 days), and can choose to also buy an $83.99 "Product Kit" containing $160.00 worth of Amway products (implying that purchase of the Product Kit along with registration fee amounts to a net registration fee of -$14.00).

[25] For example, Herbalife reports that 80.2 percent of distributors in 2015 had not sponsored another distributor, calling this population "single-level" distributors; see Appendix B for details. Similarly, the *Amway* 1979 case reported that only one-fourth of all Amway distributors engage in sponsoring (*In the Matter of Amway Corp.*, 93 F.T.C. 618, 1979 FTC LEXIS 390 (F.T.C. 1979) at 102).

[26] A second variant of this commission structure, allowing for a progressive commission structure with a lower commission rate for lower sales volumes and a higher rate for higher sales volumes, leads to the same fundamental results about the occurrence of economic harm, albeit with different specific profit and welfare values in equilibrium. The details are available from the author.

[27] Some variants on this commission structure are used in some MLM firms. For example, some MLMs offer commission on volumes above a minimum level, with no commissions awarded below that level (essentially a quota plus commission structure). Some MLMs (*e.g.,* Herbalife) offer commissions only on sales of downline distributors

distributor population, taking into account the form of distributor utility optimization and the proportion of distributors in the population with low versus high sales potential.

The MLM firm maximizes profit and is assumed to be informed about all model parameters (except for each individual distributor's type) and about the distributor utility function that is optimized in choosing effort and retail price for non-distributor end-user sales.

Different sub-models examine varying distributors' motivations and information:

- Sub-model (1): Distributors purchase for personal consumption only and do not seek to make retail sales to non-distributor end-users.
- Sub-model (2): Each distributor is informed about all model parameters and also about his/her own type, and personally consumes and sells the MLM's products. The MLM firm is assumed to be informed about all model parameters (except for each individual distributor's type); about the distributor utility function that is optimized in choosing effort and retail price for non-distributor end-user sales; and about the distributors' accurate knowledge of their own types. The MLM firm either
  - o (2a) Sets a "separating" contract structure designed to attract only Highs, or
  - o (2b) Sets a "pooling" contract structure designed to attract both Low-types and High-types
- Sub-model (3): Distributors are not aware of their own individual type, though each is apprised by the MLM firm of the proportions of Low and High types, and thus of the average productivity of selling effort, and either
  - o (3a) The MLM firm sets an "average" contract structure matching the "average" expectations of all distributors, or
  - o (3b) The MLM firm sets a contract structure designed to "fully insure" Low-types
- Sub-model (4): Distributors personally consume and sell the MLM's products. They are informed about all model parameters, including the proportion of Low-types and High-types, but all distributors *believe* they are Highs (so, all true Low types are over-optimistic about the value of the MLM business opportunity to them), and either
  - o (4a) The MLM firm sets a "separating" contract structure designed to attract only Highs, or
  - o (4b) The MLM firm sets a "pooling" contract structure designed to "fully insure" Low-types (assuming sufficient information on the part of the firm to do so, and feasibility of such a structure).

Figure 1 summarizes the cases considered.

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but not on personal volume. The zero-commission contract can be intuitively analyzed, given the more complete analysis offered in the models below.

Figure 1: Model Scenarios Analyzed
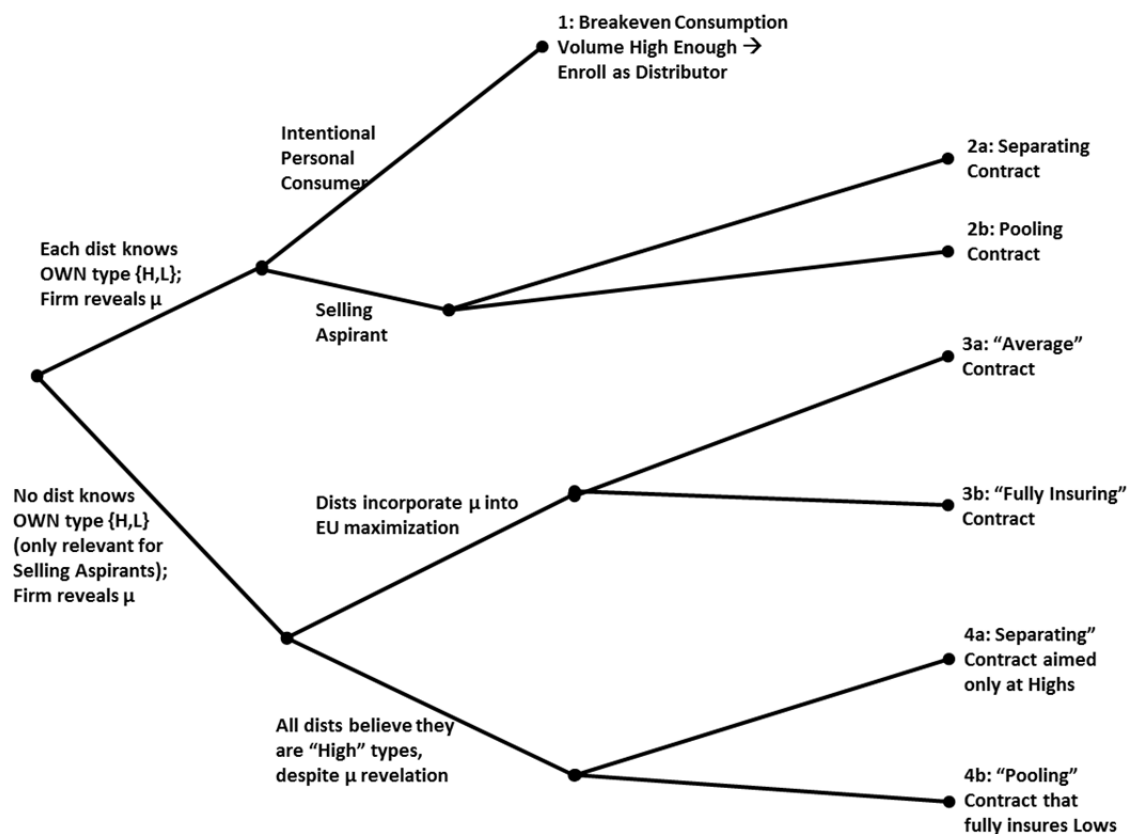
To preview the main results of these models, the analysis shows that:

- It is economically rational for a person to join the MLM as an intentional personal consumer distributor; such a distributor suffers neither *ex post* NER < W_o, nor an AEL, from joining. This is true even though s/he pays the registration fee, yet may make commissions that are less than the registration fee.
- With full information, no distributor suffers either *ex post* NER < W_0 or an AEL by joining the MLM. This strong result holds whether the distributor is only a personal consumer or also seeks to sell to non-distributor retail consumers; it also holds for both Low-type and High-type distributors.[28]
- The MLM firm may maximize its profits by targeting only High-type distributors (a "separating" strategy) or by targeting both High- and Low-types (a "pooling" strategy), depending on parameters such as the proportion of High versus Low achievers in the distributor population.
- Regardless of whether a separating or pooling strategy is most attractive, choosing to operate means that the MLM firm makes positive expected profits (i.e., it does not operate unless profits are positive in expectation).

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[28] An agency-theoretic variant of this model, not presented in this paper, was analyzed as well and shows that *ex post* NER $\geq W_0$, and no AEL is suffered, under full information in that modeling set-up either. This result is thus quite broad and arises from the information set of the distributor, not from the specific assumptions about modeling structure presented here.

- When the MLM firm optimally follows a pooling strategy and distributors are informed, High-type distributors make economic rents above their opportunity cost of participating in the business opportunity (*ex post* NER>W_0), while Low-type distributors earn just their opportunity cost (*ex post* NER=W_0). Neither segment suffers an AEL from participating.
- When the MLM firm optimally follows a separating strategy (targeting High-types only) and distributors are informed, participating distributors earn *ex post* NER=W_0, and do not suffer an AEL from participating.
- When distributors are *uninformed* about their type, but informed about the average productivity of selling effort to non-distributor consumers, expected-utility maximization combined with risk neutrality imply that Lows may earn *ex post* NER<W_0, even when *ex ante* NER>W_0. This outcome is not indicative of AELs for Low-types, however, because they did not and could not know their type *a priori* and thus could make no better *a priori* decision. The firm can nevertheless choose to insure the distributor force against this outcome by lowering registration fees, leading to a decline in effort, sales, and firm profits. The common practice in real-world MLMs of charging a low (or even a zero) registration fee is consistent with this type of insuring practice.
- When distributors all believe that they will be highly productive in the business opportunity *(i.e.,* when Lows are over-optimistic), and the MLM firm sets a contract structure consistent with high productivity, Lows earn *ex post* NER<W_0, and the firm profits from Lows' erroneously-chosen participation, indicating the possibility of an AEL for Low-type distributors. Similarly to the uninformed "average" sub-model, the MLM firm in this universally optimistic scenario can instead choose to "fully insure" Lows, leading to a decline in effort, sales and profit.
- The observation that distributors are misinformed about their type is not sufficient to infer that the MLM is responsible for an AEL on the part of some distributors.

In sum, distributor AELs are absent in many scenarios. Some instances where distributors earn *ex post* NER<W_0 are not properly categorized as an AEL purposefully inflicted by the MLM firm or by a sponsoring upline. An AEL could however be possible, for example if the MLM firm or an upline sponsor knowingly overstates the quality of the business opportunity and thereby induces prospects to join who would not have joined, had they been correctly informed. The distinction between *misapprehension* by prospective distributors and purposeful *misrepresentation* of the business opportunity is important to the discussion, as it helps to differentiate among unavoidably uninformed distributors, unheeding/inattentive distributors, and an opportunistic upline sponsor or direct-selling firm. From a policy perspective, the analysis shows that being able to cover its costs each period is a beginning to establishing the viability of an MLM firm, but that assessing distributor AEL is a more complicated task than applying a metric such as the fraction of sales made to non-distributor end-users.

The following section presents some model fundamentals and terminology of use across the sub-models. A discussion of the analysis of sub-models follows.

Model Fundamentals: Sales Response Functions, Distributor NER, and Profit

Low-type and High-type distributors are assumed to be risk-neutral and to face the following sales response functions, respectively:

$$Q_{ND,H} = h - P_H + k_H \cdot e_H \tag{1}$$

$$Q_{ND,L} = h - P_L + k_L \cdot e_L \quad , \quad \text{where} \tag{2}$$

$Q_{ND,H}$, $Q_{ND,L}$ = unit sales to non-distributor (*ND*) end-users by a High- and Low-type distributor, respectively

h = baseline sales level

k_H, k_L = marginal productivity of sales effort for the High- and Low-type distributor, respectively; $k_H > k_L > 0$

P_H, P_L = retail price of units sold to non-distributor end-users by a High- and Low-type distributor, respectively

e_H, e_L = effort level chosen by the High- and Low-type distributor, respectively.

The High-type distributor is distinguished from the Low-type one in his/her higher marginal productivity of effort: subscripts "H" and "L" are appended to the price and effort terms to highlight that a distributor who knows his/her type will choose different price and effort levels than if s/he were the other type, or were uninformed of his/her true productivity type. Baseline non-distributor demand is assumed the same for both types of distributors (*h*). Non-distributor demand is decreasing in price paid and increasing in sales effort.

Each distributor chooses retail price and sales effort level to maximize his/her *ex ante* NER from being an MLM distributor:

$$NER_H = \left[V - (1-\beta) \cdot w \right] \cdot Q_{PC} + \left[P_H - (1-\beta) \cdot w \right] \cdot Q_{ND,H} - \frac{d}{2} \cdot (e_H)^2 - RF \qquad (3)$$

$$NER_L = \left[V - (1-\beta) \cdot w \right] \cdot Q_{PC} + \left[P_L - (1-\beta) \cdot w \right] \cdot Q_{ND,L} - \frac{d}{2} \cdot (e_L)^2 - RF, \text{ where} \qquad (4)$$

NER_H, NER_L = *ex ante* NER from the MLM business opportunity to the High- and Low-type distributor, respectively

V = consumption value of a unit personally consumed by the distributor (assumed the same for High- and Low-types)

Q_{PC} = number of personally-consumed units (assumed the same for High- and Low-types)

β = the commission rate on personal volume (assumed constant across all volumes)

w = wholesale price per unit paid by the distributor to the MLM company

d = disutility for effort parameter (assume the same for High- and Low-types)

RF = fixed registration fee to be a distributor with this MLM (the same for all distributors).

The *ex ante* NER of being a distributor includes the benefit of personal consumption at a wholesale price ($(V-w) \cdot Q_{PC}$), the net income to the distributor from the wholesale-to-retail markup on every unit sold to a non-distributor end-user ($(P - w) \cdot Q_{ND}$), and the commissions earned on personal volume ($\beta \cdot (Q_{PC} + Q_{ND})$); it is decremented by the cost of effort ($\frac{d}{2} \cdot (e)^2$) and the registration fee (*RF*).

The MLM firm's profit when it targets both High-type and Low-type distributors is:

$$\Pi_{MLM,pool} = RF_{pool} + \left[(1 - \beta_{pool}) \cdot w - c \right] \cdot \left[Q_{PC} + \mu \cdot Q_{ND,L} + (1-\mu) \cdot Q_{ND,H} \right] , \text{ where} \qquad (5)$$

$\Pi_{MLM,pool}$ = MLM firm profit from targeting both High- and Low-type distributors (the "pooling" strategy)

c = marginal cost of production per unit of product sold.

The MLM firm earns RF_{pool} in total registration fees (across the distributor mass of 1). Its margin per unit on sales to distributors equals $(w - \beta_{pool} \cdot w - c)$, that is, the wholesale price (revenue per unit to the MLM firm), minus commissions paid out on wholesale price,[29] minus production costs. The total number of units the MLM firm sells (when it targets both High- and Low-type distributors) includes all personally-consumed units across the mass of distributors, plus all non-distributor end-user sales made by Lows and Highs.

