Saving Face: A Solution to the Hidden Crisis for Life Insurance Policyholders

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August 21, 2018

Abstract

The total face amount of terminated life insurance in the U.S. amounts to over two trillion dollars per annum. Little known is that, instead of allowing insurance carriers to pocket the premiums paid until termination and avoid the death claim, many policyholders may realize their policies' value through resale to the secondary market, and receive a lump-sum markedly above the surrender value. We demonstrate how the inclusion of a mandated secondary sale provision in a policy contract will affect — and ultimately benefit — the welfare of policyholders without negatively affecting that of insurance companies.

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1 Introduction

Over 33 million life insurance policies have been terminated prematurely[1] each year since 2008, giving rise to a combined face value of $2.5 trillion dollars (Figure 3), roughly equivalent to the real estate market loss through the recent global financial crisis ($2.3 trillion p.a. from 2007 to 2009) (Federal Reserve 2012, 113). While the losses in the housing market have triggered hundreds of academic papers, media firestorms, industry responses, as well as numerous regulatory and policy changes, there has been no such reaction to the apparently commensurate policyholder losses in the life insurance market. Little known to the average person is that the intrinsic value of a life insurance policy can be realized through a secondary sale: a so-called life settlement. The average price for a life insurance policy sold to the secondary market is $340,000,[2] over three times as large as the average American's 401(k) savings ($104,300) (Campbell 2018). The amount policyholders forego in personal wealth through life insurance termination, deliberately or not, is staggering — hundreds of billions of dollars over the past decade alone.

This crisis has been largely hidden from the general public as the scale of the problem is not widely understood. We suggest a simple and low-cost policy mechanism for rectification and demonstrate its positive impact on the utilitarian social welfare. The proposed reform involves mandated offer-for-sale treatment of life insurance policies: whenever a life insurance policy is to be terminated, it would immediately be placed in the secondary market for sale. The new equilibrium would yield more equitable risk transfer and value realization, which could go a long way to prevent the billions of dollars in annual policyholder value currently being misdirected.

The remainder of the paper is structured as follows: Section 2 reviews current practices and issues in the life insurance market; Section 3 proposes a reform to address the issues; Section 4 demonstrates the welfare-enhancing effect of the proposed reform; Section 5 discusses the operationalization of the reform; Section 6 concludes.

2 Current State of the Life Insurance Market

2.1 The secondary market of life insurance

The value of a policy depends on an insured's life expectancy in relation to premium rates. Life settlement investors are interested in policies held by insureds with comparatively short life expectancies. These are typically elderly people with a health impairment. Unlike viatical settlements, which involve terminally ill insureds, life settlements mainly focus on senior insureds: from 2011 to 2016, the insured's average age at settlement date was 76.3. Although smaller-face policies have started to gain traction, due to inefficiency in the market, investors continue to show preference for large-face policies. Over the last five years, the average face amount transacted was as high as $1.9 million with a median of $1 million. Consequently, settled policies mainly tend to originate from California, New York, Florida and Texas, where older, wealthier people are more likely to retire and reside (Blake et al. 2013, 513) (Figure 2). On average, the transaction price is 18% of the policy's face value. Currently, the total face amount of settled policies that are still in force is $100 billion (Roland 2016).

Investors usually have an insured's medical history analyzed before making a purchase. Since medical information for insureds whose policies have been terminated is generally unavailable, it is difficult to empirically assess how many of those policies would have qualified for a secondary sale. The estimated size of the untapped life settlement market is commonly represented by the total face amount of

[1] This includes policies lapsed and surrendered. Source: The U.S. Life industry Briefing book of the SNL financial (S&P Global Market Intelligence).
[2] AAP data.

ordinary life insurance terminated by seniors above 65 (Welcome Funds 2013), which approximates \$148 billion (see Figure 5).[3] If this market potential had been fully realized, the size of the life settlement market would have increased by 50-fold by now.

With roughly \$148 billion of face value eligible for settlement in 2017 (and similar values for other years), how much could the original policyholders have expected to receive through settlement? Using the average empirical "transaction price / face amount" ratio of 18%,[4] we arrive at an estimate of \$26.6 billion. That is to say, had those policyholders sold their policies to life settlement investors instead of terminating them, they would have received an aggregate \$26.6 billion in cash. To put it into perspective, this amount exceeds the drug invoice spending for long-term care and home health care in the U.S. in 2017, which was \$20.6 billion (IQVIA 2018).

Apart from low awareness, another reason for the underutilization of life settlements is the some people's distrust of the industry due to its troubled past. The industry is to some extent still challenged by its legacy issues associated with "STOLIs", or stranger-originated life insurance policies mass produced by life settlement intermediaries and investors in the mid-2000s (Braun et al. 2018). As the industry becomes increasingly regulated, misconducts such as STOLIs are thankfully becoming less common.

However, the strongest headwind at the moment originates from an "unhealthy" pricing dynamic endogenous to the mechanics of the current U.S. life insurance market. The following discussion highlights unsustainable practices in the industry and identifies salient shortcomings.

2.2 Lapse-supported pricing

When carriers employ lapse-supported pricing, they set competitively low premiums to gain market share (Richmond 2012, 661), expecting that they will not have to disburse some of the death benefits. A gain in market share through low premiums is, however, only a short-term win.

The carriers' perspective

Carriers set premiums such that they would at least break even from the transaction, should their assumptions on termination and mortality be accurate. Policy termination impacts carriers to varying degrees depending on insureds' characteristics. Termination on the part of young and healthy insureds with long life expectancies harms carriers, as the latter would ordinarily receive premiums from those insureds for an extended period and pay out death benefits in the distant future. On the other hand, termination from more senior and unhealthy insureds, with short life expectancies, benefits carriers, as they are relieved of the obligation to pay out the death benefit in the near future — significant amounts compared to the foregone premium payments. Consequently, persistency from older or unhealthy insureds, when unanticipated, harms carriers' profitability.

Just as price and demand influence each other in conventional markets, the carriers' premium setting and the insureds' termination behavior reinforce each other: carriers anticipate certain termination patterns among insureds and set the premiums accordingly; the insureds' termination behavior is correspondingly influenced by the insurance premiums. At equilibrium, the insureds' aggregate termination pattern should be in line with the carriers' prediction.

[3] It should be noted that not all policies from insureds above 65 are economically viable as a life settlement, and this results in overestimation. On the other hand, policies from younger insureds and group policies are occasionally also settled, which leads to some underestimation. We suppose those two effects offset each other to some extent, and the estimator's net deviation from reality is insignificant.

[4] Derived from AA-Partners' database.

The current market equilibrium, predicated on this “lapse-supported pricing”, is delicate, and carriers who extensively employ lapse-supported pricing are vulnerable to unanticipated policy persistency. For instance, if, ceteris paribus, there were zero termination (see Table 1), carriers would make a loss from the life insurance business. As described above, carriers’ profitability heavily depends on the termination of insureds with short life expectancies, as they are not financially prepared to disburse death benefits to those insureds’ policies. Termination by these insureds is essentially utilized by carriers to (i) set competitively low premiums to gain market share; and (ii) counterbalance the loss of good risks from their books, due to termination on the part of young and healthy insureds.

Forfeiture-based planning can also be found outside the insurance industry. Airline companies, for example, oversell a flight assuming a certain number of no-shows. While a healthy level of overbooking brings efficiency and profitability, an overly aggressive forfeiture assumption is counter-effective. It upsets those passengers rejected from boarding and damages the airlines’ image and reputation, thus affecting demand.

Similarly, aggressive lapse assumptions in the life insurance industry renders carriers susceptible to unanticipated policy persistency (Bakos and Parankirinathan 2006, 48). Although the primary insurers claim to disregard lapse rates in pricing (Quinn 2008, 750), empirical lapsation still largely affects insurance companies’ profitability. Notably, the adverse selection in life settlements creates an imbalance of lapsation, such that insureds with impaired health and below-average life expectancy (i.e. “bad risks” from the perspective of carrier) are assured to remain in the pool. As the lapse rate of those “bad risks” decreases, carriers receive more of the premiums that would otherwise be discontinued at termination, but pay out higher total benefits that outweigh the increase in premium receipts. Hence the carriers’ net income will turn out to be lower than expected (Figure 4). This decline in net income represents a covert value transfer from policy terminators to carriers. Based on the zero-sum proposition in the insurance industry, policy terminators have surrendered the value of their own assets to “assist” insurance companies in achieving their current level of profitability.

The insureds’ perspective

Lapse-supported pricing leads to systematic problems, notably retrospective premium adjustment, and, ultimately, to skewed peer-subsidization. We can break down policy terminators into those which would end up bringing carriers a cash surplus, and others which would cause a deficit. The former are insureds with a sufficiently long life expectancy at the point of termination, whose expected premium payments would exceed the expected death benefit. The latter, conversely, are insureds with relatively shorter life expectancies, usually the ill and seniors, whose expected premium payments for their remaining life would be insufficient to offset the expected death benefit. In other words, the former’s policies have a negative intrinsic value at termination while the latter a positive one. As established above, the latter outweighs the former from a monetary perspective, and by prematurely terminating their policies that contain a positive value it is the latter insureds who have been the “helping” carriers avoid further losses. Those insureds enable lapse-supported pricing and subsidize other policyholders who pay competitively low premiums.

Peer-subsidizing is a fundamental concept of insurance: through pooling, the fortunate subsidize the unfortunate. With lapse-supported pricing, however, ill and senior policyholders — the unfortunate, who terminate their valuable policies that would otherwise benefit their estate — become the subsidizers (Atmeh 2011, 130–31).

