Abstract

Y-Combinator’s SAFE (Simple Agreement for Future Equity) notes are a form of contract used in financing of early stage ventures, that promise to convert an investor’s money into shares at a price to be determined at a later date when an equity round establishes a valuation of the company. Although these contracts may at first appear to precisely specify the number of shares to be issued, in practice, several different approaches are used to calculate this number, that lead to divergent consequences. We argue that contracts of this type introduce a contradiction into a set of equations that usually govern equity financing rounds, the resolution of which requires that a strict subset of these equations be treated as valid. We show that different choices for this subset lead naturally to the different approaches for calculating the number of shares issued. In the case of SAFE notes, their definition moreover has a circular nature that places some constraints on the equity round. We also point out a game theoretic aspect to the situation around these contracts. The players in the associated game are the company, the SAFE note investor, and the investor in the equity round. We discuss strategies for each of these players when faced with different choices of contract and approaches to their execution.

1 Introduction

Financing of early stage ventures is increasingly using forms of investment contracts in which a seed investor provides a startup company with funds in exchange for a promise of shares to be issued in future, with the number of shares received determined according to conditions dependent on future events. These contracts provide the investor with an instrument that operates as a mix of debt and equity. They have a debt-like aspect in that they provide downside protection that aims to guarantee that the investor gets their money back (possibly, with interest) in case the company does not appreciate in value, but also
have an equity-like aspect that yields greater returns if the company enjoys a significant increase in value.

Besides the downside protection, one of the motivations for these contracts is that at its early stages, it can be difficult to meaningfully assign a valuation to a company on the basis of which to determine the shareholding received by the investor in exchange for their money. The Y Combinator [11] SAFE note is a particular instance of this class of contracts, specifically motivated to address this problem. The approach taken is to condition the number of shares issued on the valuation and share price of the equity round in which the contract converts into a shareholding.

In practice, SAFE notes introduce a number of complexities that have made their consequences difficult to understand. Our objective in this paper is to understand these complexities, and to clarify their consequences in practice. There exist many web pages intended to explain SAFE and other convertible instruments to founders and investors, but they are generally cast in terms of concrete numerical examples that do not elucidate the general principles governing these contracts, and may obscure some of their peculiarities.

For one thing, a SAFE note could be understood to be a form of liability of the company, but unlike other types of contract, it cannot be independently valued, since it depends on the valuation of the company as a whole. This makes SAFE contracts circular in a way that raises questions about their soundness.

For another, one of the consequences of SAFE notes and other convertible instruments is that they dilute the value of shares issued in the equity round in a way that may be unacceptable to the new investors, particularly if they apply an understanding from a standard equity round that does not involve convertible instruments. Various approaches are used in practice in an attempt to mitigate this undesirable consequence. We argue that the diversity of these approaches can be explained as a response to a “paradox” that applies to convertible instruments in general: the existence of such instruments causes a set of equations that usually applies to equity rounds to become inconsistent. Resolving this paradox requires selecting a strict subset of the set of equations as valid. Different choices of the applicable set of equations lead to different ways to operate the convertible instrument, explaining the diversity of approaches used in practice.

We furthermore argue that application of an accounting viewpoint is helpful to understand the paradox: from this perspective, the convertible instruments can be understood either as liabilities or as represented on the capitalization table of the company. Each of these views determines a consistent subset of equations for the equity round, but invalidates the others. Moreover, it can be argued that the two views yield essentially the same proportional shareholdings. They do, however, imply that there are two distinct interpretations of the term “Pre-Money Valuation” as used in term sheets for equity rounds. Some of the perceived difficulties of equity rounds involving convertible instruments appear to derive from confusions concerning these interpretations and/or a lack of clarity concerning what is being valued.

We illustrate the resulting understanding in the case of SAFE notes, for
which we derive the proportional shareholding resulting from each approach for each of the three parties: the company founders, the SAFE note investor, and the new investor. SAFE notes come in a number of different versions, depending on the inclusion of a valuation cap and/or discount. We focus on one case: the SAFE with valuation cap but no discount. The bulk of the paper concerns the original version of this particular contract. Y Combinator recently released a revision: the “Post-Money SAFE”, which changes the key clause that is our focus in this paper. We also analyze this new contract.

Our analysis leads to the identification of a weakness in the design of the original SAFE with cap and no discount, in the form of a lack of clarity about the relationship between “Pre-Money Valuation” and “Price”, that results in a further proliferation of conversion methods, one of which has the undesirable consequence that not all prices are feasible, and is moreover legally questionable. (The issue has been resolved in the Post-Money SAFE.)