If the MLM firm targets only High-type distributors, its profit is:

$$\Pi_{MLM,sep} = (1 - \mu) \cdot \left\{ RF_{sep} + \left[(1 - \beta_{sep}) \cdot w - c \right] \cdot \left[Q_{PC} + Q_{ND,H} \right] \right\} , \qquad (6)$$

where the "sep" subscript denotes the "separating" strategy and its associated decisions.

Sub-Model (1): Intentional Personal Consumption ("IPC") Distributors

In this sub-model, distributors enjoy consuming the MLM firm's products, but have no interest in exerting effort to make non-distributor end-user sales.[30] Because potential IPC distributors are fully informed of the parameters of their decision (knowing their intended personal consumption amount, their consumption value for the product, the wholesale price, the commission on personal volume, and the registration fee), *ex ante* and *ex post* NER values are equivalent. The IPC's decision about whether to join as an MLM distributor is therefore a straightforward break-even calculation that compares the *ex post* NER as a distributor (paying wholesale prices, but incurring the fixed registration fee) to the next-best opportunity, which is to remain as a non-distributor end-user who pays retail prices but no registration fee.

Thus, consider a non-distributor end-user who consumes Q_{PC} units. His/her NER accrued from remaining a non-distributor end-user is:

$$NER_{non-distEU} = [V - P] \cdot Q_{PC} . \qquad (7)$$

Meanwhile, his/her NER of joining as a personal-consumption distributor is given by:

$$NER_{PC,join} = \left[V - (1 - \beta_{PC}) \cdot w \right] \cdot Q_{PC} - RF_{PC} . \qquad (8)$$

This individual would therefore rationally join as a distributor if:

$$NER_{PC,join} \geq NER_{non-distEU} \Leftrightarrow \left[P - (1 - \beta_{PC}) \cdot w \right] \cdot Q_{PC} \geq RF_{PC}$$

or equivalently, $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad (9)$

$$Q_{PC} \geq \frac{RF_{PC}}{\left[P - (1 - \beta_{PC}) \cdot w \right]} .$$

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[29] These would of course be set to zero to illustrate a compensation structure like that of Herbalife, which does not award commissions on a distributor's own purchases.

[30] For example, the 1979 *Amway* case notes: "The vast majority of Amway [*180] distributors are in the business part-time. Only one in four sponsors other distributors, and many apparently are distributors in order to buy Amway products--at about a 30% discount -- which they consume" (*In the Matter of Amway Corp.*, 93 F.T.C. 618, 1979 FTC LEXIS 390 (F.T.C. 1979) at 179-180).

That is, the intentional personal consumer joins as a distributor when his/her volume consumed is high enough to make the incremental savings (plus any commission earnings) greater than the registration fee. The breakeven expression implies that personal-consumer distributors will be heavier users of the MLM product(s), the higher is the registration fee, RF_{PC}, or the wholesale price, w; and the lower are retail price, P, or the commission rate on sales, β_{PC}. Note that even for an MLM company that does not pay commission to personal consumers (such as Herbalife), the break-even calculation can still lead an individual to join as a distributor in order to benefit from wholesale, rather than retail, pricing.

It is sometimes erroneously argued that any distributor who joins and does not make sales to non-distributor end-users "loses money" because s/he does not cover his/her registration fee with commissions earned. This analysis shows that such a conclusion is faulty because it fails to account for the value of personal consumption as part of the overall value of a distributorship. Those who join clearly enjoy an *ex post* NER greater than W_0, despite the fact that the registration fee paid may be higher than any commission earnings made as a distributor.

Further, if the MLM firm *only* had personal-consumption distributors and no distributors who sold at retail or otherwise sought to build their businesses, its profit would be:

$$\Pi_{MLM,PC} = RF_{PC,TOT} + \left[(1 - \beta_{PC}) \cdot w - c\right] \cdot (Q_{PC}) \ , \tag{10}$$

where $RF_{PC,TOT}$ is the sum of all registration fees paid in by personal-consumption distributors. Even if *all* personal-consumption distributors consumed only the break-even level of personal consumption volume $\left(Q_{PC} \geq \dfrac{RF_{PC}}{\left[P - (1 - \beta_{PC}) \cdot w \right]} \right)$ identified above (and for simplicity we assume the mass of this population is equal to 1),[31] the profit earned on a force made up entirely of such distributors would still be positive:

$$\Pi_{MLM,PC|\text{all\_marginal}} = \frac{(P - c) \cdot RF_{PC,TOT}}{P - w \cdot (1 - \beta_{PC})} \ . \tag{11}$$

Thus, recognizing that voluntarily chosen personal consumption constitutes true retail sales (*i.e.*, final end-user consumption) implies profitability even with a distributor force lacking retailing or business-building aspirations.

From an economic and business policy perspective, then, observing a segment of an MLM's distributors who personally consume, but do not sell to non-distributors or otherwise engage in business-building, is not proof that the firm has misled prospective distributors or that these distributors have suffered an AEL from registering. Rather, intentional personal consumers' *ex ante* assessment of NER equals their *ex post* actual NER level and they can all therefore assess the economic benefit of joining before they pay the registration fee; those who choose to join therefore garner *ex post* NER greater than W_0, their next-best alternative of remaining a non-distributor end-user.

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[31] Note that an alternative set-up would involve assuming that there is a continuum (simply modeled with a Uniform distribution of levels of Q_{PC}) across the population of non-distributor end-users. This would require the MLM firm to trade off the value of higher registration fees against the cost of fewer non-distributor end-user enrollees. It would also imply changes throughout the models in the ensuing sections. This extension would not change the core findings here (which are that the MLM firm earns positive profit even when all distributors join solely for personal consumption at wholesale prices).

I summarize these conclusions as:

> **Proposition 2a.** No distributor in the IPC segment suffers an AEL and all IPC distributors enjoy an *ex post* NER>W_0.

> **Proposition 2b.** When the direct-selling firm is observed to offer the relevant protections to its distributors, observing a specific proportion of a direct-selling firm's distributors to be solely personally consuming the firm's products but not selling to non-distributor end-users or otherwise business-building is insufficient evidence to infer that the firm is responsible for any AEL to this population or that it is operating an illegal pyramid scheme.

Sub-Model (2): MLM Firm and Distributors Are Informed of Model Structure and Parameters; Distributors Know Own Type; Pooling and Separating Strategy Solutions

In this sub-model, each distributor is assumed to know his or her own type as well as sales response structure and parameters, and thus faces the same *ex ante* and *ex post* values of NER. The MLM firm acts as a Stackelberg leader vis-à-vis its distributors, and thus incorporates distributors' best response functions for effort and retail price into its profit maximization problem. This and later sub-models assume that all distributors who join have an aspiration to sell to non-distributor end-users (thus are not purely personal consumers), but are not intent on recruiting and mentoring other distributors. The pooling solution (wherein both Low- and High-types join as MLM distributors) is presented first, followed by the separating solution (wherein the MLM firm targets only High-type distributors).

Pooling Solution

The High-type distributor chooses e_H and P_H to maximize W_H, taking the registration fee RF and the commission rate β as given by the MLM firm. The Low-type distributor, analogously, chooses chooses e_L and P_L to maximize W_L, taking the registration fee RF and the commission rate β as given by the MLM firm. Assuming that the MLM firm's offer implies at least W_0 in *ex ante* NER (thus also for *ex post* NER, in this sub-model) to both types,[32] both the Low-type and High-type prospects enroll with the MLM.

The resulting best-response functions for effort and price by both types of distributors, as functions of β,[33] are:

$$e_{H,BRF} = \frac{k_H \cdot [h - w \cdot (1 - \beta)]}{2 \cdot d - (k_H)^2} \qquad (12)$$

$$P_{H,BRF} = \frac{-(k_H)^2 \cdot w \cdot (1 - \beta) + d \cdot [h + w \cdot (1 - \beta)]}{2 \cdot d - (k_H)^2} \qquad (13)$$

$$e_{L,BRF} = \frac{k_L \cdot [h - w \cdot (1 - \beta)]}{2 \cdot d - (k_L)^2} \qquad (14)$$

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[32] This means that a non-negative registration fee, RF, can be set that offers Lows at least W_0, which holds, for example, for high enough h (baseline demand for the firm's products), or for a number of other possible parameter-value combinations.

[33] These expressions are not functions of RF, as this is a fixed fee that does not influence marginal decision-making.

$$P_{L,BRF} = \frac{-(k_L)^2 \cdot w \cdot (1-\beta) + d \cdot [h + w \cdot (1-\beta)]}{2 \cdot d - (k_L)^2} \quad . \tag{15}$$

These imply that non-distributor end-user sales by High- and Low-type distributors as a function of β can be written:

$$Q_{ND,HBRF} = \frac{d \cdot [h - w \cdot (1-\beta)]}{2 \cdot d - (k_H)^2} \tag{16}$$

$$Q_{ND,LBRF} = \frac{d \cdot [h - w \cdot (1-\beta)]}{2 \cdot d - (k_L)^2} \quad . \tag{17}$$

In the pooling solution, the MLM firm then sets the registration fee, *RF*, to make the Low-type distributor's *ex ante* NER just equal to W_0, taking account of the Low-type distributor's propensity to exert effort and set retail price ($e_{L,BRF}$ and $P_{L,BRF}$), as a function of the commission rate β. This will make the Low-type prospect just happy to join as an MLM distributor, earning his/her opportunity cost, W_0; it can be shown to award High-type distributors strictly more than W_0, given their higher productivity.[34] The profit-maximizing registration fee that pools Low- and High-type distributors in the MLM business opportunity is therefore given by RF_{pool}:

$$RF_{pool} = -W_0 + \left[V - (1-\beta) \cdot w \right] \cdot Q_{PC} + \left[P_{L,BRF} - (1-\beta) \cdot w \right] \cdot Q_{ND,LBRF} - \frac{d}{2} \cdot (e_{L,BRF})^2$$

$$= -W_0 + \frac{d \cdot [h - w \cdot (1-\beta)]^2}{2 \cdot \left[2 \cdot d - (k_L)^2 \right]} + Q_{PC} \cdot \left[V - w \cdot (1-\beta) \right] \quad . \tag{18}$$

The MLM firm then sets the commission rate, $\beta = \beta_{pool}$, to maximize pooled profits, taking account of the pooling registration fee and the best-response functions for effort levels and prices of High-type and Low-type distributors:

$$\max_{\beta_{pool}} \Pi_{MLM,pool} = RF_{pool} + \left[(1 - \beta_{pool}) \cdot w - c \right] \cdot \left[Q_{PC} + \mu \cdot Q_{ND,LBRF} + (1 - \mu) \cdot Q_{ND,HBRF} \right] \quad . \tag{19}$$

This generates the following optimal pooled commission rate:

$$\beta^*_{pool} = 1 - \frac{h \cdot \left[(k_h)^2 - (k_L)^2 \right] \cdot (1 - \mu) + c \cdot \left[2 \cdot d - \mu \cdot (k_H)^2 - (1 - \mu) \cdot (k_L)^2 \right]}{w \cdot \left[2 \cdot d + (1 - 2 \cdot \mu) \cdot (k_H)^2 - 2 \cdot (1 - \mu) \cdot (k_L)^2 \right]} \quad . \tag{20}$$

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[34] $NER_{H,BRF} - NER_{L,BRF} = \left\{ \dfrac{d \cdot (k_H - k_L) \cdot (k_H + k_L) \cdot [h - w \cdot (1-\beta)]^2}{2 \cdot \left[2 \cdot d - (k_H)^2 \right] \cdot \left[2 \cdot d - (k_L^2) \right]} \right\}$, which is unambiguously

positive. Thus, the *RF* that makes a Low-type prospect just willing to join the MLM business opportunity will leave the High-type prospect with *ex ante* NER strictly greater than *W0*.

Note that β^*_{pool} is less than 1 in value and positive.[35]

While it is tedious to present the equilibrium values of other model expressions in reduced form, it is straightforward to show that sales effort, retail price, and non-distributor end-user sales quantities are higher for the High-type than Low-type distributors in the pooling solution. As a result, equilibrium MLM firm profits under pooling are decreasing in μ — that is, they are increasing in the proportion of High-type distributors in the population.

Finally, in the pooling equilibrium, a Low-type distributor earns an *ex post* NER of exactly W_0, his/her opportunity cost of participating in the MLM, while a High-type distributor earns an *ex post* NER in equilibrium of:

$$W_H^* = W_0 + \frac{d\cdot(h-c)^2\cdot\left[(k_H)^2-(k_L)^2\right]\cdot\left[2\cdot d-\mu\cdot(k_H)^2-(1-\mu)\cdot(k_L)^2\right]^2}{2\cdot\left[2\cdot d-(k_H)^2\right]\cdot\left[2\cdot d-(k_L)^2\right]\cdot\left[2\cdot d+(1-2\cdot\mu)\cdot(k_H)^2-2\cdot(1-\mu)\cdot(k_L)^2\right]^2}. \quad (21)$$

The last term on the right-hand side is unambiguously positive, indicating that High-type distributors receive strictly higher net benefit than Low-type distributors in the pooling equilibrium. In effect, the MLM firm is forced to leave money on the table (which the High-types garner) because it offers the same contract (registration fee and commission rate) to every distributor.

The firm's profit net of opportunity cost, W_0, in the pooling equilibrium is strictly positive:

$$\Pi_{MLM,pool,full\,\inf o} = -W_0 + QPC\cdot(V-c) + \frac{d\cdot\left[h-w\cdot\left(1-\beta^*_{pool}\right)\right]^2}{2\cdot\left[2d-(k_L)^2\right]} +$$

$$\frac{d\cdot\left[h-w\cdot\left(1-\beta^*_{pool}\right)\right]}{\left[2d-(k_H)^2\right]\cdot\left[2d-(k_L)^2\right]}\cdot\left[2d-\mu\cdot(k_H)^2-(1-\mu)\cdot(k_L)^2\right]. \quad (22)$$

Given full revelation of the parameters of the business model, this MLM firm would choose to operate only if it could do so with positive profitability, and under full information, the presence of the firm in the market is evidence of positive profitability.