Carriers are often described as money-hungry entities, taking advantage of ill and senior people (see e.g. Bayston 2016), but as a matter of fact, the current skewed subsidization mechanism is culpable.

2.3 Retrospective premium adjustment

Lapse-supported pricing in fact harbors a moral hazard. Carriers are incentivized to set competitively low premiums to attract consumers, as they understand that if need be, they may retrospectively raise premiums afterwards. A moral hazard exists when premium hikes prompt termination on the part of insureds, because they cannot or do not want to pay the higher premiums, which in turn financially benefits the carrier.

Lapse-supported pricing, inter alia, prompts carriers to recoup their losses due to underpricing through retrospective premium adjustment. Insurance companies that did not factor in the effect of the life settlement at pricing would be exposed to unexpected losses. Therefore, insurance companies could try to remedy this ex-post, i.e. by increasing the cost of insurance retrospectively,[5] but would consequently risk lawsuits and reputational damage.

For the entire life insurance industry to operate effectively, it is important that life carriers are sufficiently funded: it would be unreasonable to retain value for policyholders by lowering the carriers' profitability and thus compromising the latter's financial stability. In 2017, U.S. carriers received $138 billion in life insurance premiums and paid out $107 billion in benefits. With $24 billion of operational expenses deducted,[6] the net income amounted to $7 billion. This net income has been at a stable level for the past 5 years and is expected to remain so, absent any drastic market events. However, if the annual $26.7 billion worth of policy value taken away from terminating policyholders were to be returned, carriers would not only have their profit reduced, but they would actually make a loss (Figure 4). As a result, carriers would, justifiably, increase premiums (of newly issued policies) to compensate for the loss incurred by decreased lapsation.

Spontaneous increases in the premiums of in-force policies are already deterring potential life settlement investors. As long as they are able to maintain profitability in their business, life carriers will be reluctant to accept any regulatory changes. However, the currently prevailing myopic lapse-supported pricing scheme is a risky strategy that negatively impacts the stability of the entire life insurance industry, an industry that is indisputably designed to provide security to its policyholders in the first instance.

Longevity is an increasing societal concern: many countries, the U.S. included, are facing the challenge that the growth of their pension funds cannot keep pace with a growing senior population. Ironically, it seems that carriers, who stand to benefit from lengthening life expectancies, also struggle with profitability, demonstrated by the series of premium increases recently conducted. With a lapse assumption de-emphasized in policy pricing and a reduced uncertainty regarding future lapse rates, carriers would focus on accurately assessing life expectancy, which in turn would produce a fairer and more resilient pricing system.

3 Value Recapture

Life insurance is a financial instrument. Just like other financial instruments such as bonds, life insurance' economic value is based on its cash flow profile. As discussed, lapse-supported pricing potentiates unanticipated premium increases and results in unjust wealth redistribution (skewed peer subsidization). The central question, therefore, is how to change the lapse-based status quo, and transform a vicious cycle into a virtuous one that maximizes utilitarian social welfare.

In accordance with Partial Equilibrium Theory, a perfect secondary market is needed to ensure that a policy's price, i.e. its payout to policyholder, is permanently pegged to its economic value. In pursuit

[5] For example, John Hancock recently announced to increase COI "as a result of changes in [their] expectations of [...] lapse experience" (Jeffrey Leonard v. John Hancock 2018, 3).
[6] Data collected from SNL.

of a perfect secondary market, we propose a simple, low-cost policy mechanism for rectification. The proposed intervention — featuring three rules — addresses issues in the market stemming from lapse-supported pricing practices, as well as harnesses untapped potential:

A. It is mandated to place policies up for secondary sale before termination.

B. Policies valued with negative economic value would charge an equivalent amount of surrender penalty when terminated.

C. Premiums of in-force policies may not be raised.

Rule A: Mandated secondary sale

A contractual provision that automatically places a policy in the secondary market when the policy is threatened to be terminated would help policyholders monetize the policy value. With every policy available for secondary sale, carriers make life insurance products more attractive, since policyholders will have their policy value protected. Potential consumers will be more willing to purchase policies knowing that they are given an additional option to forfeit their policies, and that the losses associated with early termination of policies can be mitigated.

Rule B: Surrender penalty for negative economic value

The prior provision would largely benefit policyholders by enabling them to monetize their insurance policy, as long as the policy has a positive economic value. However, it is not sustainable to fully realize the life settlement potential without taking other measures, since that would negatively impact insurers' profitability. As benefits paid to life settlement insureds originate from the insurance pool, measures have to be taken to deter policyholders from terminating an insurance contract when the policy has a negative value. Therefore we suggest that when policies have a negative economic value, the surrender penalty is pegged to that value.

Rule C: Prohibition of retrospective premium increase

Our first suggested provision will only work if premiums of in-force policies are not increased. People purchase insurance policies to gain certainty in undesired situations. However, they are often unaware of, or underestimate, the risk of a premium increase. The benefits a premium increase brings to carriers are twofold: (i) their revenue increases; (ii) their costs decrease, because they expect to pay lower death benefits due to increased lapsation. For those forced to terminate their policies due to a rate hike ("shock lapse"), all the premiums they have paid to date are lost, with no opportunity of any future benefit.

A provision to prohibit premium increases of in-force policies is especially critical in the context of life settlements. The last couple of years have witnessed multiple premium raise incidents initiated by leading insurance companies such as AXA, Transamerica Lincoln National and Voya.[7] Most affected policies are large-face and have been issued to senior insureds: precisely the type of policies sought after by investors. Raises ranged between 5% and an incredible 600%, causing tremendous losses in life settlement investments. This demonstrates the necessity of this provision: if it is permissible to raise premiums of in-force policies, carriers can target policy groups most commonly seen in the life settlement market, and make those policies costlier, and even uneconomical, to keep in force. This would strangle the very interest in investing in life settlements, as a policy's value would completely depend on such maneuvers, leaving policyholders' interest unprotected.

[7] see https://www.forbes.com/sites/nextavenue/2017/04/21/a-problem-with-life-insurance-thats-universal/

We are, however, not opposed to premium raises in newly issued policies. In fact, we encourage carriers to set premiums appropriately at policy issuance. This is discussed later in this article in more detail.

4 Impact of Mandated Secondary Sale (MSS)

Next, we analyze the impact of the proposed regime, mandated secondary sale with variable surrender penalty ("MSS"), in a theoretical framework. To simplify the theoretical demonstration, we apply the following set of assumptions

i) The primary insurance market, where insurance carriers issue policies to insureds, is always perfectly competitive.

ii) With MSS, the secondary market of life insurance is perfectly competitive.

iii) Insurance carriers and investors are risk neutral.

iv) Information on insureds' health status is symmetrical, i.e. every market participant holds the same view on an insured's mortality profile.

v) Markets are frictionless, i.e. there is no transaction costs, sales provisions, taxes etc.

Let PP denote policy price. PP has the following meanings:

If the insured wants to forfeit an owned policy by a) terminating the policy with the carrier, then PP represents the surrender value SV that the insured obtains from the carrier; b) selling the policy to an investor in the secondary market, then PP represents the highest price achievable to the insured.

Let Δ denote the *price-markup*,[8] i.e. the difference between PP and the policy's economic value EV:

$$\Delta := PP - EV \tag{1}$$

At $t = 0$ when an insured enters an insurance contract with a carrier, Equation $PP_0 = EV_0$ always holds due to Assumption i). In reality, carriers usually do not charge insureds anything other than premiums, which means $PP_0 = 0$. In that case, perfect competition among carriers leads to fair pricing of a policy, i.e., $EV_0 = PP_0 = 0$.[9]

Based on Assumption ii), the perfect competition in the secondary market induced by MSS ensures $PP \equiv EV$, i.e. insureds can always monetize the economic value of a policy when they forfeit it. Therefore,

$$\Delta^{MSS} \equiv 0$$

4.1 Effect on pricing

General setting

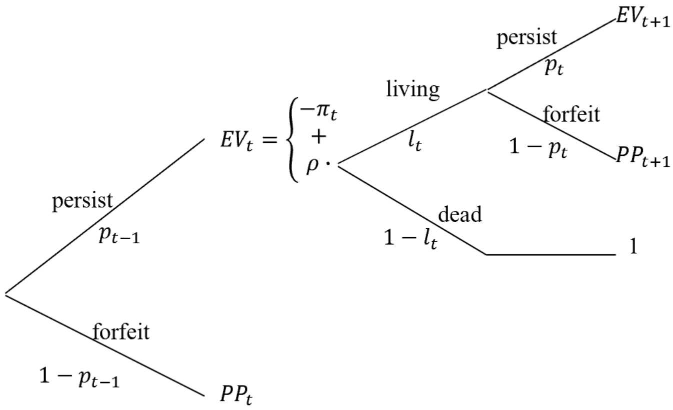
Define an insured cohort as a group of insureds with the same age who share the same mortality profile. A cohort is therefore homogeneous and insureds in a cohort are issued identical insurance contracts at the same time. The value of a policy from a cohort is dependent on the following components:

[8] Despite the name of the variable, Δ can be positive, zero, or negative ("price-markdown").
[9] Similar to the equality of two legs of a fairly priced swap.

1. if the policy is forfeited, then the policyholder's payoff is PP.
2. if the policy is kept in force, then the policyholder retains the economic value of the policy EV. To persist in the policy, the insured pays the premium π, and expects a payoff that considers:
   a. the insured dies within the next period, and the policy pays out 1;
   b. the insured survives the next period, and the policy's payoff depends on whether the policy will be forfeited or kept in force.

Assume cash flow only occurs at period start, i.e. at $t = 0, 1, 2, ...$, but not between periods. The tree plot below illustrates the average payoff of policies from a cohort:

Figure 1: Probability tree



where

$\{\pi_t\}_{t\in\mathbb{N}_0}$: a policy's premium amount at time t. Premiums are paid in advance, i.e. premium payment at t guarantees coverage between t and $t + 1$.

$\{l_t\}_{t\in\mathbb{N}_0}$: survival rate between time t and $t + 1$.

$\{p_t\}_{t\in\mathbb{N}_0}$: persistency rate between time t and $t + 1$.

We can thus express EV_t in a recursive manner:

$$EV_t = -\pi_t + \rho\Big\{l_t\Big[p_t EV_{t+1} + (1 - p_t)PP_{t+1}\Big] + (1 - l_t)\Big\}$$

Plugging $PP_{t+1} = EV_{t+1} + \Delta_{t+1}$, as derived from Equation 1, into the equation above:

$$\begin{aligned} EV_t &= -\pi_t + \rho\Big\{l_t\Big[p_t EV_{t+1} + (1 - p_t)(EV_{t+1} + \Delta_{t+1})\Big] + (1 - l_t)\Big\} \\ &= \rho\Big\{l_t\Big[EV_{t+1} + (1 - p_t)\Delta_{t+1}\Big] + (1 - l_t)\Big\} - \pi_t \end{aligned} \tag{2}$$

We can also transform Equation 2 into a non-recursive format (transformation see Appendix):

$$EV_t = \sum_{j=t}^{\infty} \frac{\Big\{\rho\Big[l_j(1 - p_j)\Delta_{j+1} + (1 - l_j)\Big] - \pi_t\Big\}\rho^{j-t}\prod_{i=t}^{j} l_i}{l_j} \tag{3}$$

Under MSS

By plugging $\Delta_t^{MSS} = 0, \forall t$ into Equation 3, we can simplify the formula for EV_t^{MSS} :

$$EV_t^{MSS} = \sum_{j=t}^{\infty} \frac{\left[\rho(1-l_j) - \pi_t^{MSS}\right]\rho^{j-t}\prod_{i=t}^{j} l_i}{l_j} \tag{4}$$

Carriers and insureds have the exact inverse positions on a policy: a carrier's profit from a policy is the negative value of the policy's economic value ($-EV_t$). To ensure that MSS does not affect its profitability, a carrier can issue policies with premiums adjusted such that the policies' economic value estimated at issuance remain the same with or without MSS:

$$\begin{aligned}
&EV_0^{MSS} = EV_0 \\
\Rightarrow &\sum_{j=0}^{\infty} \frac{\left[\rho(1-l_j) - \pi_j^{MSS}\right]\rho^{j-t}\prod_{i=t}^{j} l_i}{l_j} = \\
&\sum_{j=0}^{\infty} \frac{\left\{\rho\left[l_j(1-p_j)\Delta_{j+1} + (1-l_j)\right] - \pi_j\right\}\rho^{j-t}\prod_{i=t}^{j} l_i}{l_j}
\end{aligned}$$

One possible solution would be:

$$\begin{aligned}
\forall t, \pi_t^{MSS} &= \pi_t - \rho l_t(1-p_t)\Delta_{t+1} \\
&\begin{cases} < \pi_t, & \Delta_{t+1} > 0 \\ = \pi_t, & \Delta_{t+1} = 0 \\ > \pi_t, & \Delta_{t+1} < 0 \end{cases}
\end{aligned}$$

Absent MSS, carriers are the monopsonistic buyer of policies, and policy price is its surrender value SV, i.e. $\Delta_{t+1} = SV_{t+1} - EV_{t+1}$. If $SV_{t+1} > EV_{t+1}$, then MSS-based premiums π_t^{MSS} would be adjusted lower than current lapse-based premium π_t; If $SV_{t+1} < EV_{t+1}$, then π_t^{MSS} would be adjusted higher than premium π_t.

MSS enables full monetization of policies, and does not alter a policy's economic value despite the adjustment in dollar premiums. Therefore, in line with Doherty, O'Dea, and Singer (2004, 115), we believe demand will not decrease because of MSS.

MSS also frees carriers from making assumptions on lapsation (no persistancy rates included in Equation 4). This would simplify the insurance pricing approach for carriers. With the sole focus on predicting mortality trends, carriers would be more likely to correctly price policies up front, making retrospective premium adjustment due to erroneous lapse assumptions unnecessary.

4.2 Effect on welfare

General setting

Let u denote the policy's utility to its insured, measured in monetary units. At purchase, a policy's utility to an insured u is no less than the policy price PP, such that the insured obtains a positive surplus ($u - PP \geq 0$) by acquiring the policy. The policy's surrender value SV must be no greater than PP ($SV \leq PP$); otherwise insureds can arbitrage by acquiring a policy and forfeiting immediately. Naturally, no insured would forfeit their policy at issue date.

With the passage of time, policies' economic value and utility to insureds change. For some insureds, keeping the policy in force remains worthwhile. For others, the opportunity cost becomes too high, and the policy's utility falls below the surrender value. Consequently, those insureds will choose to terminate the contract.

Assume that both carriers and investors are risk neutral with no non-monetary utility, hence their policy's utility is based solely on the policy's economic value EV. Table 5 summarizes the utility of various parties associated with the issuance of a policy.[10]

The carrier's and investor's utility, depending on whether or not the insured opts to keep a policy in force, is slightly more complex. First, we investigate a carrier's and investor's utility separately, according to the insured's mode of forfeiture in Table 6 Panel A, and then we present the utility overview in Table 6 Panel B.

A policy's utility u is positively related to its economic value EV, but they are not necessarily equal. Define u^e as the utility of a policy beyond its economic value:

$$u^e := u - EV \tag{5}$$

u^e denotes an insured's personal perspective on the policy's *excess utility*,[11], the non-monetary part of the policy utility. The value of u^e depends on the insured's personal situation. Factors that can influence u^e include, but are not limited to, the insured's liquidity situation and bequest motive. Ceteris paribus, u^e will be higher if the insured has adequate cash, and lower if the insured experiences a liquidity crisis and the insurance becomes less affordable; u^e will be lower if the insured's beneficiary becomes financially independent, and conversely higher if the beneficiary is financially dependent and the insured's bequest motive is high.

Based on Equation 1 and Equation 5:

$$PP - u = \Delta - u^e \tag{6}$$

We have the following lemma:

Lemma 1. *Δ and u^e defined as above. At the time of issuance of a policy*
1. if $u^e > \Delta$, an insured acquires the policy;
2. if $u^e < \Delta$, an insured does not acquire the policy;
3. if $u^e = \Delta$, an insured is indifferent whether or not to acquire the policy.
If the policy is owned by an insured, then
1. if $u^e > \Delta$, an insured keeps the policy;
2. if $u^e < \Delta$, an insured forfeits the policy;
3. if $u^e = \Delta$, an insured is indifferent with regard to keeping or disposing of the policy.

The proof is self-explanatory.

[10] Policyholders can in theory also purchase policies back from investors.
[11] Similar to Δ, despite its name, u^e can be positive, zero, or negative ("deficient utility").

Supply and demand of policies

Since a cohort is per our definition homogeneous in mortality profile, each policy in a cohort has the same economic value EV in the actuarial sense, and hence can be forfeited for the same price PP. Therefore, given Equation 1, every policy also gets the same price-markup Δ.

However, the excess utility of each policy in a cohort can vary. Let m denote the total number of policies in a cohort and $\{u_k^e\}_{k=1,2,..,m}$ the excess utility of the policies. $F(u^e)$ denotes the cumulative frequency function of $\{u_k^e\}_{k=1,2,..,m}$, and can be expressed as:

$$F(u^e) = \sum_{k=1}^{m} \mathbb{1}_{u_k^e \leq u^e} \tag{7}$$

where $\mathbb{1}_A$ is an indicator function defined as:

$$\mathbb{1}_A = \begin{cases} 1, & \text{if } A \text{ is true} \\ 0 & \text{if } A \text{ is false} \end{cases}$$

Based on Equation 6 and Equation 7, the surplus for the whole insured cohort, denoted by IdS, can be expressed as:

$$IdS = \sum_{k=1}^{m} (\Delta - u_k^e) \mathbb{1}_{u_k^e \leq \Delta} = \int_{-\infty}^{\Delta} F(u^e) dx \tag{8}$$

The total number of policies that will be forfeited can be expressed as:

$$\sum_{k=1}^{m} \mathbb{1}_{u_k^e \leq \Delta} = F(\Delta) \tag{9}$$

Let Q denote *policy supply*: the total amount of policies that an insured cohort forfeits. In line with the supply-demand demonstration for conventional commodities, curve $F^{-1}(Q)$ drawn on a $Q \rightarrow u^e$ plane (Figures 6-8) represents the marginal cost of the cohort's policy supply at supply volume Q. IdS equals the area bounded by lines $Q = 0$, $u^e = \Delta$ and curve $u^e = F^{-1}(Q)$. The "/"-shaded area in Figures 6-8 represents the value of IdS in case of $\Delta \neq 0$.

Unlike insureds, policy buyers who take over insureds' policies are only concerned with the economic value. Therefore, the surplus generated by each policy acquired equals $EV - PP$ ($= -\Delta$, based on Equation 1). Given that the number of policies forfeited by insureds is $F(\Delta)$, the total surplus of buyers (including carrier and investor), denoted by BrS, obtained by taking over those policies, can be expressed as:

$$BrS = -\Delta F(\Delta) \tag{10}$$

The marginal cost of acquiring an additional unit of a policy equals PP, and the *net* marginal cost Δ. Hence the *policy demand* curve is $u^e = \Delta$.