Separating Solution

Next, still within this sub-model, consider the separating equilibrium in which the MLM firm targets only High-type distributors. Distributor best-response functions are as above in the pooling analysis. However, the MLM firm now sets *RF*, the registration fee, to give High-type (rather than Low-type)

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[35] To see that this is true, note that when $k_L=k_H$, the commission rate becomes $\left(1-\dfrac{c}{w}\right)$, which is strictly positive and less than 1 in value (because marginal cost of production, c, must be less than the wholesale price charged, w, for the MLM firm to make profit). Then, note that the comparative-static effect of k_L on β^*_{pool} is positive – that is, as k_L diverges downward from k_H (the only direction in which it can diverge), β^*_{pool} falls in value.

distributors NER just equal to W_0, their opportunity cost. Given distributors' full information about their own types, Lows do not register because they know that doing so would generate an *ex post* NER less than their opportunity cost of W_0. Because High-type distributors are more sales-productive than Low-types, this *RF* value is higher than that in the pooling solution:

$$RF_{sep} = -W_0 + \left[V - (1-\beta) \cdot w\right] \cdot Q_{PC} + \left[P_{H,BRF} - (1-\beta) \cdot w\right] \cdot Q_{ND,HBRF} - \frac{d}{2} \cdot \left(e_{H,BRF}\right)^2$$

$$= -W_0 + \frac{d \cdot \left[h - w \cdot (1-\beta)\right]^2}{2 \cdot \left[2 \cdot d - (k_H)^2\right]} + Q_{PC} \cdot \left[V - w \cdot (1-\beta)\right] .$$

(23)

The MLM firm then sets the commission rate, β, to maximize profits from serving only the High-type distributors, taking account of the separating registration fee and the best-response functions for effort levels and prices of High-type distributors:

$$\max_{\beta} \Pi_{MLM,sep,full\,info} = (1-\mu) \cdot \left\{RF_{sep} + \left[(1-\beta_{sep}) \cdot w - c\right] \cdot \left[Q_{PC} + Q_{ND,HBRF}\right]\right\} ,$$

(24)

This generates the following optimal commission rate under the separating strategy:

$$\beta_{sep}^* = 1 - \frac{c}{w} .$$

(25)

Note that β_{sep}^* is less than 1 in value and positive. It implies that the firm's profit margin on Q_{PC} and $Q_{ND,HBRF}$ equal zero; this is the channel-coordinating commission rate, and the MLM firm's profit is accrued through the fixed registration fee, RF_{sep}. The separating commission rate, β_{sep}^*, is a much simpler expression than β_{pool}^* because the MLM firm does not have to create a single incentive for sales across two distributor segments with different marginal productivities of effort. Indeed, when $k_L = k_H$, β_{pool}^* reduces to β_{sep}^*.

Further, β_{sep}^* is greater in value than β_{pool}^* :

$$\beta_{sep}^* - \beta_{pool}^* = \frac{(h-c) \cdot (1-\mu) \cdot \left[(k_H)^2 - (k_L)^2\right]}{w \cdot \left[2 \cdot d + (k_H)^2 \cdot (1 - 2 \cdot \mu) - 2 \cdot (k_L)^2 \cdot (1-\mu)\right]} > 0.$$

(26)

Equilibrium profit in this separating solution is easily seen to be:

$$\Pi_{MLM,sep}^* = (1-\mu) \cdot RF_{sep} .$$

(27)

The MLM firm seeking to serve just one homogeneous segment of distributors can thus perfectly coordinate the channel with an optimal two-part tariff (consisting of the fixed registration fee and a marginal commission rate). The commission rate β_{sep}^* gives the targeted High-type distributor a margin

on non-distributor end-user sales of $(P_H - c)$, which is the channel surplus-maximizing margin. Equilibrium total channel surplus (the sum of MLM profit and all High-type distributors' benefits) reduces to:

$$TSurplus^*_{sep,full \inf o} = (1 - \mu) \cdot (W_0 + RF_{sep}) \quad ,$$ (28)

with the MLM firm taking all channel rents (above and beyond High-type distributors' opportunity costs of time) in the form of the fixed up-front registration fees, earned on the *(1-μ)* High-type distributor share of the potential distributor population.

Thus, as in the pooling solution, no distributor earns *ex post* NER less than his/her opportunity cost of time, and thus none suffers an AEL. The MLM firm is profitable as well. There is therefore no indication in this sub-model of either imminent demise of the MLM firm due to operation of a pyramid scheme, nor of AELs to distributor participants in the business opportunity.

This begs the question of when the MLM firm in this sub-model would prefer to set its registration fee and commission rate to attract only High-types (separate), versus Lows and Highs (pooling). This is examined next.

Comparing the Pooling and Separating Situations in Sub-Model (2)

When all distributors are Low-types (i.e., $\mu \rightarrow 1$), the pooling solution is obviously more profitable than the separating solution, because pooling decision variables are set to attract both Lows and Highs, while separating decision variables are set to exclude Lows and attract only Highs. As a result, as $\mu \rightarrow 1$, pooling profits remain positive, while separating profits approach zero in value.

Meanwhile, when all distributors are High-types (i.e., $\mu \rightarrow 0$), the firm makes profits whether using a pooling or a separating strategy, but the difference in equilibrium profits favors the separating strategy:

$$\left[\Pi^*_{MLM,sep,full \inf o} - \Pi^*_{MLM,pool,full \inf o}\right]_{\mu=0} = \frac{d \cdot (h - c)^2 \cdot \left[(k_H)^2 - (k_L)^2\right]}{2 \cdot \left[2d - (k_H)^2\right] \cdot \left[2d + (k_H)^2 - 2 \cdot (k_L)^2\right]} > 0 \ .$$ (29)

This, too, makes sense, because as the population tilts toward all High-type distributors, the MLM firm can do no better than to set the optimal two-part tariff with a commission rate that induces distributors to exert effort at the channel-surplus-maximizing level, while then setting the fixed registration fee to extract all distributor rents (leaving the High-type distributors with just their opportunity cost, W_0, in benefit).

Thus, notably:

$$\beta^*_{sep} = \left[\beta^*_{pool}\right]_{\mu=0} = \left[1 - \frac{c}{w}\right].$$ (30)

That is, the commission rate at the two extremes of the population of distributors – all High-types or all Low-types – is the same and equal to $\left(1 - \frac{c}{w}\right)$, because in each situation, this is the commission that (on the margin) induces the homogeneous population of distributors to exert effort at the channel-coordinating level. When all distributors are High-types ($\mu=0$), it is the equilibrium commission rate in the separating solution. When all distributors are Low-types ($\mu=1$), it is the equilibrium commission rate

in the pooling solution, because the pooling solution degenerates into a homogeneous-distributor analysis when all distributors are Lows: pooling in effect becomes a single-segment targeted strategy. The profit-maximizing registration fees of course differ across the two single-segment strategies, because there is more surplus to extract from a population of High-type distributors than from a population of Low-types.

Further, the derivative of β^*_{pool} with respect to μ is negative; thus, the pooling commission rate takes on its highest value, $\left(1 - \dfrac{c}{w}\right)$, when all distributors are Low-types ($\mu=1$), and decreases monotonically as μ falls.

We thus have established that (a) when all distributors are High-types, the separating strategy is most profitable for the MLM firm, while (b) when all distributors are Low-types, the pooling strategy is most profitable. It is also clear that $\Pi^*_{MLM,sep} = (1 - \mu) \cdot RF_{sep}$ is decreasing in μ. Similarly, equilibrium profit in the pooling solution is decreasing in μ:

$$\frac{\partial \Pi^*_{MLM,pool,full\,info}}{\partial \mu} = \frac{d \cdot (h - c)^2 \cdot \left[(k_H)^2 - (k_L)^2\right]^2 \cdot (-1 + \mu) \cdot \left[2d - (1 - \mu) \cdot (k_L)^2 - \mu \cdot (k_H)^2\right]}{\left[2d - (k_H)^2\right] \cdot \left[2d - (k_L)^2\right] \cdot \left[2d + (1 - 2u) \cdot (k_H)^2 - 2 \cdot (1 - \mu) \cdot (k_L)^2\right]^2} < 0. \quad (31)$$

These facts imply the following Proposition in the full-information sub-model (2) analyzed here:

> ***Proposition 3.*** There exists an interior value for μ ($0 < \mu < 1$), $\hat{\mu}$, in sub-model (2), such that:
> - o For $0 \le \mu < \hat{\mu}$, the separating strategy is strictly preferred by the MLM firm;
> - o For $\mu < \hat{\mu} \le 1$, the pooling strategy is strictly preferred by the MLM firm; and
> - o For $\mu = \hat{\mu}$, the MLM firm garners equal profits from either the separating strategy or the pooling strategy.

Neither AEL to Distributors, Nor Negative Profitability, Occurs in Sub-Model (2)

In conclusion, in the analysis of the sub-model where each distributor knows his/her type and knows all parameters of the MLM business opportunity, and where the MLM firm is fully informed of model parameters and the benefit-maximization rules of distributors (though not informed about each individual distributor's type), no distributor accrues *ex post* negative NER less than W_0 and thus there is no AEL. Should the MLM firm set the commission rate and registration fee according to the pooling strategy, all Low-type distributors earn the opportunity cost of their time, and all High-type distributors earn strictly positive surplus above their opportunity cost of time. Should the MLM firm implement a separating strategy by targeting only High-type distributors, the Low-types do not register (because they understand that they stand to earn less than their opportunity cost of time), while the High-types do register and each earns his/her opportunity cost of time. In both situations the MLM firm makes positive profits. In the special instances of all Low-type distributors or all High-type distributors in the market – that is, when the distributor force is homogeneous – the MLM firm's commission rate is set to coordinate the channel, and the registration fee completes an optimal two-part tariff by extracting distributor's rents, leaving them with their opportunity cost of time. This is formalized in the following Proposition:

> ***Proposition 4.*** When distributors and the MLM firm are fully informed, neither High-type nor Low-type distributors suffer an AEL from participating, regardless of whether the firm follows a pooling or a separating strategy, and regardless of the proportions of Low- and High-type

distributors in the population. In both the pooling and separating strategies, the MLM firm enjoys positive profits.

Sub-Model (3): Each Distributor is Informed About Model Parameters, But Does Not Know His/Her Own Type

This sub-model is characterized by partially, but not fully, informed distributors: every distributor is assumed to know the value of μ, and thus average productivity of selling effort – but not to know his/her own type. Distributors may be previously endowed with knowledge of the value of μ, but more likely, the firm reveals it to them through its income disclosure statement.[36]

Lacking any better information, true Low-types and true High-types both exert effort and set retail prices under the same (incorrect) belief of "average" selling productivity, although in fact Lows have below-average productivity while Highs have above-average productivity. Because all distributors act under the same information structure, no separating solution exists to attract only (true) Highs but not (true) Lows; if the MLM firm were to try to attract only Highs by offering a contract that leaves (true) Highs with just their opportunity cost, no distributors would register at all, because true High-type distributors do not perceive themselves as Highs, but as "average." Therefore, only the pooling solution is analyzed in this sub-model. I analyze two pooling contract structures here: one that matches the average beliefs of all distributors, and another that recognizes the lower productivity of (true) Low-type distributors and offers a contract that generates a zero *ex post* NER for them (called a "fully-insuring" contract).

Sub-Model (3): Generalities for Either an "Average" or "Fully Insuring" Contract Structure

Because all prospective distributors believe they have "average" sales productivity, all will register if the *ex ante* NER associated with average productivity is at least W_0, given the registration fee and commission offered through the MLM firm's contract structure.

With their homogeneous beliefs, Low- and High-type distributors will exert effort and set price according to the same best-response functions:

$$e_{BRFcase3} \equiv e_{H,BRF} = e_{L,BRF} = \frac{\left[k_H \cdot (1-\mu) + k_L \cdot \mu\right] \cdot \left[h - w \cdot (1-\beta)\right]}{2 \cdot d - \left[k_H \cdot (1-\mu) + k_L \cdot \mu\right]^2} \tag{32}$$

$$P_{BRFcase3} \equiv P_{H,BRF} = P_{L,BRF} = \frac{d \cdot \left[h + w \cdot (1-\beta)\right] - \left[k_H \cdot (1-\mu) + k_L \cdot \mu\right]^2 \cdot w \cdot (1-\beta)}{2 \cdot d - \left[k_H \cdot (1-\mu) + k_L \cdot \mu\right]^2} \quad . \tag{33}$$

Both Low- and High-type distributors believe their sales to non-distributor end-users will be:

$$Q_{NDBRFBeliefcase3} \equiv Q_{NDH,BRFBeliefcase3} = Q_{NDL,BRFBeliefcase3} = \frac{d \cdot \left[h - w \cdot (1-\beta)\right]}{2 \cdot d - \left[k_H \cdot (1-\mu) + k_L \cdot \mu\right]^2} . \tag{34}$$

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[36] See Appendix B for some examples of various income disclosures for Amway, Herbalife, and Nu Skin, three major MLM firms.