Utilitarian social welfare without MSS

Without the enforcement of MSS, Δ can deviate from 0. Specifically, in the complete absence of the secondary market, an insured who wishes to terminate an insurance contract has to do so by surrendering the policy to the carrier. The carrier has the monopsony power (Doherty and Singer 2003, 471; Kohli 2006, 112), and can set any level of surrender value SV for "buying back" a policy. Since the carrier is the sole buyer of policies, SV is the highest and only price available for insureds ($PP = SV$), and buyers' surplus BrS is the carrier surplus. The carrier's payoff arising from policy termination is two-fold: on the one hand, the carrier pays the terminating insureds each the amount of SV; on the other hand, the carrier is relieved of the insurance liability for each policy terminated, which is equivalent to the economic value EV of the policy.

Depending on the value of Δ, BrS can be negative (red-"\"-shaded), zero, or positive (black-"\"-shaded). The absolute value of BrS represents the area of the rectangle bounded by lines $Q = 0$, $u^e = \Delta$, $u^e = 0$ and $Q = F(\Delta)$ (Figures 6-8).

Figure 6 illustrates a case with $\Delta > 0$, where the carrier loses from the cohort's forfeiture of policies. This type of cohort typically consists of insureds who have developed little or no health impairment since policy issuance and have longer life expectancies than estimated at policy underwriting. Therefore, those insureds are expected to pay premiums, should their policies persist, for a long time before a death claim, and their policies often have an $EV < 0$. In that case, if the carrier does not charge a surrender penalty or charges only an inadequate surrender penalty such that $SV - EV = \Delta > 0$ (note that $PP = SV$), the carrier would suffer a negative surplus ("deficit") from the loss of good risks from their book.

This undesired termination, however, is not necessarily detrimental to the carrier. Should the carrier have made accurate assumptions on termination ex ante, the deficit caused by terminating insureds would have been anticipated, and surplus would have been gained from other insured cohorts that can make up this deficit. Figure 7 illustrates a case with $\Delta < 0$, where the carrier gains from the cohort's forfeiture of policies. This type of cohort consists of insureds whose health is more impaired and their life expectancies shorter. In this case, if the carrier offers only an inadequate surrender value such that $SV - EV = \Delta < 0$ (note that $PP = SV$), the carrier would benefit from policy termination, for it can now shed the liability of EV at a lower price, namely SV.

Figure 8 highlights an extreme scenario that can be observed in cohorts of terminally ill insureds. Due to an extremely short LE, those insureds' policies have a very high EV. In that case, if the surrender value SV offered by the carrier does not reflect the high EV at all, such that Δ is significantly below zero, then no insured in the cohort is willing to terminate the policy. They would prefer keeping their policy in force, knowing that their beneficiaries will receive the death benefit in short order.

The insured cohort surplus is enhanced from zero to a significant amount through MSS. However, MSS does not change the carrier surplus in this particular case, which equals zero with and without MSS. This likely explains the widespread implementation of a free accelerated death benefit (ADB) rider for the terminally ill: the carrier loses nothing, and instead, gains goodwill for enhancing the insureds' welfare.

Utilitarian social welfare with MSS

Plugging $\Delta = 0$ into Equations 8 and 10,

$$IdS^{\text{MSS}} = \int_{-\infty}^{0} F(u^e)du^e \tag{11}$$

$$BrS^{\text{MSS}} = 0 \tag{12}$$

The grey-shaded area in Figures 6-8 represents the value of IdS^{MSS}. BrS^{MSS}, sum of the buyer's (carrier's and investor's) surplus, would be pushed to zero, as demonstrated in Equation 12.

With MSS, if a policy $EV < 0$, the carrier penalizes the policy termination with an amount up to the absolute value of EV. Thus, the carrier is able, and has the incentive, to set $SV \leq EV$: the carrier surplus is always greater when $SV \leq EV$ than when $SV > EV$.

If the carrier wants to compete with secondary market buyers and buy back policies, it needs to set $SV = EV$, i.e. $\Delta = 0$. If the carrier sets $SV < EV$, then insureds will sell their policies in the secondary market (Doherty and Singer 2003, 473–74) for a price of EV rather than forfeiting for a price of SV. From the carrier's perspective, the policies are kept in force, hence zero surplus. After being purchased by an investor, a policy is expected to be kept in force until maturity. This is because an investor would only terminate a policy if the surrender value is greater than the economic value, and, as discussed, carriers would not allow that. Therefore, the expected net liability the carrier assumes for the policy is EV. For the carrier, this is no different than granting the insured a surrender value of EV right away.

The welfare impact of MSS on insureds and the carrier varies across cohorts. With a healthy cohort as illustrated in Figure 6, through a decrease of Δ from positive to zero, insurance persistency is increased and carrier surplus is increased from negative to zero, whereas insured surplus is decreased. With an unhealthy cohort as illustrated in Figure 7, through an increase of Δ from negative to zero, insurance forfeiture is decreased, carrier surplus is decreased from positive to zero, and the insured surplus is increased.

To summarize, in the case of absent MSS, the carrier gains from the unhealthy terminators and loses from the healthy terminators. Even if the carrier ultimately breaks even, absent MSS, those fortunate enough to maintain good health are additionally advantaged as they are subsidized by the unfortunate. MSS redistributes wealth and reverses this dynamic. More importantly, no matter with which cohort, MSS always enhances the total welfare of all insurance market participants through the retention of the deadweight loss. Combining Equations 8, 10, 11 and 12, the deadweight loss caused by not implementing MSS is:

$$\begin{aligned}
&(IdS^{\text{MSS}} - IdS) + (BrS^{\text{MSS}} - BrS) \\
=&\left[\int_{-\infty}^{0} F(u^e)du^e - \int_{-\infty}^{\Delta} F(u^e)du^e\right] + \left[\Delta \cdot F(\Delta)\right] \\
=&\int_{\Delta}^{0} F(u^e)du^e + \Delta \cdot F(\Delta) \\
=&\int_{\Delta}^{0} \left[F(u^e) - F(\Delta)\right]du^e \\
\geq& 0 \qquad \because F(u^e) \text{ is monotonically increasing}
\end{aligned} \tag{13}$$

It is implicitly assumed that MSS alone does not engender any factor that changes u^e: if all external conditions hold, then u's change will be fully and solely reflected by EV's change, and u^e will remain the same.

MSS impact on policy utility throughout time

The above comparison only suggests that, with regard to social welfare, MSS is more Pareto-efficient than the status quo at any given point in time, all other things being equal. It is, however, noteworthy that some policies' forfeiture is postponed due to MSS while others are accelerated. That is to say, MSS causes some surplus to materialize earlier, and some later, compared to the general setting. Therefore, we need a measurement to compare the welfare impact of MSS throughout time.

From Tables 5 and 6 at any point of time, the total utility a policy brings to society (insured + carrier + investor) equals u^e ($u^e = u - PP$), whether the policy is being kept in force or at the point of being acquired by the insured. This can be intuitively explained by the zero-sum nature of insurance from a purely economic perspective: wealth is transferred between individual insureds and carriers through life insurance, but not generated. Therefore, the economic gain and loss of insurance participants (insured + carrier + investor) cancel out eventually, and the only value that insurance adds to society is through the policies' utility beyond their economic value, i.e. policies' excess utility u^e as defined in Equation 5.

Clearly, u^e is only meaningful when a policy is owned by an insured. From Lemma 1 we know that a policy will only be owned by an insured if $u^e > \Delta$. Therefore, a policy's total utility to society throughout time, denoted by U, can be expressed as:[12]

$$U = \int_0^\infty \rho(t) u^e(t) \mathbb{1}_{u^e(t) > \Delta(t)} dt \tag{14}$$

where $\rho(t)$, $u^e(t)$ and $\Delta(t)$ are continuous time series, denoting the discount factor, the policy's excess utility, and the policy's price-markup at time t, respectively.

Since $\Delta(t) \equiv 0$ with MSS, the policy's total utility U^{MSS} is hence:

$$U^{\text{MSS}} = \int_0^\infty \rho(t) u^e(t) \mathbb{1}_{u^e(t) > 0} dt \tag{15}$$

In Figure 9 we illustrate a time series of a policy's discounted excess utility $\rho(t)u^e(t)$. With MSS, $\Delta \equiv 0$ and the policy is forfeited at time t_6 where $u^e(t_6)$ drops below 0, and repurchased at t_8 when $u^e(t_8)$ rebounds to 0. As a result, the value of U, the policy's total utility to society throughout time, equals the area A+B+D+E.

Absent MSS, the policy will not necessarily be forfeited at time t_6. If the forfeiture occurs at t_3, implying $\Delta(t_1) > 0$, U equals the area of A. In connection with Figure 6, the insured often belongs to a healthy cohort, where MSS would prolong the insurance persistency until t_6, and additional positive utility equal to area B would materialize.

If the forfeiture occurs at t_{11}, U equals the area of A+B-C+D. In conjunction with Figure 7, the insured is typically part of an unhealthy cohort, and MSS would advance the policy forfeiture to t_6, avoiding the disutility of the policy equal to area C.

With Equations 14 and 15, the deadweight loss due to the non-existence of MSS can be calculated as:

$$\begin{aligned} U^{\text{MSS}} - U &= \int_0^\infty \rho(t) u^e(t) \mathbb{1}_{u^e(t) > 0} dt - \int_0^\infty \rho(t) u^e(t) \mathbb{1}_{u^e(t) > \Delta(t)} dt \\ &= \int_0^\infty \rho(t) u^e(t) (\mathbb{1}_{u^e(t) > 0} - \mathbb{1}_{u^e(t) > \Delta(t)}) dt \\ &= \int_0^\infty \rho(t) u^e(t) \mathbb{1}_{0 < u^e(t) \leq \Delta(t)} dt - \int_0^\infty \rho(t) u^e(t) \mathbb{1}_{\Delta(t) < u^e(t) \leq 0} dt \\ &\geq 0 \end{aligned} \tag{16}$$

Given that the insurance demand and economic value will remain stable, the profit a carrier expects from an insurance business line will be little altered via MSS. Therefore, the deadweight loss that will be avoided through MSS will, in a large part, benefit the insureds.

[12]Note that the policy does not have to be continuously in force: as long as $u^e(t) > \Delta(t)$, an insured will keep the policy in force; the insured will forfeit the policy when $u^e(t)$ drops below $\Delta(t)$ and then repurchase a "make-up" policy when $u^e(t)$ surpasses $\Delta(t)$ again.

Moreover, MSS corrects the existing skewness in peer-subsidization via adjustment in welfare distribution. MSS essentially reduces the welfare surplus of healthy people and increases that of unhealthy people, making life insurance regain its original purpose: the fortunate subsidizing the unfortunate.

5 Further Economic Contributions

5.1 Surrender penalty reserve

To ensure just peer-subsidization, it is critical to have a high persistency rate in young and healthy insureds. MSS suggests this can be achieved by having every policy sellable, even if it has a negative economic value. This would imply that insureds get charged if at termination the value of their policy is deemed negative. For those insureds, this event increases termination cost, reduces their surplus obtained from termination, and hence deters them from early termination.

There are several ways to guarantee that insureds, in the case of a negative economic value, do not walk away from the insurance contract without paying. Carriers with a rigorous credit checking system can charge a surrender penalty, similar to the existing practice[13], simply through direct debit. For carriers averse or susceptible to credit risk, a surrender penalty reserve is one possible solution to cover the carriers' loss incurred by an early termination.

The reserve is saved in the insureds' cash account in order to accumulate interest. The money in the reserve belongs to insureds but is not at their disposal. It is held by the carrier, and can only be fully or partially released to insureds, or used to cover insured's premium payment if there is evidence for an appreciation of their policies' economic value resulting from, e.g. an exacerbated health situation.

The surrender penalty reserve can be built via deposit in a cash account. The carrier can contractually enforce deposit into the insureds' cash account to gradually build up the reserve, or take a sufficient deposit up-front, or, in its extreme form, use the format of a "single premium insurance" (Gatzert, Hoermann, and Schmeiser 2009, 889) that secures enough funds in the penalty reserve. The practice resembles the existing front-loading technique widely employed by carriers. Front-loading premiums are designed to protect carriers against reclassification risk. A liquid and open secondary market eases policy trading, exposing carriers to higher reclassification risk. Enforced security deposit is a variation of "front-loading" scheme for the protection of carriers.

At policy termination, should the policy have a negative economic value $EV < 0$, the amount of the surrender penalty reserve that exceeds the actual surrender penalty equal to $|EV|$ will be refunded to the insured. Should the policy have a positive economic value ($EV > 0$), the penalty reserve will be fully returned. The money from the reserve that is returned to the policyholder is usually referred to as the "cash value" of a policy. Note that from beginning to end, the owner of a policy's cash value is the policyholder, not the carrier, and the amount of the "cash value" is largely influenced by the money deposited in the cash account by the policyholder, either voluntarily (to benefit from tax deferral), or contractually demanded by the carrier (for potential surrender penalty deduction).

Demand effects

In the previous chapter we suggest that under certain assumptions MSS does not necessarily change consumers' demand for life insurance, but we do not take into account the potential effect of an up-front deposit on demand. A deposit can, in fact, affect demand in several ways.

For consumers who lack liquidity, a deposit may add to the cash drain and deter them from purchasing a policy (see e.g. Cowley and Cummins 2005, 202; and Daily, Hendel, and Lizzeri 2008, 151–52). A

[13] See Koutnik (2013, 919–20) and Gatzert (2009, 145) for the existing practice of surrender penalty.

deposit, however, also has upsides. Firstly, some consumers are willing to use a cash account for deferral of income tax (Gelfond 2009, 84; Doherty, O'Dea, and Singer 2004, 111). Secondly, the idea can block "freeloaders" with no strong insurance desire.[14] They may sign an insurance contract when there is little or no premium charge at the beginning, and terminate as soon as the low premium period ends. Those consumers are likely to be attracted by a "premium financing" scheme with a couple of years of "free coverage" after issuance. Due to their low persistency, those insureds would not be profitable for carriers but instead impose operating costs. Underestimation of those insureds' termination rate would cause policies to be underpriced.

Economic analogies

Note that the surrender penalty reserve is essentially a down payment, or a security deposit. It is to be differentiated from a "fee": the former merely serves to cover contingent charges, while the latter is a definite charge. This penalty reserve is loosely analogous to a hotel room deposit: a deposit deters guests who seek to get away from paying what they have consumed or damaged; for those who have no problem of paying for what they get, a deposit should not matter. The difference between the two is that, hotels' invoicing guests for their consumption upon checkout is retrospective; whereas carriers' penalizing insureds for what they would spend in the future, i.e. the policy's economic value, is prospective.

The way a surrender penalty works can also be compared to margin for future contracts. The initial futures margin is the counterpart of a "security deposit" in a penalty reserve: both referring to the amount required to enter a contract. The call for more deposit and the release of partial or full deposit is equivalent to margin maintenance in the context of future contracts.

5.2 Carrier buy-back

Carriers can compete against life settlement investors by offering a competitive surrender value. Carriers' direct participation in secondary sale would increase the transaction efficiency in the market. Furthermore, consumers' interest would be better served as they would receive competitive bids from their carrier as well as from life settlement investors. It also provides consumers some leeway by keeping the existing forfeiture option on the table: if they are uncomfortable with the idea of having their life insurance policy owned by an unknown investor, they can always choose to sell the policy to their initial insurance carrier.

Carriers might prefer buying back a policy rather than having it owned by an investor, since an in-force policy also incurs operational costs to them. Due to investors' disadvantages compared with carriers, the latter's active participation in the secondary sale might discourage the former's participation, resulting in a secondary market with carriers as the majority buyers. When internalizing a life settlement, carriers have a cost advantage over third-party policy buyers because carriers can simply retire a policy without having to maintain it. In contrast, if owned by an investor, a policy is kept in force and the servicing fee (e.g. tracking cost) that it incurs needs to be considered.

Evans, Russell, and Sager (2013, 116) suggest a contractual provision that gives carriers the right of first refusal to match any viable life settlement offer. This would give carriers an additional second-mover advantage. Such a provision could, however, jeopardize market competition. While carriers' participation in life settlement is not prohibited, the norm is that they compete fairly with other life settlement buyers. In addition, carriers cannot disadvantage life settlement investors by simply offering a matching bid right before life settlement providers are about to close a deal. The life settlement business would no longer exist if buyers went through all the effort of pricing policies,

[14]For example, they might be risk tolerant or have no bequest motive.

only to have carriers secure them at the last minute. Such an attempt to undermine a life settlement transaction was conducted by insurer John Hancock. Coventry First LLC, the life settlement buyer in the particular case in which Hancock interfered, filed a complaint against the insurer (Hersch 2011). The case was settled in the end with John Hancock paying $2M to Coventry (Horowitz 2013), sending a pro-competitive signal. Such development in the life insurance industry, incidentally, aligns with this paper's proposed reform.

With MSS, even when carriers become the frequent policy buyer, they do not process the monopsony power, because the pure existence of an open and free market deters carriers from setting excessively low surrender values. If a carrier decides to compete against life settlement investors, it has to strategically adjust the surrender value of a policy in close proximity to its fair market price, otherwise investors will return. That is to say, investors will only be edged out if the surrender value offered by carriers is so high that competing becomes futile. Therefore, MSS wields the autonomy of a free and competitive market to propel the monetization of policies' economic value and to accelerate the materialization of policies' full utility.

5.3 Accelerated death benefit

Carrier buy-back is not an entirely new concept. Many carriers offer accelerated death benefits for the terminally ill, who can cash out on a slightly discounted death benefit, to fund their treatment.

To date, most life insurance companies offer some form of accelerated death benefit (ADB) options: as a stand-alone insurance product, as a rider attached to a life insurance, or directly embedded in the policy contract. There are several ways for a carrier to pay out ADB. For terminal illness ADB, the NAIC model act requires carriers to provide a lump sum option. The lump sum payment can be in the form of (i) a pre-specified portion of the death benefit, (ii) the total death benefit discounted, sometimes actuarially, to the present value according to insureds' life expectancy; or (iii) a lien against the death benefit (Spurrier 1997, 810; Schmidt 1997, 107). Note that (ii) works most similar to a life settlement from the perspective of an insured, whereas (iii) resembles a life settlement from the perspective of a carrier. The carrier continues to receive premiums until the insured's death and is still liable to pay death benefit, with policy lien deducted, at the death event.

The applicability of various ADB products differ. The ADBs for terminal illness apply to insureds with a life expectancy of no longer than 12 months (Perez 2002, 437; Gatzert, Hoermann, and Schmeiser 2009, 905). This offer is often free and included as a default provision in a life insurance contract. With this option, a carrier would maximally lose from each ADB claim a one-year premium and the one-year time value of the death benefit; without this option, the insured by default must pay the premium during the last year of his/her life so that his/her beneficiary could claim the death benefit after his/her passing. Not only is the financial loss insignificant, but also infrequent given the low prevalence of terminal illness. In fact, carriers can even benefit from the inclusion of this option, since it gives insureds flexibility which creates demand, and presents a caring image which enhances a carrier's PR. Therefore, most carriers are willing to offer the ADB for terminal illness option free of charge.