However, true sales to non-distributor end-users will be higher for Highs than for Lows, as is clear from the "True" expressions below:

$$Q_{NDLowBRFTruecase3} = \frac{\left[h - w \cdot (1-\beta)\right] \cdot \left[d - (k_H - k_L) \cdot (1-\mu) \cdot \left[k_H \cdot (1-\mu) + k_L \cdot \mu\right]\right]}{2 \cdot d - \left[k_H \cdot (1-\mu) + k_L \cdot \mu\right]^2} \tag{35}$$

$$Q_{NDHighBRFTruecase3} = \frac{\left[h - w \cdot (1-\beta)\right] \cdot \left[d + (k_H - k_L) \cdot \mu \cdot \left[k_H \cdot (1-\mu) + k_L \cdot \mu\right]\right]}{2 \cdot d - \left[k_H \cdot (1-\mu) + k_L \cdot \mu\right]^2} . \tag{36}$$

The MLM firm is aware of the true proportions of High- and Low-type distributors, as well as of their information set and behavioral rules (although not of each distributor's type). The firm's profit function therefore reflects the true levels of non-distributor end-user sales that Lows and Highs will generate, given their effort and price levels arising from their "average" beliefs:

$$\Pi_{MLMcase3} = RF_{case3} + \left[(1 - \beta_{case3}) \cdot w - c\right] \cdot \left[Q_{PC} + \mu \cdot Q_{NDLowBRFTruecase3} + (1-\mu) \cdot Q_{NDHighBRFTruecase3}\right]. \tag{37}$$

Given these generalities, the MLM firm can choose to offer an "average" contract or a "fully insuring" contract, either of which attracts both (true) Lows and (true) Highs.

The "Average Contract" in Sub-Model (3)

An "average contract" implies a registration fee that offers W_0 to an "average" distributor – which is what all distributors expect to be:

$$RF_{Avgcase3} = -W_0 + Q_{PC} \cdot \left[V - (1-\beta) \cdot w\right] +$$
$$\left[P_{BRFcase3} - (1-\beta) \cdot w\right] \cdot Q_{NDBRFBeliefcase3} - \frac{d}{2} \cdot (e_{BRFcase3})^2 \tag{38}$$
$$= -W_0 + Q_{PC} \cdot \left[V - w \cdot (1-\beta)\right] + \frac{d \cdot \left[h - w \cdot (1-\beta)\right]^2}{2 \cdot \left[2 \cdot d - \left[k_H \cdot (1-\mu) + k_L \cdot \mu\right]^2\right]} .$$

The MLM firm's profit function reflects this registration fee, and the fact that both (true) Lows and (true) Highs will join as distributors, each generating his/her *true* type of non-distributor end-user sales. The commission rate is thus set to optimize:

$$\max_{\beta Avgcase3} \Pi_{MLMAvgcase3} = RF_{Avgcase3} + \left[(1 - \beta_{Avgcase3}) \cdot w - c\right] \cdot \left[Q_{PC} + \mu \cdot Q_{NDLowBRFTruecase3} + (1-\mu) \cdot Q_{NDHighBRFTruecase3}\right]. \tag{39}$$

Optimization shows the optimal commission rate to be:

$$\beta^*_{Avgcase3} = 1 - \left(\frac{c}{w}\right). \tag{40}$$

This commission rate coordinates the channel, in the sense of granting the MLM firm a zero margin on non-distributor end-user sales and thus incentivizing all distributors to set a retail price that maximizes total MLM channel system profits, rather than suffering from the profit-reductions of double marginalization. The MLM firm then extracts all expected rents but W_0 from the distributor population, entirely through the registration fee, in a classic two-part tariff solution. The two-part tariff solution is possible because of the homogeneity of all distributors' beliefs and thus actions.

The *ex ante* NER for both Low- and High-type distributors is W_0. But Lows' *ex post* NER is strictly less than W_0, while Highs' *ex post* NER is strictly greater than W_0:

$$W^*_{AvgLowcase3} = W_0 - \frac{d \cdot (h-c)^2 \cdot (k_H - k_L) \cdot (1-\mu) \cdot \left[k_H \cdot (1-\mu) + k_L \cdot \mu\right]}{\left[2 \cdot d - \left[k_H \cdot (1-\mu) + k_L \cdot \mu\right]^2\right]^2} \tag{41}$$

$$W^*_{AvgHighcase3} = W_0 + \frac{d \cdot (h-c)^2 \cdot (k_H - k_L) \cdot \mu \cdot \left[k_H \cdot (1-\mu) + k_L \cdot \mu\right]}{\left[2 \cdot d - \left[k_H \cdot (1-\mu) + k_L \cdot \mu\right]^2\right]^2}. \tag{42}$$

By inspection, it is clear that the firm pays out just W_0 in total (given the proportions μ and *(1-μ)* of Lows and Highs, respectively, and the mass of 1 of all distributors).

The MLM firm's equilibrium profit in sub-model (3) with an "average" contract structure is:

$$\Pi^*_{MLMAvgcase3} = -W_0 + Q_{PC} * (V - c) + \frac{d \cdot (h-c)^2}{2 \cdot \left[2 \cdot d - \left[k_H \cdot (1-\mu) + k_L \cdot \mu\right]^2\right]}. \tag{43}$$

The "Fully Insuring Contract" in Sub-Model (3)

A "fully insuring contract" implies a registration fee that offers an NER of W_0 to a distributor who believes him/herself to be "average" *a priori* but who discovers him/herself to be a Low-type *ex post*.

As in the "average" contract discussion above, all distributors exert effort and set prices according to the best-response functions $e_{BRFcase3}$ and $P_{BRFcase3}$, leading to actual non-distributor end-user sales (as a function of the commission rate) of $Q_{NDLowBRFTruecase3}$ and $Q_{NDHighBRFTruecase3}$. But now, the MLM firm is assumed to set its registration fee to guarantee (true) Lows a return of just W_0, and thus sets:

$$RF_{FInscase3} = -W_0 + Q_{PC} \cdot \left[V - (1-\beta) \cdot w \right] + \left[P_{BRFcase3} - (1-\beta) \cdot w \right] \cdot Q_{NDLowBRFTruecase3}$$

$$-\frac{d}{2} \cdot \left(e_{BRFcase3} \right)^2 \tag{44}$$

$$= \left\{ \begin{array}{l} -W_0 + Q_{PC} \cdot \left[V - w \cdot (1-\beta) \right] \\[2mm] + \dfrac{\left\{ \begin{array}{l} d \cdot \left[h - w \cdot (1-\beta) \right]^2 \cdot \\[2mm] \left[2d - 3(k_H)^2 \cdot (1-\mu)^2 + (k_L)^2 \cdot \mu \cdot (2-3\mu) + 2k_H \cdot k_L \cdot \left(1 - 4\mu + 3\mu^2 \right) \right] \end{array} \right\}}{2 \cdot \left[2 \cdot d - \left[k_H \cdot (1-\mu) + k_L \cdot \mu \right]^2 \right]^2} \end{array} \right\} .$$

The firm accounts for this registration fee in its profit-maximization to choose the fully-insuring commission rate, $\beta_{FInscase3}$:

$$\overset{max}{\beta_{FInscase3}} \Pi_{MLMFInscase3} = RF_{FInscase3}$$

$$+ \left[(1 - \beta_{FInscase3}) \cdot w - c \right] \cdot \left[Q_{PC} + \mu \cdot Q_{NDLowBRFTruecase3} + (1-\mu) \cdot Q_{NDHighBRFTruecase3} \right]. \tag{45}$$

After substitution and optimization, the optimal fully-insuring commission rate in sub-model (3) is:

$$\beta^*_{FInscase3} = 1 - \frac{c \cdot \left[2d - \left[k_H \cdot (1-\mu) + k_L \cdot \mu \right]^2 \right] + 2h \cdot (k_H - k_L) \cdot (1-\mu) \cdot \left[k_H \cdot (1-\mu) + k_L \cdot \mu \right]}{w \cdot \left[2d + (k_H)^2 \cdot (1-\mu)^2 - 2k_H k_L (1-\mu)^2 - \mu \cdot (2-\mu) \cdot (k_L)^2 \right]}. \tag{46}$$

When $\mu=1$ and/or where $k_L = k_H$, the commission reduces to the coordinated value of $\left[1 - \left(\dfrac{c}{w} \right) \right]$ found in

the "average" scenario above. This is because the distributor population in either of these parametric instances behaves as a single homogeneous segment, for which a commission rate reducing the MLM firm's margin to zero is optimal. However, in this fully-insuring scenario, the registration fee is lower than in the "average" scenario because only the excess benefit to true Low-type distributors is extracted – not the higher excess benefit "on average." Low-type distributors earn an NER equal to their opportunity cost, W_0, while High-type distributors earn an NER strictly greater than W_0:

$$W^*_{FInsHighcase3} = W_0 + \frac{d \cdot (h-c)^2 \cdot (k_H - k_L) \cdot \left[k_H \cdot (1-\mu) + k_L \cdot \mu \right]}{\left[2d + (k_H)^2 \cdot (1-\mu)^2 - 2k_H k_L (1-\mu)^2 - \mu \cdot (2-\mu) \cdot (k_L)^2 \right]^2} > W_0 . \tag{47}$$

Finally, the MLM firm earns equilibrium profit in the fully-insuring solution of sub-model (3) of:

$$\Pi^*_{MLMFInscase3} = -W_0 + QPC * (V - c) +$$

$$\frac{d \cdot (h-c)^2}{2 \cdot \left[2d + (k_H)^2 \cdot (1-\mu)^2 - 2k_H k_L (1-\mu)^2 - \mu \cdot (2-\mu) \cdot (k_L)^2 \right]}. \tag{48}$$

Comparing Average-Contract Versus Fully-Insuring-Contract Profits in Sub-Model (3)

Intuition suggests that the MLM firm makes more profit from the average solution than from fully insuring Lows. Note that the intuition does not derive from any difference in the total enrollment in the MLM distributor force in this sub-model: both Lows and Highs enroll in both solutions. However, two other forces work to reduce profits under full insurance for Lows below those for the "average" solution. The first is the lower registration fee charged in the full insurance solution. The second more subtle effect is the lower commission rate offered in the fully-insuring solution, which diminishes the incentives of both Lows and Highs to exert effort on non-distributor selling.

The commission rate is indeed seen to be higher for the "average" than the fully-insuring solution in the expression below:

$$\beta^*_{Avgcase3} - \beta^*_{FInscase3} = \frac{2 \cdot (h-c) \cdot (k_H - k_L) \cdot (1-\mu) \cdot \left[k_H \cdot (1-\mu) + k_L \cdot \mu \right]}{w \cdot \left[2d + (k_H)^2 \cdot (1-\mu)^2 - 2k_H k_L (1-\mu)^2 - \mu \cdot (2-\mu) \cdot (k_L)^2 \right]} > 0 . \quad (49)$$

Equilibrium profits in sub-model (3) are higher in the "average" than in the fully-insuring solution as well:

$$\Pi^*_{MLMAvgcase3} - \Pi^*_{MLMFInscase3} =$$

$$\frac{d \cdot (h-c)^2 \cdot (k_H - k_L) \cdot (1-\mu) \cdot \left[k_H \cdot (1-\mu) + k_L \cdot \mu \right]}{\left\{ \begin{array}{l} \left[2d + (k_H)^2 \cdot (1-\mu)^2 - 2k_H k_L (1-\mu)^2 - \mu \cdot (2-\mu) \cdot (k_L)^2 \right] \cdot \\ \left[2 \cdot d - \left[k_H \cdot (1-\mu) + k_L \cdot \mu \right]^2 \right] \end{array} \right\}} > 0. \quad (50)$$

Given these comparisons, the MLM firm has a pure profit incentive *not* to fully insure Lows, but rather to offer the "average" contract. But if the firm – for whatever reason – indeed does set up an "on average W_0" compensation system, Lows will actually accrue an *ex post* NER less than W_0. Whether this outcome rises to the level of an AEL for Lows then depends both on the reason for the MLM firm's choice of this contract structure, and on its (and upline sponsors') education of distributors about the possible outcomes from participating in the MLM business opportunity.

If the firm does not track data other than "on average," then it does not know about the disparity in performance between Highs and Lows, and cannot be expected to consider an alternative contract structure like the fully-insuring one analyzed here. This suggests that rather than inflicting AELs on Lows, the firm simply lacks the ability to inform Lows that their *ex post* outcome will be less than W_0.

Suppose instead, however, that the MLM firm is aware of the disparity and is aware that it can fully insure Lows (albeit at a lower profit level). If it does implement the fully-insuring contract structure, then clearly even Low-type distributors garner *ex post* NER of at least W_0. But suppose that the MLM firm instead implements the more profitable "average" contract structure. Then the question of whether the firm or upline sponsors have caused an AEL to Low-type distributors hinges on whether it is in fact possible either for the firm, or for upline sponsors, to educate distributor prospects about sales productivity. Educational success is not assured, because neither the MLM firm nor an upline sponsor can discern which specific distributor prospects are Lows and which are Highs. The answer to this

question also hinges on the MLM firm's and upline sponsors' efforts (or lack thereof) to educate all distributors about the possible outcomes from participating.

If the firm and upline sponsors can and do educate distributor prospects not only about the average productivity of non-distributor selling, but also about the actual proportions of Lows and Highs in the population and the actual selling productivities of Lows versus Highs, then each individual distributor can decide for him/herself if the expected outcome of W_0 is worth the possibility that s/he discovers *ex post* that s/he is a Low. Full information about the model parameters would still lead these risk-neutral individuals to join in full knowledge that a proportion μ of them will earn less than W_0 *ex post*. This outcome does not rise to the level of an AEL, because distributors were informed of the parameters and thus of the outcomes for Lows versus Highs.

The firm and upline sponsors can further emphasize that the amount of selling effort is entirely up to the prospect and that no selling effort at all is required to be a distributor, given their status as independent contractors. As such, one can also argue that even if the *ex post* NER of Lows is less than W_0, this would not rise to the level of an AEL because NER includes the (non-required) disutility cost of effort exertion. The value of NER net of effort cost can exceed W_0, and if this holds, any argument of an AEL is accordingly weakened.