ADB also exists for chronic or critical illness, sometimes also referred to as long-term care benefit rider. Unlike ADB for terminal illness,[15] these riders are predominantly subject to additional premium charges.[16]

The idea of accelerated death benefit (ADB) originated in the 1980s during the onset of the HIV/AIDS epidemic, the same event that triggered the advent of the viatical settlement market (Spurrier 1997, 808). As more and more carriers adopted free ADB for the terminally ill, viatical settlements

[15]E.g. Accelerated Death Benefit Rider of William Penn, Terminal Illness Death Benefit Advance Rider of Principal Life.

[16]E.g. Lincoln LifeEnhance Accelerated Benefits Rider of Lincoln, Long-Term Care ServicesSM Rider of AXA.

simultaneously became rarer. This phenomenon demonstrates that carriers have an edge when competing against secondary market investors: between accelerating death benefit through the carrier and settlement in the secondary market, insureds seem to prefer the former, possibly because they have more trust in their carrier and do not want the added complication of introducing a third party. Consequently, viatical settlements evolved into life settlements, comprising primarily senior insureds with milder health impairments, while accelerated death benefits continue to focus on terminally ill insureds.

To date, ADB remains restricted to insureds with severe illness (Evans, Russell, and Sager 2013, 108). Expanding the applicability of ADB would certainly benefit a larger scope of insureds even without the assistance of the secondary market. So why would we suggest implementing mandated secondary sale, instead of just expanding the applicability of accelerated death benefit? The existence of the secondary market enhances market competition, gives consumers more options, and encourages carriers to devise products that can benefit consumers to the greatest extent: the coexistence of the viatical settlements market and ADB for terminally ill have ensured that the latter is a standard byproduct of life insurance with little or no surcharge.

5.4 Regulation

Officially legalized in 1911,[17] the life settlement market has become healthier and more regulated with successive legislation. Realizing the benefit of life settlement, many states started to adopt laws that would indirectly support the market. For example, Georgia forbids carriers from penalizing insurance agents for assisting policyholders to lawfully secure policy benefits.[18] This counteracts the condition of consumers being uninformed of life settlement terms due to pressure exerted by the insurance carrier on their agent. Florida stipulates that carriers suggest policyholders consult professionals before making a change to their policy.[19] This law helps policyholders be aware of the life settlement option. California stipulates that carriers should not "make any false or misleading statement for the purpose of dissuading an owner or insured from a lawful life settlement contract" or "unreasonably delay effecting change of ownership or beneficiary with any life settlement contract lawfully entered into in this state or with a resident of this state."[20]

Mandating a secondary sale, we believe, is naturally the next step for regulators to generally protect consumers. Furthermore, the regime will accelerate the prospect of the entire insurance market reaching a new and more sustainable equilibrium.

5.5 Process kaizen

Just as end consumers are the ultimate payer of sales tax, insureds' are the ultimate bearer of the medical (re-)underwriting expenses and settlement intermediary cost. Whether explicitly stated in a contract or not, the proceeds an insured receives from selling a policy always has those operational costs deducted.

MSS involves carriers' engagement: upon consent of insureds who wish to forfeit their policies, carriers immediately place those policies into the secondary market. This reduces search cost and enhances the disintermediation of life settlements. Specifically, intermediaries, whose job is to source policies from policyholders, would most likely be eliminated from the transaction chain.

[17] Grigsby v. Russell, No. 53. 222 U.S. 149 (1911), see https://www.leagle.com/decision/1911371222us1491348

[18] 101120.5.(6) http://www.leg.state.co.us/preclics/1997/hbills97/HB1345.htm

[19] HB 1007 626.99292, http://myfloridahouse.gov/Sections/Documents/loaddoc.aspx?FileName=_h1007er.docx&DocumentType=Bill&BillNumber=1007&Session=2017

[20] SEC. 6. 10113.3. (d) (n) https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200920100SB98

MSS also aligns with the InsurTech trend (Tempesta 2018, 15) of ultra-customized policies: MSS drives the surrender value of a life insurance policy to be calibrated according to the insured's personal health condition. In addition, InsurTech promotes digitization which enables process kaizen for data management, hence lowering the (re-)underwriting cost and information cost in general, making MSS more feasible now than ever. With the assistance of InsurTech and the increase in popularity of life settlements, we believe that mandated secondary sale with the option of insurer buy-back should become the new normal for the life insurance industry.

6 Conclusion and Outlook

To date, it is still not widely known that a life insurance policy is a tradable asset. This piece reveals value destruction for policyholders through lapsation of life insurance policies and attempts to raise awareness of the secondary market of life insurance and its benefits to society. We criticize carriers' abuse of outdated lapse-supported pricing schemes, which leave policyholders vulnerable to retrospective premium hikes. Carriers reportedly increase premium rates in the event of unanticipated insurance persistency of "bad-risk policies", which can be caused by a wider usage of life settlement by seniors and insureds with health impairment.

Against the backdrop of rising regulatory intervention favoring life settlements, we advocate imminent abandonment of lapse assumptions in premium pricing and encourage an embrace and internalization of policy secondary sale. We propose a simple but robust reform: a mandated secondary sale treatment of all life policies that are about to be terminated. The regime could drastically increase the amount of wealth retained by the senior population in U.S. and, in turn, help fund long-term care, longer than expected retirements, and other issues surrounding rising life expectancies. In addition, we suggest a morbidity-contingent surrender penalty scheme targeting healthy insureds who wish to terminate a policy. We further propose a prohibition on premium raises of in-force policies to guarantee the feasibility of a mandated policy secondary sale.

We believe the proposed regime will not only protect consumers' interest but also benefit the entire life insurance industry by increasing sustainability, enhancing stability and improving its reputation. Combining mandated secondary sale with a morbidity-contingent surrender penalty would ensure that a policy's monetizable value is constantly pegged to its economic value. This, we demonstrate, encourages scrutiny of human mortality, propels realization of the economic value of life insurance, consequently maximizing insurance utilization to policyholders, and augmenting the utilitarian welfare of the society.

We suggest that life carriers make a prompt business model transition to embrace and participate in the secondary sale of policies. We are confident that the new equilibrium reached through the regime change will yield higher market efficiency and a more just wealth transfer among consumers.

The study has a few limitations. While briefly discussed in the previous chapter, tax issues related to life insurance, e.g. concerning income tax deferral through insurance cash account or tax from life settlement proceeds, are beyond the scope of the paper and should be investigated before the implementation of the reform. Secondly, in order to simplify the demonstration and focus on the core line of inquiry, in the theoretical framework we assume risk neutrality of carriers and investors, independence of policy excess utility from policy economic value and perfect market conditions (which implies perfect competition, zero transaction cost and information asymmetry). The market mechanism under more relaxed assumptions merits further research. Thirdly, research is often limited by data availability and this case is no exception. Due to the opaque nature of the current market, We are constrained in our estimation of size and potential of the market. Due to the arbitrariness of consumers' utility function, we are unable to quantify the welfare impact of MSS. Future studies may utilize the availability of more data to conduct empirical studies on this matter.

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Appendix

Data

We use two sets of samples to depict the U.S. life insurance landscape: (i) The U.S. Life industry Briefing book of the SNL financial (S&P Global Market Intelligence); and (ii) SOA & LIMRA - U.S. Individual Life Insurance Persistency studies. The SNL sample is representative, covering more than 90% of total life insurance business in the U.S., and up-to-date, reported on an annual basis. Each year from 1996 to 2017, the total face amount of policies issued, surrendered, lapsed during the year and in force at year-end is reported. The sums are broken down by policy format: (i) ordinary / individual insurance, (ii) group insurance which is often offered through the workplace, (iii) credit insurance which is primarily offered by lending companies and (iv) industrial insurance which is mainly for burial purposes. Ordinary policies are further broken down into two categories: (i) Whole Life & Endowment; (ii) Term-life. However, the data lack granularity: no further break-down (by e.g. insureds' age, policy face value, insurance duration) is available.

The data used for the SOA & LIMRA study provide much more insight on U.S. life insurance termination pattern. The study breaks down the sample policies by attained age, issue age, policy type, duration etc. In addition, the study provides lapse rate of different cohorts (e.g. the lapse rate term policies from 65-year old insureds). Unfortunately, the sample only involves individual life insurance business from 27 U.S. life carriers, and is not up to date, with the last observation year being 2009.

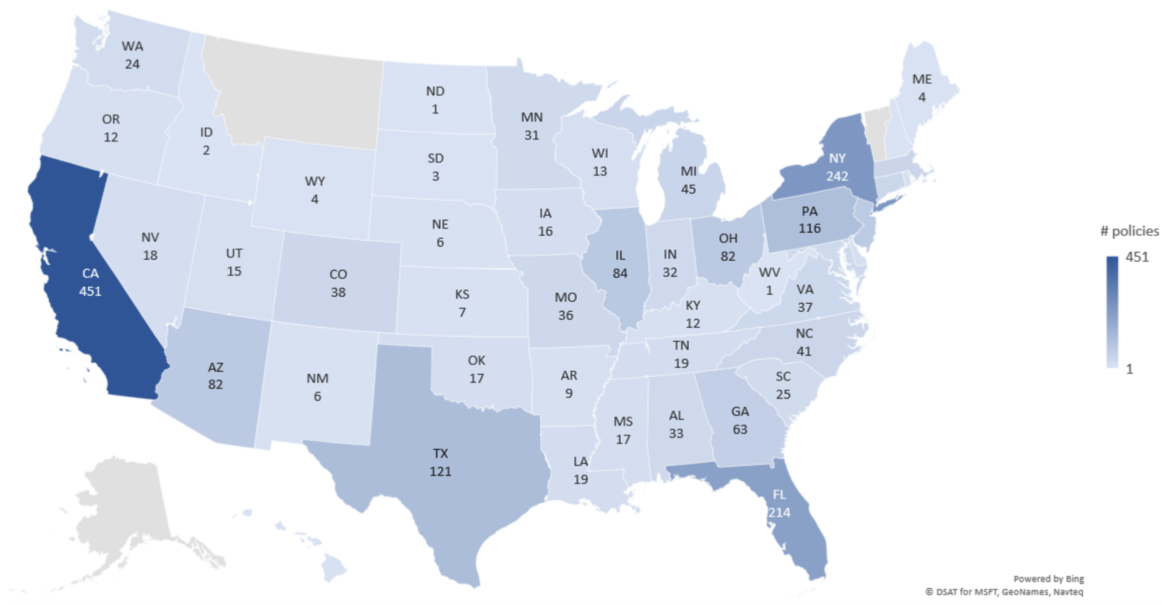
We use the granularity of SOA & LIMRA study and scale the numbers up to reach the aggregate shown in the SNL database. While the LIMRA sample is incomplete, to make sure that it is not skewed, we compare the age distribution indicated from this sample and from another independent study by SOA, and find that the two distributions are similar.