The remaining possibility is that the MLM firm is aware of the disparity in selling productivity between Lows and Highs; that it is aware that it can fully insure Lows (albeit as a lower profit level); that it, and/or upline sponsors, have the ability to inform distributor prospects of the relevant parameters; and yet that neither chooses to inform them, while the firm implements the higher-profit "average" contract structure. Interestingly, the conditions for an AEL for Lows are still not met in this scenario, because had (true) Lows been accurately advised of the true model parameters, they would still have enrolled as distributors, given their risk neutrality and the fact that *ex ante* NER equals their opportunity cost, W_0. In other words, the lack of information to (true) Lows about model parameters does not change their enrollment decision compared to the informed scenario described immediately above; they would join in any event.

In sum, a pooling solution under the information conditions in sub-model (3) – whether based on "average" performance or designed to "fully insure Lows" – is the only non-degenerate solution. Under the "full insurance" contract structure, Lows are not harmed and Highs earn a net benefit strictly greater than W_0. No AEL is inflicted on distributors in this fully-insuring contract structure. This is an interesting finding because it demonstrates that being imperfectly informed about one's type does not always lead to Low-type (or any type of) distributors suffering an AEL. Further, even under the "average" contract structure, Lows' *ex post* net benefit less than W_0 is shown not to meet the criteria for an AEL inflicted by the firm or by an upline sponsor. These findings are summarized in the following Propositions:

> **Proposition 5a.** When distributor prospects believe themselves to be of "average" productivity, the *ex ante* NER equals W_0 for all. However, an "on-average" registration fee plus commission contract structure leaves true Low-types with an *ex post* NER strictly less than W_0, while awarding true High-types an *ex post* NER strictly greater than W_0. An alternative "fully-insuring" contract structure guarantees that no prospect earns an *ex post* NER less than his/her W_0, but strictly decreases profit for the MLM firm.

> **Proposition 5b.** AELs do not occur in sub-model (3), whether the MLM firm implements an "average" or a "fully insuring" contract structure.

Sub-Model (4): Low-Type Distributors Erroneously Believe They Are High-Type, But Are Otherwise Correctly Informed re: Model Parameters; Firm Is Informed About Distributors' Assessments of Type

This sub-model is distinguished from sub-model (2) above by Low-type prospects' misapprehension about their own type: specifically, each *believes incorrectly* that s/he will be a High-type distributor. This sub-model is evocative of some complaints of MLMs or upline sponsors depicting too rosy a picture of the value of participating in the business opportunity.

Sub-Model (4): Generalities for Either the Separating or Pooling Solutions

Here, not only are all Lows misinformed about their low sales productivity (and think instead they are Highs), but the firm and/or the upline sponsor actually know that they are misinformed. This sub-model (4) assumes that the MLM firm and upline sponsors are unable to resolve, and/or uninterested in resolving, that misapprehension. Lows as well as Highs therefore register as long as the *ex ante* NER to Highs is at least W_0.

Given that both Low- and High-type distributors will make effort and retail pricing decisions as if they are Highs, the best-response functions for effort and retail price are given by:

$$e_{BRFcase4} \equiv e_{H,BRF} = e_{L,BRF} = \frac{k_H \cdot \left[h - w \cdot (1 - \beta) \right]}{2 \cdot d - \left(k_H \right)^2} \tag{51}$$

$$P_{BRFcase4} \equiv P_{H,BRF} = P_{L,BRF} = \frac{-\left(k_H \right)^2 \cdot w \cdot (1 - \beta) + d \cdot \left[h + w \cdot (1 - \beta) \right]}{2 \cdot d - \left(k_H \right)^2} \ . \tag{52}$$

However, the firm knows both (a) that there are proportions μ of Low-type distributors and *(1-μ)* of High-type distributors, and (b) that all the Lows believe they are Highs and hence will respond to the firm's commission choice according to the above best-response functions. The firm's optimization problem is therefore:

$$\Pi_{MLMcase4} = RF_{case4} + \left[\left(1 - \beta_{case4} \right) \cdot w - c \right] \cdot \left[Q_{PC} + \mu \cdot Q_{ND,LBRFcase4} + (1 - \mu) \cdot Q_{ND,HBRFcase4} \right]. \tag{53}$$

In the above profit expression, note that $Q_{ND,LBRFcase4}$ is the actual non-distributor end-user sales volume generated by Low-type distributors. This is not the amount of sales Low-type distributors expect to make, of course, because they over-optimistically believe they are High-types, not Low-types. True Low-type distributors face the Low-type sales response function, $Q_{ND,L} = h - P_L + k_L \cdot e_L$, although they exert effort and set retail price as if they are High-types (according to the expressions above for $e_{BRFcase4}$ and $P_{BRFcase4}$). Lows therefore actually generate sales (as a function of commission rate β) according to:

$$Q_{ND,LBRFcase4} = \frac{\left[d - k_H \cdot \left(k_H - k_L \right) \right] \cdot \left[h - w \cdot (1 - \beta) \right]}{2 \cdot d - \left(k_H \right)^2} \ . \tag{54}$$

Meanwhile, true High-type distributors have the same best-response value of $Q_{ND,H}$ as in sub-model (2):

$$Q_{ND,HBRFcase4} = \frac{d \cdot \left[h - w \cdot (1 - \beta) \right]}{2 \cdot d - (k_H)^2} . \tag{55}$$

It is clear by inspection that for any commission rate, β, offered by the MLM firm, true Low-type distributors generate smaller unit sales than High-type distributors in this sub-model (4).

Given these generalities, the MLM firm can choose a separating or a pooling equilibrium concept.

Separating Solution for Sub-Model (4)

A separating equilibrium involves setting the registration fee and commission rate that result in (true) Highs just receiving W_0 in *ex post* NER, as in sub-model (2) above:

$$RF_{sepcase4} = -W_0 + Q_{PC} \cdot \left[V - (1 - \beta) \cdot w \right] + \left[P_{H,BRF} - (1 - \beta) \cdot w \right] \cdot Q_{ND,HBRFcase4} - \frac{d}{2} \cdot (e_{H,BRF})^2$$

$$= -W_0 + Q_{PC} \cdot \left[V - w \cdot (1 - \beta) \right] + \frac{d \cdot \left[h - w \cdot (1 - \beta) \right]^2}{2 \cdot \left[2 \cdot d - (k_H)^2 \right]} . \tag{56}$$

However, unlike the situation in sub-model (2) above, in this sub-model (4), *setting the separating registration fee does not deter (true) Lows from registering*. Thus, the MLM firm's profit function in this sub-model involves charging the separating registration fee, but enjoying participation by both High- and Low-type distributors. Knowing this fact, the MLM firm's problem in this sub-model (4) is then to set the commission rate, β_{case4}, to maximize profits from both types of distributors:

$$\overset{max}{\underset{\beta_{sepcsae4}}{}} \Pi_{MLM,sepcase4} = RF_{sepcase4} +$$
$$\left[(1 - \beta_{sepcase4}) \cdot w - c \right] \cdot \left[Q_{PC} + \mu \cdot Q_{ND,LBRFcase4} + (1 - \mu) \cdot Q_{ND,HBRFcase4} \right] \tag{57}$$

After substitution and optimization, the profit-maximizing commission rate is:

$$\beta^*_{sepcase4} = 1 - \left[\frac{c \cdot d - (h + c) \cdot \mu \cdot k_H \cdot (k_H - k_L)}{w \cdot d - 2w \cdot \mu \cdot k_H \cdot (k_H - k_L)} \right] . \tag{58}$$

If all distributors were High-types, $\beta^*_{sepcase4}$ would take on the channel-coordinating value of $\left[1 - \left(\frac{c}{w} \right) \right]$

because then the MLM firm would be setting the registration fee and commission to optimally incentivize and draw profit from just one homogeneous group of distributors. As the population deviates from all High-types ($\mu=0$) to having a positive proportion of Low-types ($0<\mu<1$), the MLM firm maximizes profits by lowering the registration fee (used to extract rents) from the level matching an all-High-type distributor force, but compensating for this lower revenue stream by increasing the commission rate in order to induce all distributors to exert more effort and thus sell more units of product.

In this separating solution for sub-model (4), true High-type distributors earn an *ex post* NER of W_0:

$$NER^*_{H,sepcase4} = W_0.$$
(59)

However, true Low-type distributors earn an *ex post* NER strictly less than W_0:

$$W^*_{L,sepcase4} = W_0 - \frac{d \cdot (h-c)^2 \cdot k_H \cdot (k_H - k_L) \cdot \left[d - \mu \cdot k_H \cdot (k_H - k_L) \right]^2}{\left[2d - (k_H)^2 \right]^2 \cdot \left[d - 2\mu \cdot k_H \cdot (k_H - k_L) \right]^2} < W_0 .$$
(60)

The downward deviation in Lows' benefits from W_0 is greater in this separating solution for sub-model (4), *ceteris paribus*:
- The higher is h;
- The lower is c;
- The lower is k_L;
- The higher is k_H; and
- The higher is μ.

Intuitively, higher h or lower c values encourage the firm to more strongly incentivize sales effort and also encourage the misguided Low-type distributor to raise non-distributor end-user prices higher that are warranted by his/her true productivity, thus worsening his/her *ex post* NER. The lower is k_L or the higher is k_H, the worse is the Low-type distributor's selling ability relative to the High-type's, and this leads to poor non-distributor sales for Lows relative to Highs and hence to a greater downward deviation of *ex post* NER from W_0. And the higher is the proportion of Lows, μ, in the population, the higher is the commission rate and thus the higher is the over-exertion of effort by true Lows, leading to a greater deviation from W_0 in their *ex post* NER. Finally, the effect of d, the disutility of effort, is ambiguous; higher d leads to lower effort exertion, which leads to lower sales but also to a dampening of the overall disutility of effort.

The MLM firm's profit in sub-model (4), using a separating equilibrium concept, is:

$$\Pi^*_{MLMSepcase4} = -W_0 + Q_{PC} * (V-c) + \frac{(h-c)^2 \cdot \left[d - \mu \cdot k_H \cdot (k_H - k_L) \right]^2}{2 \cdot \left[2d - (k_H)^2 \right] \cdot \left[d - 2\mu \cdot k_H \cdot (k_H - k_L) \right]} .$$
(61)

The MLM firm would not enter into business if it could not cover the offering of W_0 to distributors; all other terms in the equilibrium profit equation above are positive.

However, while the separating solution of sub-model (4) offers High-type distributors an *ex post* NER equal to their opportunity cost for participating in the MLM, it unambiguously leaves Low-type distributors with an *ex post* NER less than their opportunity cost, raising the possibility of AELs for Lows. Whether AELs have been inflicted on Low-type distributors depends on (a) whether the MLM firm or upline sponsor *knows* of their misapprehension; (b) whether the MLM firm or upline sponsor knows the information necessary to *resolve* their misapprehension; and (c) whether the MLM firm or upline sponsor *makes efforts* to inform Low types of their prospects. The premise of this sub-model's separating solution is that the MLM firm and/or upline sponsor do indeed know that Lows erroneously believe themselves to be High-type distributors. Further, the MLM firm and/or upline sponsor do have some relevant information concerning the true proportions of Low- and High-type distributors (and thus, that not all prospects are High-types) and the disparity in their non-distributor sales productivities (though not which prospect is of which type).

However, there are two important limitations to the ability of the MLM firm or upline sponsor to correctly inform Lows of their prospects. The first is that they do not know which specific distributor prospects are Lows and which are Highs – they only know the proportion of Lows and Highs in the total population. Thus, they cannot communicate to specific Lows that they are in fact Lows and what this means for their NER from the MLM business opportunity. The second limitation is that each Low believes him/herself to be a High-type distributor, so any promotional or educational message aimed at "Lows" is likely to be ignored by these over-optimistic distributors. Even if known by all distributors, the available information might not disabuse some or even many Lows from believing themselves individually to be Highs (a variant of the "Lake Wobegon" effect where all the children are "above average").

Nevertheless, the MLM firm and upline sponsors can seek to educate *all* prospects and distributors about the proportion of Lows and Highs in the distributor population, and about the disparity in productivity between Lows and Highs. It can further remind prospects and distributors of the possible earnings outcome, should a participant discover that s/he is not a High-type, but rather a Low-type distributor. Such educational efforts are in fact extremely common in the income disclosures of MLM firms, and are commonly backed up by added statements that the business opportunity is not a "get-rich-quick scheme," that success requires a combination of skill and effort, and that there are no guarantees of success. Upline sponsors are generally required to make such statements when describing the business opportunity to a prospect as well. An enrolling distributor is also usually forced to acknowledge through his/her signature on the MLM's registration form that s/he has been given, and has read, the income disclosure statements and understands them.[37]

Given the impossibility of pre-identifying Low-type prospects and distributors, this type of education by the MLM firm and upline sponsors is arguably the best effort that can be made to share available information with distributors and prospects. It is impossible to fully inform each prospect truly of his/her type, given the MLM's and upline sponsor's lack of information on individuals' abilities, so informing the overall population that not all are High-types at least has a chance of planting the idea in a prospect's mind that s/he may not be a High. In this sense, engaging in these good-faith educational efforts – even if they are inevitably less than completely effective – implies that the MLM firm and upline sponsors have not inflicted AELs on prospective distributors.

However, the ensuing question is whether the firm or upline sponsors could take any other actions that would better insure that prospective distributors' expectations are met or exceeded. In fact, given the MLM firm's knowledge that Lows will in fact end up with an *ex post* NER strictly less than W_0 if it implements a separating solution in sub-model (4), an alternative is to "insure" true Low-type distributors against such an outcome by setting a registration fee consistent with a pooling solution: that is, one that is low enough to give Lows just W_0 from participating. This alternative is examined next.

Pooling Solution for Sub-Model (4)

A pooling equilibrium involves setting the registration fee and commission rate that result in Lows attaining an *ex post* NER just equal to W_0 from joining the MLM as a distributor. Just as in the separating solution for sub-model (4), Lows' misapprehension of their true type leads them to join as distributors, along with Highs. But unlike in the separating solution, Lows' misapprehension is not compounded by a high registration fee that lowers their *ex post* NER below W_0 in the pooling solution. This pooling solution thus shares the "fully insuring" characteristic shown sub-model (3) above.

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[37] See Appendix B for details from three MLMs on these disclosure behaviors (Amway, Herbalife, and Nu Skin).

Specifically, Lows and Highs exert effort and set prices according to the same decision rules as in the separating solution for sub-model (4). As in that situation, here too the firm correctly perceives the true proportions of Lows and Highs in the distributor population (although it does not know the individual productivity levels of each distributor). Then the registration fee is set as follows:

$$RF_{poolcase4} = -W_0 + Q_{PC} \cdot \left[V - (1-\beta) \cdot w \right] + \left[P_{L,BRF} - (1-\beta) \cdot w \right] \cdot Q_{ND,LBRFcase4} - \frac{d}{2} \cdot \left(e_{L,BRF} \right)^2$$

$$= -W_0 + Q_{PC} \cdot \left[V - w \cdot (1-\beta) \right] + \frac{d \cdot \left[2d - k_H \cdot (3k_H - 2k_L) \cdot \left[h - w \cdot (1-\beta) \right] \right]^2}{2 \cdot \left[2 \cdot d - (k_H)^2 \right]^2} \quad . \tag{62}$$

Given the pooling registration fee structure, the firm then sets the commission rate to maximize profits:

$$\max_{\beta_{poolcase4}} \Pi_{MLM,poolcase4} = RF_{poolcase4} +$$

$$\left[(1 - \beta_{poolcase4}) \cdot w - c \right] \cdot \left[Q_{PC} + \mu \cdot Q_{ND,LBRFcase4} + (1-\mu) \cdot Q_{ND,HBRFcase4} \right] \tag{63}$$

After substitution and optimization, the optimal commission rate is:

$$\beta^*_{poolcase4} = 1 - \left[\frac{\begin{bmatrix} c \cdot \left[2d - (k_H)^2 \right] \cdot \left[d - \mu \cdot k_H \cdot (k_H - k_L) \right] + \\ h \cdot k_H \cdot (k_H - k_L) \cdot \left[2d \cdot (1-\mu) + \mu \cdot (k_H)^2 \right] \end{bmatrix}}{w \cdot \left[2d + 2\mu \cdot (k_H)^3 \cdot (k_H - k_L) + d \cdot k_H \cdot \left[k_H - 2k_L - 4\mu \cdot (k_H - k_L) \right] \right]} \right] \quad . \tag{64}$$

It can be shown that this commission rate is always lower than the commission rate that coordinates a single-segment channel (that is, it is lower than $\left[1 - \left(\frac{c}{w} \right) \right]$), for any proportion of Lows in the distributor population, μ. This is an understandable finding because the pooling solution in sub-model (4) must simultaneously recognize (a) the inclusion of both Lows and Highs in the distributor population, and (b) the accommodation of the misperception of Lows about their effort productivity in setting the registration fee.

By substitution of the equilibrium commission rate, the equilibrium registration fee can be calculated (but is suppressed here for simplicity). Lows earn just W_0 in net benefit from participating, while Highs earn a net benefit strictly greater than W_0:

$$W^*_{poolcase4} = W_0 + \frac{d \cdot (h-c)^2 \cdot k_H \cdot (k_H - k_L) \cdot \left[d - \mu \cdot k_H \cdot (k_H - k_L) \right]^2}{\left[d \cdot \left[2d + k_H \cdot (k_H - 2k_L) \right] - 2\mu \cdot k_H \cdot (k_H - k_L) \cdot \left[2d - (k_H)^2 \right] \right]^2} > W_0 \quad . \tag{65}$$

The MLM firm's profits in equilibrium from this solution are then:

$$\Pi^*_{MLMPoolcase4} = -W_0 + QPC*(V-c)$$

$$+ \frac{(h-c)^2 \cdot \left[d - \mu \cdot k_H \cdot (k_H - k_L) \right]^2}{2 \cdot \left[2d^2 + 2\mu \cdot (k_H)^3 \cdot (k_H - k_L) + \mu \cdot d \cdot k_H \cdot \left[k_H - 2k_L - 4\mu \cdot (k_H - k_L) \right] \right]}. \qquad (66)$$

All of these equilibrium values hold, if the parameters of the problem are such that the optimal registration fee that accommodates the over-optimistic Lows is non-negative. It clearly must be lower than the registration fee in the separating solution for this sub-model (4); but, it is possible for the necessary "insurance discount" for Lows to be too great to permit a positive registration fee. This is more likely to occur for lower values of QPC, V, or k_L, and for higher values of $W0$. Under such circumstances, the closest the MLM firm can come to insuring Lows would be to set the registration fee to zero, as discussed earlier in this paper. In a market with relatively few High-type distributors and a large majority of Low-type distributors, this practice would be consistent with the pooling solution described here.

Profitability and Possible AEL in Sub-Model (4)

Sub-model (4) is more complex than sub-model (2), because of the need to account for the misapprehension on the part of Low-type distributors. Whether Low-types earn their opportunity cost of time or a lower amount than this is dependent on both the MLM firm's awareness of the situation, and its choice of the registration fee. If the firm were in fact unaware of the misapprehension of Lows, instead believing (as in sub-model (2)) that each distributor knew his/her productivity type, it would err with either a pooling or a separating strategy for setting registration fee and commission rate, because it would unwittingly fail to take account of the over-optimistic effort exertion and high price-setting of the Lows in the distributor population. It would also not expect any Lows to register when it chooses a separating solution, yet the Lows' misapprehension would lead them to enroll. Lows would then earn an *ex post* NER even lower than their opportunity cost in the separating solution as implemented in sub-model (2); and interestingly, they could earn an *ex post* NER less than their opportunity cost even in the pooling solution, if their effort exertion and price-setting cause enough extra effort disutility, compounded with lower sales due to the optimistically high prices set in the market. Yet, in a scenario where the firm is simply uninformed about the misapprehension of Lows about their productivity, the actions of the MLM firm are not taken with purposeful intent to harm Low-type distributors. The MLM firm is then not responsible for an AEL to Lows; instead, it is incomplete information throughout the whole distribution channel, which leads Lows to earn *ex post* NERs that are less than W_0.

Instead, in the pooling and separating solutions of sub-model (4) discussed here, the MLM firm is assumed to be apprised of the Low-type distributors' erroneous beliefs. Assuming that it (and upline sponsors) do not (and/or cannot fully) disabuse Lows of their belief of being High-types, being informed about these beliefs equips the MLM firm to insure the Lows in the pooling solution concept, which averts an outcome where all Low-types earn an *ex post* NER less than their opportunity cost, while all Highs earn more than theirs. This insurance comes at a cost to the firm's profits, however; equilibrium profits for sub-model (4) are always greater when the MLM firm implements a separating solution than a pooling solution:

$$\Pi^*_{sepcase4} - \Pi^*_{poolcase4} = \left(\frac{d \cdot (h-c)^2 \cdot k_H \cdot (k_H - k_L) \cdot \left[d - \mu \cdot k_H \cdot (k_H - k_L) \right]^2}{\left[2d - (k_H)^2 \right] \cdot \left[d - 2\mu \cdot k_H \cdot (k_H - k_L) \right]} \right) \cdot$$

(67)

$$\cdot \left(\begin{array}{c} 2 \cdot d^2 + d \cdot (k_H)^2 - 2d \cdot k_H \cdot k_L - 4d \cdot \mu \cdot (k_H)^2 \\ + 2\mu \cdot (k_H)^4 + 4d \cdot \mu \cdot k_H \cdot k_L - 2\mu \cdot (k_H)^3 \cdot k_L \end{array} \right) \cdot$$

The first term of this profit difference is unambiguously positive. The second term is also positive under the second-order condition for $\beta_{poolcase4}$. Thus, for any proportion of Lows versus Highs and for any disparity in k_L versus k_H, the firm has a profit incentive to set its registration fee and commission rate as if only Highs were going to register – despite its knowledge that in fact, both Highs and over-optimistic Lows will register as distributors.

Further, note that the commission rate set in the separating solution is always higher than that in the pooling solution, using the same arguments as for the profit comparison above:

$$\beta^*_{sepcase4} - \beta^*_{poolcase4} = \left(\frac{2d \cdot (h-c) \cdot k_H \cdot (k_H - k_L) \cdot \left[d - \mu \cdot k_H \cdot (k_H - k_L) \right]}{w \cdot \left[d - 2\mu \cdot k_H \cdot (k_H - k_L) \right]} \right) \cdot$$

(68)

$$\cdot \left(\begin{array}{c} 2 \cdot d^2 + d \cdot (k_H)^2 - 2d \cdot k_H \cdot k_L - 4d \cdot \mu \cdot (k_H)^2 \\ + 2\mu \cdot (k_H)^4 + 4d \cdot \mu \cdot k_H \cdot k_L - 2\mu \cdot (k_H)^3 \cdot k_L \end{array} \right) > 0.$$

Thus, if the MLM firm insured over-optimistic Lows, the result would be a loss of profits for the firm for three reasons: first, because the same total population of distributors participates in either situation (so the size of the distributor force in the pooling solution is no larger than in the separating solution); second, because the pooling solution generates smaller revenue from registration fees than the separating solution; and third, because the commission rate is also lower in the pooling than the separating solution, generating a lower incentive for all participating distributors to exert effort on non-distributor sales generation.

Clearly, then, when all distributors believe they are Highs, the MLM firm has an unambiguous profit incentive both to allow (true) Lows' misapprehension to persist (even if it were possible to disabuse them of their misapprehension), and to fail to insure Lows against their inevitable negative net benefit that will result. Given these incentives, is it then reasonable to infer that the MLM firm or upline sponsors inflicted an AEL on Lows in this situation?

The answer is not unambiguously "yes." Whether an AEL actually does occur is not simply a function of the profit incentives of the firm (although these incentives are strong). It is also dependent on (a) the firm or upline sponsors *knowing* that Low-types over-estimate their abilities, (b) the firm or upline sponsors *being able* to correct the misapprehension, and (c) the decision of distributors to join being *different* as a result. If these conditions all hold, yet the firm does not seek to correct the error, its actions can be construed as causing an AEL to Low-type distributors. But if it is unaware of the misapprehension, or if aware but unable to correct it despite best efforts at education, observing Low-type distributors' *ex post* net NER that falls below their opportunity cost is not sufficient to conclude that the MLM firm is

responsible for Lows' *ex post* NER less than W_0. As noted elsewhere, the criterion most unlikely to be met here is (b): while the MLM firm can communicate the differences between Lows and Highs to all distributors, the very fact of Lows' misapprehension of their type is likely to undercut their internalization of this message.

Thus, a combination of several factors needs to hold to conclude that economic harm has occurred: first, that lower-productivity distributors *ex post* outcomes are worse than expected *ex ante*; second, that the firm has the knowledge and ability to intervene; and third, that the firm nevertheless makes the conscious choice not to do so, in the pursuit of higher profits.

These insights are summarized in the following Proposition.

> ***Proposition 6.*** When all distributors believe they are Highs, yet a proportion μ of them are Lows, no distributor suffers an AEL if the MLM firm implements a "fully insuring" contract structure. However, the profit from the fully-insuring contract is less than the profit from a "separating" contract structure. If the MLM firm is aware of the misapprehension; is able to (or can make best efforts to) accurately inform the distributor force of the true variation in selling productivity; and in fact does make such efforts (or upline sponsors do so), then an AEL is not inferred despite some non-remedial Lows erroneously persisting in their belief that they are Highs. However, if the MLM firm is aware of the misapprehension; is able to (or can make best efforts to) accurately inform the distributor force; but in fact fails to make such efforts while implementing the "separating" contract, the conditions for an AEL are met. This is because true Low-type distributors enroll in this circumstance and as a result earn *ex post* NER less than W_0, but would not have enrolled, had they been accurately informed of the value of the MLM business opportunity.

Summary, Conclusions, and Directions for Future Research

This paper starts with an investigation of VK's model, which suggests that the proportion of non-distributor sales could provide a metric to indicate the likelihood of operation of an illegal pyramid scheme. The analysis shows that VK's model structure includes some important but implicit assumptions – namely, that key protections for distributors are absent and that therefore purchases by distributors that are not resold to non-distributors are suspect and should not count as sales for end-user consumption. However, the absence of these protections could be verified outside of the VK model and therefore the usefulness of the metric proposed by VK in identifying an illegal pyramid scheme is limited. Ignoring whether the protections are present thus biases the VK model toward predicting that a direct seller operates a pyramid scheme, when this may not in fact be the case. I show that when the relevant protections are observed to be in place, it is proper to categorize personal consumption as end-user sales, alongside sales to non-distributor end-users. With the relevant protections, the "metric" offered by VK turns into a very simple condition that the firm with a single-period horizon must be able to cover all its costs – including production, marketing, and distributor compensation – from current revenues. The present analysis thus shows the limitations of making implicit assumptions about the absence of relevant protections that are in fact commonly offered to distributors at many direct-selling firms.

I then develop an emended model that focuses not on aggregate measures but rather investigates prospective individual distributors' enrollment decisions and their subsequent accrual of Net Economic Return (NER) from the MLM business opportunity. I identify segments of prospects and distributors that help in identifying who could and who could not earn an *ex post* NER less than their opportunity cost. Even an *ex post* NER lower than opportunity cost need not imply an Avoidable Economic Loss (AEL),

however. The individual is defined as suffering an AEL at the hands of the MLM firm, or his/her upline sponsor, if s/he enrolls, while s/he would not have done so had s/he been informed of some information available to the firm or sponsor; and if by enrolling, s/he garners an *ex post* NER less than his/her opportunity cost.

Given this AEL concept, I show that personal-consumption distributors and High-type distributors are not harmed by joining the MLM business.