Table 1: 30-year term profit present value

interest rate	5%	8%	11%
Net Revenue			
Pricing Lapse	912	872	12
0% Lapse	2,244	1,947	1,521
Net Benefits			
Pricing Lapse	(1,036)	(769)	(574)
0% Lapse	(4,026)	(2,889)	(2,040)
Net Income			
Pricing Lapse	(125)	103	107
0% Lapse	(1,782)	(942)	(520)

Note: Assumed rates in pricing: 12-15% in the first year, grading down to 5-8% over time. Source: SOA (1998). Insurance carriers often cite low interest rate as their reason to hike COI. While low interest rate does put carriers in stress, unexpected persistency exacerbates the situation.

Figure 2: Life settlement by state



Note: Life settlements are mostly concentrated in California, New York and Florida, where wealthy people reside.

Figure 3: Annual face amount terminated 1996-2017

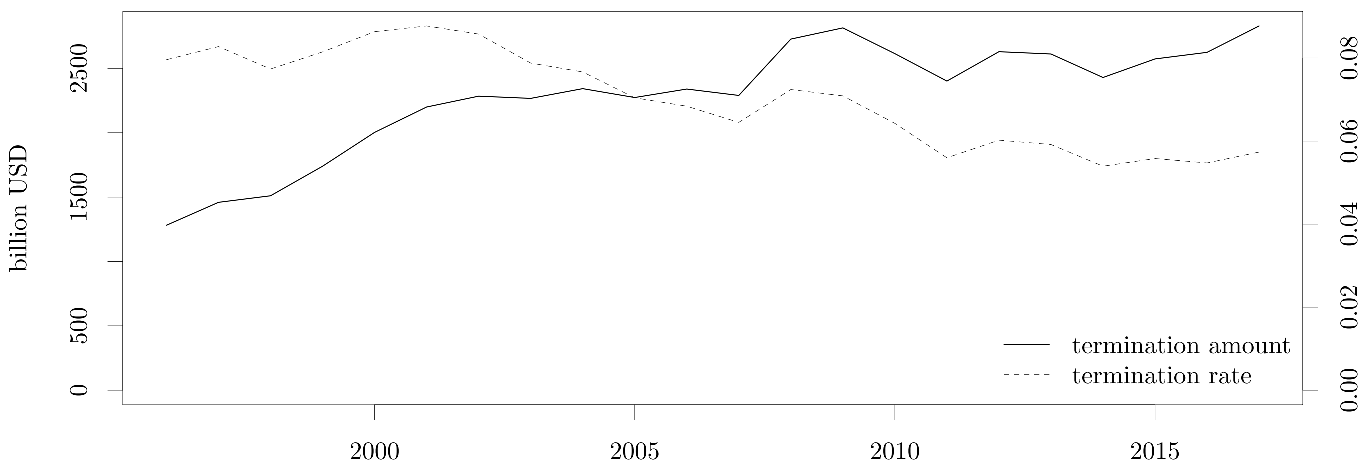
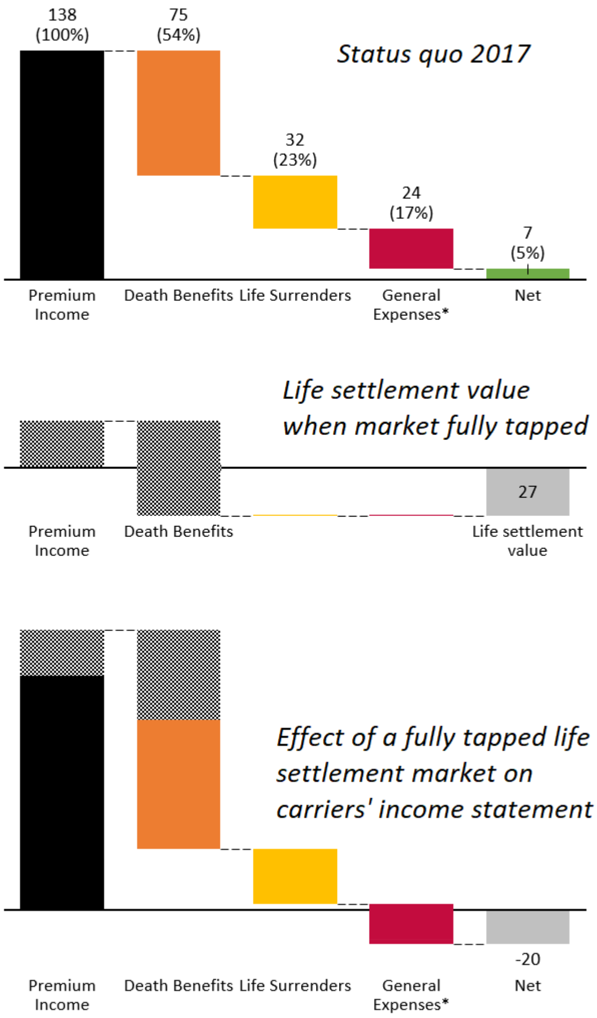
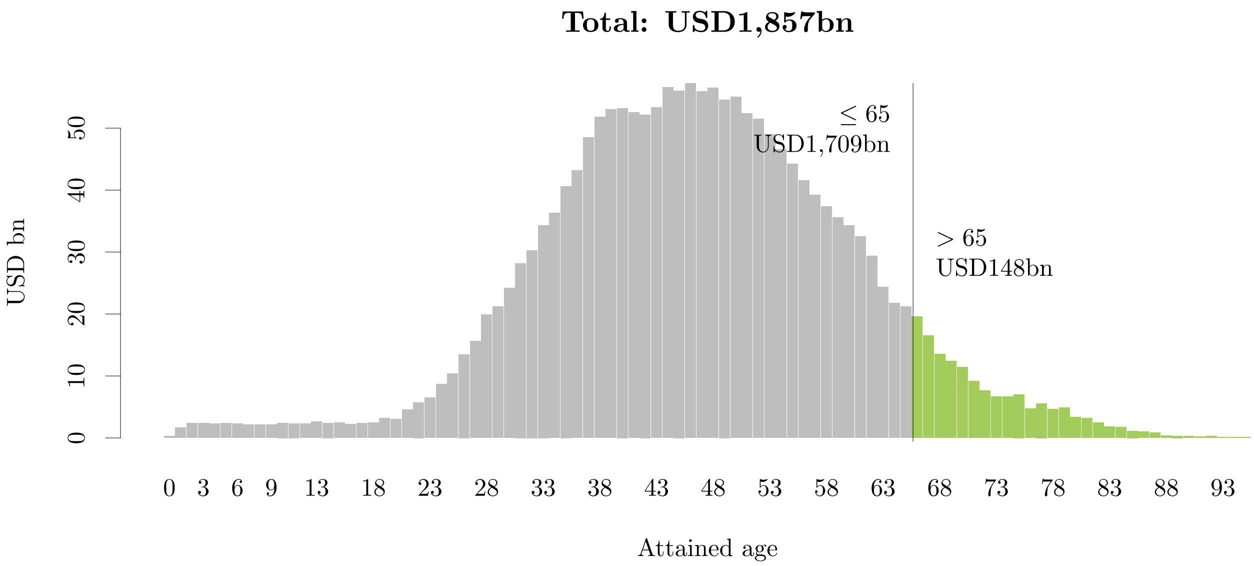


Figure 4: Life settlement effect on insurers' net income



Note: *General expenses do not include insurance commissions, taxes, licenses and fees. If primary insurers leave life settlement being fully exploited, their net income would be negatively impacted.

Figure 5: Face amount of ordinary life policies terminated in 2017



Note: The face amount of ordinary life policies terminated in 2017 totals 1,857 billion USD, consisting of 1,709 billion USD from insureds below age 65, and 148 billion USD from insureds above age 65.