I further show that even if a distributor earns a negative *ex post* NER by joining under a misapprehension about one of the business opportunity's parameters, one still cannot conclude that s/he has necessarily suffered an AEL. The key to this seemingly counterintuitive result is that whenever an individual decides to take up an entrepreneurial activity – whether it be starting one's own retail shop, opening a franchise, or becoming a direct-selling distributor – there are inevitable informational shortcomings associated with doing so that the prospective entrepreneur must be willing to take on in order to have the chance of a positive return. By the very nature of the unknown information surrounding the business opportunity, there is a chance of a negative as well as a positive outcome; so, observing that some (or even many) direct-selling distributors appear to earn a negative *ex post* NER from the business is not surprising. Even when a prospective distributor's belief about a parameter of the business opportunity is incorrect, the analysis shows that it may result in the exact same join / no-join decision as would have occurred if the prospect had been correctly informed. Given that the outcomes would therefore have been the same with or without correct information, an AEL cannot be inferred from an NER less than W_0 for the entrepreneurial distributor in this situation. Only if it is possible for the MLM firm and/or upline sponsor to correct any misperceptions; if doing so would have caused the prospective distributor to choose a different outcome (not joining rather than joining); and if doing so would have prevented an *ex post* NER less than opportunity cost, can one conclude that the prospective distributor suffers an AEL by joining without best-available information about the business opportunity's parameters.

Moving beyond the boundaries of the model, it is useful to note that in the MLM selling environment, the metrics available to completely measure *ex post* financial or monetary value to a distributor are unavoidably incomplete, because (a) the MLM firm cannot accurately measure the income to a distributor from wholesale-to-retail markups on sales to non-distributor end-users (since retail pricing is each distributor's choice in each retail transaction), and (b) it cannot account for each distributor's value in use of personal consumption. Non-observability of these two real-world economic benefit measures implies a bias toward concluding that distributors "lose money" because of the tendency to ignore elements that are not easily observable; but in fact, these apparent "losing" distributors may well be enjoying strictly positive *ex post* NER from participating in the business opportunity.

These insights suggest the following guidelines for assessing the viability of a direct-selling firm and any AEL to distributors:

- It is important to first assess the nature and extent of provisions in the direct-selling distribution system that protect distributors against inventory loading pressure or other forced investments that could disqualify personal consumption from being considered valid end-user sales (the "protections" discussed here).
- Assuming that the direct-selling firm passes this scrutiny, then the same straightforward financial assessment of company viability can be assessed as would be used for any other firm: to verify that (over the horizon considered by the analyst) the firm can cover all its costs, including compensation payments to the distributor force, without resorting to using overly-high registration fees or forced inventory purchases to generate income to cover compensation costs. This paper takes a conservative stance in assessing only single-period returns and describing

financial viability as positive single-period profits, when it may also be insightful to allow for a multi-period profit horizon.

- The analyst can then proceed to investigate the individual distributor's information set to see if the direct-selling firm or upline sponsors make any purposeful misrepresentations to prospective distributors that both skew their decision toward enrollment, and by so doing, lead to negative *ex post* NER when this could have been avoided by not registering. This analysis requires an understanding of all the elements of the prospect's NER function, not just commission checks and registration fees easily viewed by the firm. Connected with this distributor-level investigation, the analyst can assess the type and nature of communications by the firm and by upline sponsors to prospective distributors. In the face of imperfect information even by the firm, the question then becomes whether the firm undertakes what communication it can about the general nature of the business opportunity; whether it states explicitly to the prospect that there are no specific guarantees of monetary returns; and whether it seeks to provide some information concerning the outcomes for active distributors.

- If misrepresentations have been made by upline sponsors but not by the firm, it is useful to evaluate the governance efforts made by the MLM firm to minimize such events to seek to establish if they are reasonable and sufficient. It is practically speaking impossible to perfectly enforce rules governing sponsoring distributor behavior, so evidence of some misrepresentation is not automatic evidence of poor governance by the MLM firm, but the firm's investigation and enforcement of penalties when such rules are ignored is evidence of good-faith efforts.

Beyond these insights, various future research directions can also be pursued. First, a compensation structure allowing two (or multiple) commission rates rather than the assumed single commission-rate structure here would produce different specific model results. However, it does not overturn the fundamental finding of this analysis, which is that an AEL is inflicted on the distributor by the firm only with an information asymmetry whose resolution could have been effected by the firm, and which would cause the prospective distributor not to join, but under which the prospect does join and as a result suffers a loss.

Second, this analysis took the most conservative view of "distributor success" and "firm success" possible, namely, a one-period horizon. However, direct-selling businesses are multi-period investment and return-generating processes on both the firm and distributor sides; thus, a dynamic look at the ability of a firm to survive over a multi-period horizon, and of its distributors to reap positive multi-period returns, is also of interest.

Third, because of the one-period focus in this analysis, plausible dynamic parameter shifts such as dynamic cost declines and changing distributor force sizes in the aggregate have been suppressed. Injecting time-dependence in processes like these can provide insight into the impacts of low versus high turnover and recruiting behaviors on short- and longer-term financial returns to the MLM firm and to its distributors.

Fourth, after showing the distributor protection provisions that make it sensible to categorize all sales as true end-user sales, it would be useful to sequentially relax one or more of the distributor "protections" appealed to in this paper and examine their incremental implications for firm profit and distributor *ex post* NER from participation.

Fifth, investigating "business-builder" distributors' motivations, abilities, and outcomes along with the retail-selling distributors examined here would expand on the insights into MLM incentive optimization, profitability, and growth.

And finally, future research could fruitfully seek to measure and apply empirically-validated values of the model's parameters to examine the models' empirical implications.

In sum, the emended model offered here offers a distributor-focused alternative to the aggregate approach of the VK model, under the observable conditions that relevant distributor protections are in place. The insights available from this analysis show that the VK model does not offer a reliable metric for diagnosing whether a direct seller operates a pyramid scheme subject to inevitable collapse, or instead offers a legitimate business opportunity. Standard protections regarding product guarantees and refunds, reasonable registration fees, and standard financial and cost management by the direct selling firm make it sensible to count all sales (not just those going to non-distributor end-users) as true sales, and suggest a modified analysis of a direct-selling firm to evaluate its status as a legitimate MLM company or an illegitimate pyramid scheme.

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Appendix A: Assessment of the VK Model

Some initial terminology used by VK facilitates the exposition of their model structure:

- VK assume that "packages," rather than individual product units, are sold by the direct-selling firm to a distributor. A single package consists of some array of products or number of units of product, some of which may be personally consumed by the distributor and others of which may be sold for a retail mark-up to non-distributor end-users;
- P is the actual retail price of the package (considered by VK to be a constant parameter, implying the same retail price for all units sold to non-distributor end-users; this can be interpreted as the average retail price);
- Q total packages are sold to distributors (some of which may be personally consumed by distributors and some of which are resold to non-distributor end-users);
- W is the wholesale price paid by the distributor to the firm for a package. Hence, W is the per-package revenue to the firm;
- m is the markup on retail price: $m = \dfrac{P-W}{P}$;
- r is the fraction of a package sold to non-distributor end-users;
- f is the constant per-package full production and marketing costs incurred by the firm, expressed as a fraction of wholesale price (thus, fW is the marginal cost of a package to the firm in money terms, and therefore no economies of scale are allowed);
- u is the fraction of wholesale price paid out in upline commission awards; thus, on a per-package basis, uW is the dollar amount of commission payouts on a wholesale sale of one package unit.[38]

VK assume that fixed costs are zero for the firm, so the firm faces no set-up costs or overhead costs. They consider only a one-period horizon for profitability, which is equivalent to considering one of many identical periods for a firm whose cost and demand structures remain constant for all time periods – thus abstracting away from any dynamic factors such as experience effects that lead to falling marginal costs over time, the incursion of one-time fixed costs that are amortized over a multi-period horizon, or any other dynamic cost or demand effects. Given these elements, VK's direct selling firm's single-period profit can be expressed as follows:

$$\Pi_{MLM} = Q \cdot \left[W - f \cdot W - u \cdot W \right] = W \cdot Q \cdot \left[1 - f - u \right] , \tag{A 1}$$

and (although VK do not explicitly calculate this) distributors' aggregate economic benefit from engaging in the business is:

$$U_{Dist} = \begin{bmatrix} r \cdot Q \cdot (P-W) + (1-r) \cdot Q \cdot \{\text{utility benefit of personal consumption per package}\} \\ + \{\text{commissions earned}\} \end{bmatrix}, \tag{A 2}$$

where $r \cdot Q$ is the number of packages resold to non-distributor end-users (and thus, $\left[(1-r)Q \right]$ is the number of packages personally consumed by distributors). Because VK's goal is to examine the total

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[38] VK do not explicitly model a multi-level compensation structure; they simply assume that the compensation structure (whether uni-level or multi-level) implies that a proportion u of the firm's wholesale revenues are paid out in commissions.

system's ability to profitably pursue its business (not individuals' decisions to join), it is helpful to account for all the dollars in the channel system. Specifically:

total revenue to the channel (firm + distributors) $= P \cdot r \cdot Q + W \cdot \left((1-r) \cdot Q \right)$

total retail markup dollars $= \mathrm{r} \cdot Q \cdot (P - W)$;

total (wholesale) revenue to the firm $= W \cdot Q$;

total commission payouts $= u \cdot W \cdot Q$;

total firm costs (production, marketing) $= f \cdot W \cdot Q$.

Total surplus generated by the firm's distribution channel is therefore:

$$
\begin{aligned}
Surplus_{Channel} \quad &= \Pi_{MLM} + \{\text{total retail markups}\} + \{\text{total commission payouts}\} \\
&\quad + \{\text{net utility benefit of personal consumption by all distributors}\} \\
&= W \cdot Q \cdot (1 - f - u) + r \cdot Q \cdot (P - W) + u \cdot W \cdot Q \\
&\quad + \{\text{net utility benefit of personal consumption by all distributors}\} \\
&= W \cdot Q \cdot (1 - f) + r \cdot Q \cdot (P - W) \\
&\quad + \{\text{net utility benefit of personal consumption by all distributors}\} \ .
\end{aligned}
\tag{A 3}
$$

In the above channel surplus expression, note that the commission *costs* to the firm ($u \cdot W \cdot Q$ in dollar terms) are exactly countered by the commission *earnings* of distributors in total, so that the u term is absent from total channel surplus. This is simply a reflection that in any distribution channel, there is a sharing of the total profit "pie" amongst the channel members. Conceptually, the expression for "net utility benefit of personal consumption by all distributors" accounts for the fact that distributors who personally consume the firm's products generally pay a wholesale price to acquire them and voluntarily consume them because doing so is worth more than the cost to acquire those units. The monetized value of the difference between the gross utility of consuming the products and the cost to acquire them is the net utility of personal consumption. VK do not include this net utility in their assessment of direct-selling legitimacy.

One of the common implications of running a pyramid scheme is that the scheme operator cannot cover all current period costs out of current period revenues, and is thus tempted to charge high registration fees to generate incremental current-period revenue with which to fund the costs of its business and provide some profit for the scheme operator. In the VK model set-up above, registration fees are not included at all; this is consistent with the operation of a direct selling firm where either (a) both registration fees and the cost to register/support a new distributor are zero, or (b) registration fees just cover the marginal costs of registering a new distributor. In either case, the net profit from registration is zero. Should these conditions not characterize registration or renewal fees, the model would have to be changed to reflect the economic impact of such fees.

VK then define a variable called "ARC" (Advance Retail Commissions)[39]:

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[39] This variable name is not particularly transparent, because it has nothing to do with "Advance" payments (since the VK model is static, not dynamic); because it is not equal to actual commission payments; and because it includes wholesale as well as retail parameters.

$$ARC = \{\text{gross retail sales}\} - \{\text{direct retail commissions}\} - \{\text{full production costs}\}$$
$$= Q \cdot (r \cdot P - m \cdot r \cdot P - f \cdot W) \ = Q \cdot (r - f) \cdot W \ . \tag{A 4}$$

ARC is represented as "the portion of actual retail volume (in monetary terms) that is available for the payment of upline rewards."[40] In other words, VK's "actual retail volume" at least covers the cost of upline rewards only if:

$$Q \cdot (r - f) \cdot W \geq Q \cdot u \cdot W \ \Leftrightarrow \ u < (r - f) \ . \tag{A 5}$$

Note that the full production burden of fW includes costs of producing units sold to non-distributor end-users as well as of units sold to distributors for personal consumption. But VK force non-distributor end-user sales revenues alone to bear the burden of covering *all costs*, not just the costs of the units sold to non-distributor end-users. Ignoring revenues to the firm from distributor personal consumption, but forcing all costs to be covered by non-personal-consumption revenues, naturally downwardly biases the metric for viability of the direct selling firm.

VK use ARC as a basis to define another variable, "ERR":

$$ERR = u \cdot W - ARC = (u - f + r) \cdot W, \ \text{if} \ ARC \leq u \cdot W \ ; \ \text{else, } ERR=0 \ . \tag{A 6}$$

VK state that "The model thus identifies ERR to be the reward for recruitment,"[41] as it measures upline rewards that are not funded by wholesale-to-retail sales income nor by MLM commissions on non-distributor end-user sales. This definition thus explicitly argues that end-user consumption by distributors is not part of "retail sales." VK then proffer a definition of the conditions under which distributor rewards are "*based primarily on recruitment*." This is defined as occurring when the fraction of the MLM's unit sales sold to non-distributor end-users is lower than some c^* ($0<c^*<1$) which implies that both (a) more than 50% of gross distributor earnings (from commissions and wholesale-to-retail markups), and (b) more than 50% of upline commission earnings, are not retail-based. VK conclude that "The model supports a pyramid conclusion whenever the percentage of product retailed to the public falls below c^*."[42]

Thus, the logic for VK's metrics of ARC and ERR (and other metrics derived from them), and the ensuing examples developed in their paper, depend crucially on the unstated assumptions of *a lack of provisions protecting consumer and distributor personal consumption*, and *a lack of distributor protections regarding inventory loading*, in the direct-selling firm under analysis. But in fact, legitimate direct selling companies commonly *do* provide such protections, so that failing to consider these provisions biases the VK metrics toward a false-positive pyramiding conclusion and thus limits their value in assessing legitimacy of a direct selling system. From a business perspective, when the abovementioned protections are in place, all wholesale revenue earned by the direct selling firm (not just the portion of wholesale revenue destined for non-distributor end-user consumption) should be considered to be available to cover the costs of doing business.