Table 3: Summary of used variables and notations

Notation	Description
PP	Policy price
EV	Policy economic value
Δ	Policy price mark-up, $\Delta = PP - EV$
u	Policy utility to insured
u^e	Policy excess utility to insured, $u^e = u - EV$
$F(\cdot)$	Cumulative frequency function
U	Policy utility to society
IdS	Insureds' surplus
BrS	Buyers' (carrier and investor's) surplus
ρ	discount factor
π_t	policy premium to be paid at time t
l_t	insured survival rate between time t and $t+1$
p_t	policy persistency rate between time t and $t+1$

Table 5: Utility depending on insured's choice between leaving and taking a policy

	surplus from taking
insured utility	$u - PP$
carrier utility	$PP - EV$
total utility	$u - EV$

Table 6: Utility depending on insured's choice between persistency and forfeiture of a policy

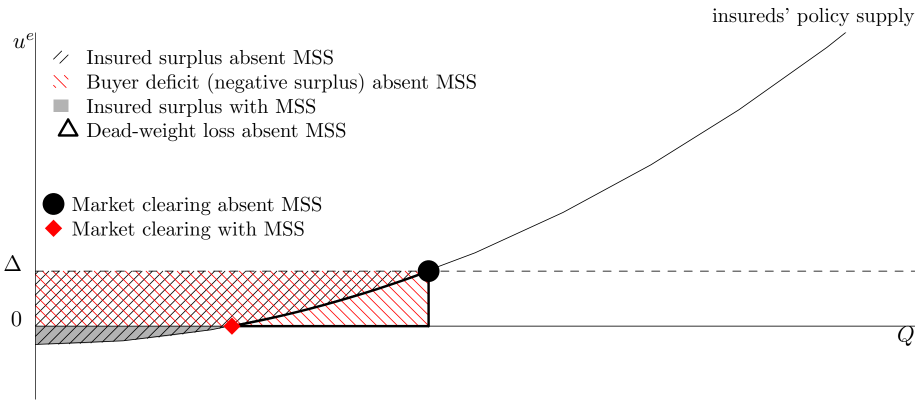
Panel A: carrier+investor utility

	persistency	forfeiture	surplus from forfeiture	way of forfeiture
carrier utility	$-EV$	$-PP$	$EV - PP$	terminated via carrier
		$-EV$	0	sold to investor
investor utility	0	$EV - PP$	$EV - PP$	
carrier+investor utility	$-EV$	$-PP$	$EV - PP$	

Panel B: insured and carrier+investor utility

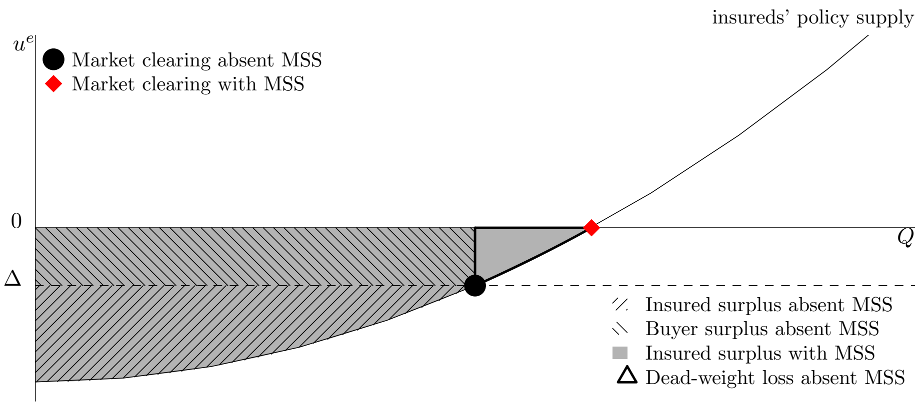
	persistency	forfeiture	surplus from forfeiture
insured utility	u	PP	$PP - u$
carrier+investor utility	$-EV$	$-PP$	$EV - PP$
total utility	$u - EV$	0	$EV - u$

Figure 6: Utility of policyholders and policy buyers: healthy insured cohort



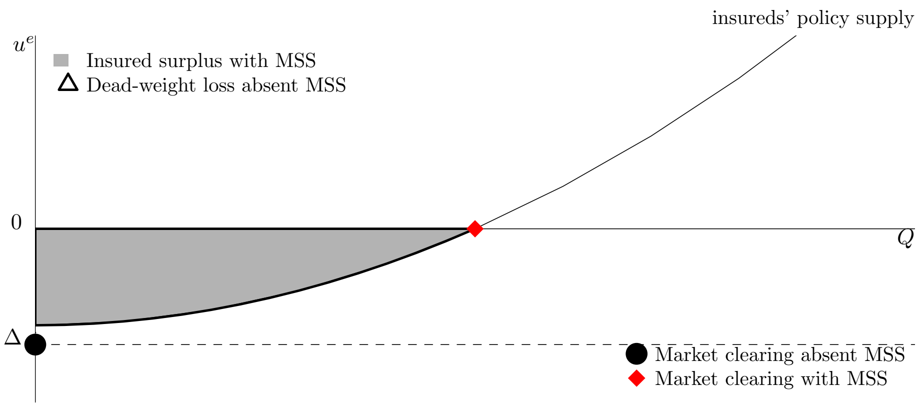
Note: With a healthy insured cohort, MSS increases insurance persistency, increases carrier surplus (from negative to zero), and decreases insured surplus.

Figure 7: Utility of policyholders and policy buyers: unhealthy insured cohort



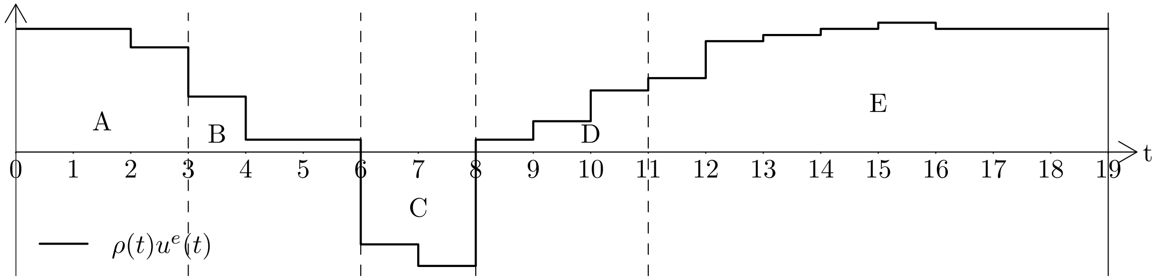
Note: With an unhealthy insured cohort, MSS decreases insurance persistency, decreases carrier surplus (from positive to zero), and increases insured surplus.

Figure 8: Utility of policyholders and policy buyers: terminally ill insured cohort



Note: With a terminally ill insured cohort, MSS reduces insurance persistency, increases insured surplus (from zero to positive), and has no impact on carrier surplus.

Figure 9: Time series of discounted excess utility $\rho(t)u^e(t)$ of insurance



Note: With $\Delta \equiv 0$, the insured disposes of a policy at $t = 6$ and re-acquires a policy at $t = 8$. The insurance's utility to the whole society, U, is thus maximized, equal to area A+B+D+E. If the policy is kept in force from $t = 0$ to $t = 19$, U equals area A+B−C+D+E, smaller than A+B+D+E; if the forfeiture occurs at $t = 3$ and re-acquisition at $t = 11$, U equals area A+E, also smaller than A+B+D+E.

Transformation of Equation 2 to Equation 3

Equation 2 can be rewritten as:

$$EV_t - \rho l_t EV_{t+1} = \rho\Big[l_t(1-p_t)\Delta_{t+1} + (1-l_t)\Big] - \pi_t$$

Let

$$A_t := \rho l_t \tag{17}$$

$$B_t := \rho\Big[l_t(1-p_t)\Delta_{t+1} + (1-l_t)\Big] - \pi_t \tag{18}$$

We can further write down the following equation system:

$$\begin{aligned}
EV_t - EV_{t+1}A_t &= B_t \\
EV_{t+1}A_t - EV_{t+2}A_tA_{t+1} &= B_{t+1}A_t \\
EV_{t+2}A_tA_{t+1} - EV_{t+3}A_tA_{t+1}A_{t+2} &= B_{t+2}A_tA_{t+1} \\
&\cdots \\
EV_{t+n}\prod_{i=t}^{t+n-1} A_i - EV_{t+n+1}\prod_{i=0}^{n} A_{t+i} &= B_{t+n}\prod_{i=t}^{t+n-1} A_i \\
&= \frac{B_{t+n}\prod_{i=t}^{t+n} A_i}{A_{t+n}}
\end{aligned}$$

By summing the LHS and the RHS of the equation system above, we have:

$$\begin{aligned}
EV_t - EV_{t+n+1}\prod_{i=t}^{n} A_i &= \sum_{j=t}^{t+n} \frac{B_j \prod_{i=0}^{j} A_i}{A_j} \\
\lim_{n\to\infty}\left(EV_t - EV_{t+n+1}\prod_{i=t}^{t+n} A_i\right) &= \lim_{n\to\infty}\sum_{j=t}^{t+n} \frac{B_j \prod_{i=t}^{j} A_{t+i}}{A_j} \\
EV_t - \lim_{n\to\infty}\left(EV_{t+n+1}\prod_{i=t}^{n} A_i\right) &= \sum_{j=t}^{\infty} \frac{B_j \prod_{i=t}^{j} A_i}{A_j} \\
\because \lim_{n\to\infty}\left(EV_{t+n+1}\prod_{i=t}^{t+n} A_i\right) = 0 \qquad \therefore EV_t &= \sum_{j=t}^{\infty} \frac{B_j \prod_{i=t}^{j} A_i}{A_j}
\end{aligned} \tag{19}$$

Plugging Equation 17 and Equation 18 back to Equation 19:

$$\begin{aligned}
EV_t &= \sum_{j=t}^{\infty} \frac{\Big\{\rho\Big[l_j(1-p_j)\Delta_{j+1} + (1-l_j)\Big] - \pi_j\Big\}\prod_{i=t}^{j} \rho l_i}{\rho l_j} \\
&= \sum_{j=t}^{\infty} \frac{\Big\{\rho\Big[l_j(1-p_j)\Delta_{j+1} + (1-l_j)\Big] - \pi_j\Big\}\rho^{j-t}\prod_{i=t}^{j} l_i}{l_j}
\end{aligned}$$