This is particularly important, given the VK model's lack of mention of legitimate direct selling firms' practices of failing to require any minimum product purchase by distributors and discouraging inventory loading by distributors. When these provisions are in play, all sales to distributors are properly construed

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[40] VK, p. 145.
[41] VK, p. 146. Note however that there is no explicit recruitment in the VK model.
[42] The formula for c* underlying VK's claim is: $c^* = \dfrac{(2f + u) \cdot (1 - m)}{(2 - m)}$ (VK, p. 148).

as sales for ultimate consumption (because if the distributor did not actually want to consume the product or sell it to a non-distributor end-user, s/he was under no obligation to purchase it from the firm in the first place). Clearly, products sold for non-distributor consumption are properly categorized as sales for ultimate consumption. But beyond this, because no distributor purchase is forced in a legitimate direct selling business and all such purchases are voluntary, units destined for personal consumption by distributors are also properly classified as ultimate end-user consumption.[43] In the presence of the relevant protections described here, it is therefore logical and reasonable to include these units in the firm's profit calculations and in any consideration of the funds available to the direct selling firm for upline awards. This logic suggests that VK's ARC concept underestimates the ability of the legitimate direct selling firm to cover its costs.

If instead, one considers all final end-user sales (including units consumed by both non-distributor end-users and distributor end-users) to be retail sales (i.e., *r=1*), then instead of VK's ARC concept, the firm would be seen to cover all its current costs – including production/marketing and compensation costs – out of current revenues if:

$$Q \cdot (1 - f) \cdot W \geq Q \cdot u \cdot W \quad \Leftrightarrow \quad u < (1 - f).$$

(A 7)

Thus, when the direct selling firm offers a product (or product line) of real value that is voluntarily purchased and consumed, its decision about overall compensation budgeting is straightforward: it can cover current costs from current revenues in each period only if its per-unit sales commission rate is no greater than its gross margin per unit (revenue per unit minus cost of goods sold minus marketing costs). The parameter *u* is thus really just a mechanism through which the direct selling firm shares channel profit with distributors, by means of a fraction of wholesale sales revenue generated in the channel system.

VK's ARC-based condition, *u<(r-f)*, is a stricter condition than *u<(1-f)* because *r*, the fraction of sales that are made to non-distributor end-users, is by definition less than or equal to 1 in value. This constraint in VK explicitly denigrates *all* sales for personal consumption by distributors – even when voluntary – as not meritorious enough to allow their profit to be allocated to help cover the costs of producing the units thus sold. This is an economically unreasonable criterion, particularly because it is imposed without regard for whether or not the business under scrutiny offers the protections described above. In particular, when the direct selling firm fails to require personal consumption by distributors, then even when $(r - f) \leq u \leq (1 - f)$ (thus violating the VK criterion *u<(r-f)*), the direct selling firm still covers all of its costs out of current sales (which legitimately include sales to non-distributor and distributor end-users). This insight can be summarized as:

> ***Proposition 1.*** VK's analysis over-classifies direct-selling firms as possible pyramid scheme operators. When the firm offers distributor protections, distributor losses due to saturation and collapse are avoided, and a standard financial criterion that revenues exceed the sum of distributor compensation, production, marketing and associated costs is sufficient to verify that the firm is not destined for inevitable collapse as a pyramid scheme.

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[43] Indeed, one common path to becoming a distributor for a direct-selling company is to first buy the products as a non-distributor end-user. Such use develops familiarity with the products. Although not all non-distributor consumers choose to become distributors, consumers who like the products can then make an informed decision about their interest in joining as a distributor to seek to build a business, as well as to benefit from personal consumption at wholesale prices.

Appendix B: Income Disclosures and Statements About Business Opportunity Value for a Selection of MLMs (Amway, Herbalife, NuSkin)

Amway[44]

Amway's distributors, called "Independent Business Owners" (IBOs) in the U.S., pay a $62.00 annual registration fee to maintain their status as IBOs. The registration agreement must be signed by the distributor to be valid. The "Authorization and Agreement," appearing immediately above the signature, requires registrants to attest that they have read relevant materials disclosing the nature of the business opportunity, the compensation plan, the gross income for active distributors, and the proportion of all distributors who are active (which is disclosed in the online-available Business Reference Guide and Business Overview Brochure, with 53 percent of distributors falling into the "active" category, and "gross income" including retail markups as well as commission income):

"REGISTRANT(S) – I certify that all of the information above is complete and correct, including my sponsoring IBO. I have read and agree to adhere to the terms of this Agreement, including the Amway Terms and Conditions printed on the reverse side (Page 2 of 2). I need only select the Business Services & Support portion of the Amway Registration Package to become an IBO. I certify that in deciding to become an IBO I have relied solely on the earnings representations and information contained in the Plan. I certify that I have received, read, and understood the Amway Business Overview Brochure. I understand that the average monthly Gross Income for 'active' IBOs in the U.S. was $183 in 2013."

On page 2 of this form, the following statements amplify on these provisions:

"You acknowledge that prior to signing this agreement you have received, read and understood a copy of a brochure authorized by Amway for use with Prospects that contains the average profits, earnings, and sales figures and percentages as published by Amway, that you have read and understood the Amway Business Reference Guide including the Plan and the Rules, which are incorporated into this Agreement and made a part of it as if restated in full, as posted on www.amway.com, and that you have read and agree to all terms set forth in this Agreement. You understand that to become an IBO you need only select the Business Services & Support portion of the Amway Registration Package, and that additional products or support items are optional."

[Guidance to distributors presenting the business opportunity to prospects:] "You agree to give all prospective IBOs a copy of a brochure authorized by Amway for use with Prospects that contains the average profits, earnings, and sales figures and percentages as published by Amway and orally inform the Prospect that the brochure contains the average profits, earnings, and sales figures and percentages as published by Amway."

Amway also publishes on its website (www.amway.com) information disclosing the $62.00 registration fee, a money-back guarantee on that fee if the registrant wishes to quit within 90 days, availability of assets to help the new distributor, and information on an incrementally available $99.99 ($111.74 including delivery) "Product Kit" containing $245.00 worth of Amway products (implying that purchase of the Product Kit along with registration fee amounts to a net registration fee of -$71.26).

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[44] See www.amway.com; this information from July 9, 2016.

Herbalife[45]

Registering Herbalife distributors pay an annual fee of either $60.70 or $94.10 (plus tax, shipping, and handling), at their discretion. The lower fee provides registration plus a "Mini Herbalife Member Pack" with sample-sized products; the higher fee provides registration plus a "Full Herbalife Member Pack" with full-sized products. Both also include access to product information and sales training materials provided by Herbalife.

Herbalife promotes the "Gold Standard Guarantee" which includes:
- Low start-up costs (the above fees; no minimum purchases required)
- Money-back guarantee (90-day full refund offered for the cost of the Member Pack if the distributor cancels his/her membership for any reason; 100% refund on unsold products purchased in the prior 12 months and returned to the company, plus shipping costs, if the distributor cancels his/her membership)
- Upfront business opportunity information (Statement of Average Gross Compensation)
- Written acknowledgement (requiring registrant to acknowledge in writing that they are aware of the Gold Standard Guarantees before becoming a distributor).

The Statement of Average Gross Compensation includes a one-page textual statement regarding the reasons for joining Herbalife. It reports that 73 percent "primarily join us to receive a wholesale price on products they and their families enjoy." It states: "Anyone considering an active Distributorship needs to understand the realities of direct selling. It is hard work. There is no shortcut to riches, no guarantee of success." It reports that 80.2 percent of distributors have not sponsored another distributor, calling this population "single-level" distributors: "The economic rewards for single-level Members are the wholesale pricing received on products for consumption by the Member and his or her family as well as the opportunity to retail product to non-Members. Neither of these rewards are payments made by the company and therefore are excluded from this chart." Herbalife's compensation plan does not pay commissions to single-level distributors or on own purchases (the models presented in this paper can easily accommodate this by setting the commission rate to zero). In reporting income information, this document states: "These figures should not be considered as guarantees or projections of your actual compensation or profits. Success with Herbalife results only from successful product sales efforts, which require hard work, diligence, and leadership. Your success will depend upon how effectively you exercise these qualities."

The income disclosure reports that 86 percent of distributors received no payments from Herbalife (commission, bonus) in 2015, although the benefits of discounted price on product purchases and profit on product resale to others were open to them. The tabular information provided is replicated below:

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[45] http://opportunity.herbalife.com/, with clickable links on each webpage to Herbalife's "Statement of Average Gross Compensation Paid by Herbalife to U.S. Members in 2015."

From the "Statement of Average Gross Compensation Paid by Herbalife to U.S. Members in 2015," downloaded from www.herbalife.com on July 4, 2016:

Single-Level Members (No Downline)			
Economic Opportunity	Members*		The economic rewards for single-level Members are the wholesale pricing received on products for consumption by the Member and his or her family as well as the opportunity to retail product to non-Members. Neither of these rewards are payments made by the company and therefore are excluded from this chart.
	Number	%	
• Wholesale price on product purchases • Retail profit on sales to non-Members	437,152	80.2%	

Non-Sales Leaders With a Downline			
Economic Opportunity	Members*		In addition to the economic rewards of the single-level Members above, which are not included in this chart, certain non-Sales Leaders with a downline may be eligible for payments from Herbalife for wholesale commissions on downline product purchases made directly with Herbalife.
	Number	%	
Wholesale price on product purchases Retail profit on sales to non-Members Wholesale profit on purchases by a downline Member	39,240	7.2%	16,730 of the 29,119 eligible Members earned such payments in 2015. The average total payments to the 16,730 Members was (USD) 51.

Sales Leaders With a Downline						
Economic Opportunity	Members*		All Sales Leaders with a Downline			
	Number	%	Average Payments From Herbalife (USD)	Number of Members	% of Total Grouping	Average Gross Payments (USD)
Wholesale price on product purchases Retail profit on sales to non-Members Wholesale profit on purchases by a downline Member Multilevel compensation on downline sales • Royalties • Bonuses	68,768	12.6%	>250,000	187	0.3%	642,279	This chart includes all Commissions, Royalties and Bonuses paid by Herbalife. It does not include amounts earned by Members on their sales of Herbalife® products directly to others.
			100,001-250,000	450	0.7%	147,016
			50,001-100,000	617	0.9%	71,885
			25,001-50,000	1,187	1.7%	35,410
			10,001-25,000	2,084	3.0%	15,445
			5,001-10,000	2,694	3.9%	7,130
			1,001-5,000	11,627	16.9%	2,202
			1-1,000	42,658	62.0%	303
			0	7,264	10.6%	0
			Total	68,768	100.0%	5,272

*40,204 of the 437,152 single-level Members are Sales Leaders without a downline.

Nu Skin[46]

The base registration fee is not reported on Nu Skin's distributor agreement, but the fee is reported as a "non-profit" fee (meaning that the company prices it at cost, rather than seeking to make a corporate profit on registration fees) if the registering distributor buys a "Purchase Product Package."

A registrant agrees that as an independent contractor, s/he will "be paid Bonuses based on purchases and sales and not the number of hours that I work," and "be subject to entrepreneurial risk and responsible for all losses that I incur as a distributor." No minimum purchase requirements are placed on a distributor. A 100 percent refund of the basic registration fee is offered within 30 days of filing the registration agreement, should the distributor wish to terminate his/her relationship with Nu Skin. Unsold, unopened, resalable product can also be returned to Nu Skin by a departing distributor for a 90 percent refund (i.e., a 10 percent restocking fee), with a bonus clawback feature to prevent distributors from benefiting from their or their downline distributors' inventory-loading.

Nu Skin's Distributor Compensation Summary document reports that just under 40 percent of distributors were "active" in 2013, where "active" means a distributor who placed an order for products or services during the most recent three-month period. Thus, just over 60 percent of distributors earned no commissions from Nu Skin; the company notes however that its income figures omit earnings from markups on sales to non-distributor end-users. As with the other companies profiled here, Nu Skin cautions the distributor not to expect a "get rich quick" scheme, comments on the varying reasons for becoming a distributor (not all of which involve income aspirations), and emphasizes that "Generating meaningful compensation as a Distributor requires considerable time, effort, and commitment…. There are no guarantees of financial success."

The company reports the following for earnings of active distributors by level in 2013:

Title	Monthly Average Commission Income, 2013	Annualized Commissions	Average % of Active Distributors in This Category	Average % of Executive-and-above level Distributors
Active Distributor Earning a Check (Non-Executive)	$30.00	$360.00	5.38%	N/A
Qualifying Executive	$86.00	$1,032.00	1.74%	N/A
Provisional Executive	$35.00	$420.00	0.33%	N/A
Executive	$451.00	$5,412.00	4.07%	60.26%
Gold Executive	$887.00	$10,644.00	1.09%	16.13%
Lapis Executive	$1,553.00	$18,636.00	0.77%	11.38%
Ruby Executive	$2,874.00	$34,488.00	0.36%	5.39%
Emerald Executive	$5,196.00	$62,352.00	0.15%	2.24%
Diamond Executive	$10,639.00	$127,668.00	0.12%	1.77%
Blue Diamond Executive	$53,263.00	$639,156.00	0.19%	2.84%

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[46] www.nuskin.com . Resources include the Distributor Agreement and the 2013 Nu Skin Enterprises, Inc. Distributor Compensation Summary, and Nu Skin Policies & Procedures 2011.