After deriving closed form solutions for the distribution of shareholdings of the parties after the equity round on various conversion methods, we investigate SAFE notes from a game theoretic perspective. The players of the game are the company founders, the SAFE investor, and the new (equity round) investor. The game consists of a number of stages: in the first stage, the founders and SAFE investor negotiate terms for the SAFE investor’s investment, in the second stage, the founders and new investor negotiate the terms of the equity round in which a SAFE contract converts to equity. We argue that if all the players are fully rational, then the range of conversion methods and instruments collapses to one main case and a fallback to cover a scenario where the SAFE cannot be converted. However, there is evidence that in practice, players are not fully rational, and may settle a “Pre-Money Valuation” before having agreed on a conversion method. We also consider a version of the game modelling this order of events and show that it leads to a rather complex negotiation scenario.

The structure of the paper is as follows. Section 2 introduces the convertible instrument that provides the focus of most of the paper: the (pre-money) SAFE with cap and no discount. For purposes of comparison, Section 3 considers standard equity rounds not involving convertible instruments, and identifies a number of equations governing such rounds. Section 4 argues that the presence of convertible instruments implies that these equations cannot all hold, so that a consistent subset needs to be selected. An accounting view on the situation is discussed in Section 5, where it is argued that two distinct ways in which the convertible instrument could be represented lead to the selection of particular consistent subsets of these equation. The following sections then apply the resulting insight to understand a number of distinct methods used in practice to operate equity rounds involving the SAFE instruments: the Standard Method (Section 6), the Percent-Ownership Method, which is argued to be closely related to a “Discounted Valuation” method (Section 7), the Dollars-Invested method, which is used as a compromise between the previous two (Section 8), as well as a Two-Round approach in which the SAFE contract is discharged before new money is added in a standard round (Section 9). Section 10 considers the new “Post-money SAFE” with cap and no discount. We compare
the outcomes of all these approaches and consider the associated game in Section 11. Section 12 concludes with some remarks on the weakness we identify in the Pre-Money SAFE in the course of the analysis.

2 SAFE note with cap and no discount

In this section we introduce a version of the SAFE contracts that were used by Y Combinator as its “standard deal” up until November 2018. These SAFEs may be called pre-money SAFEs in contradistinction with the post-money SAFEs introduced by Y Combinator as its “new standard deal” after that date. Y-Combinator’s contracts have been adapted by other investors and incubator organisations, so there are now many different versions of these contracts extant. We focus in this paper on just one form of the Y Combinator SAFE, which offers a cap on the valuation at which the SAFE note is converted to shares, but has no discount on the conversion price [7]. (The other forms make different choices about which of these parameters apply. Many of the general points we make in the paper will apply equally to these variants, but the formulas we derive will require some modification.)

The SAFE note is a 4 page document comprised of a number of clauses, which define the parties to the contract, its purchase price, define a number of terms (Capital Stock, Change of Control, Company Capitalization, Distribution, Dissolution Event, Equity Financing, Initial Public Offering, Liquidity Capitalization, Liquidity Event, Liquidity Price, Pro Rata Rights Agreement, Safe, and Safe Preferred Stock), lists events of relevance to the execution of the contract (Equity Financing, Liquidity Event, Dissolution Event and Termination), and describes the consequences of each, assert representations made by the company and the investor that underpin their capacity to enter into the contract, and describes various process issues relevant to the operation of the contract (e.g., rules concerning service of notices) that delimit the effect of revisions and specify legal jurisdiction.

We concentrate in this paper on just one key aspect of the contract, the Equity Financing clause, whereby the SAFE note specifies the number of shares received by the SAFE note holder as a result of the SAFE note converting to shares. The contract says the following:

**Equity Financing.** If there is an Equity Financing before the expiration or termination of this instrument, the Company will automatically issue to the Investor either: (1) a number of shares of Standard Preferred Stock equal to the Purchase Amount divided by the price per share of the Standard Preferred Stock, if the pre-money valuation is less than or equal to the Valuation Cap; or (2) a number of shares of Safe Preferred Stock equal to the Purchase Amount divided by the Safe Price, if the pre-money valuation is greater than the Valuation Cap.

The definitions section tells us:
“**Equity Financing**” means a bona fide transaction or sequence of transactions with the principal purpose of raising capital, pursuant to which the Company issues and sells Preferred Stock at a fixed pre-money valuation.

“**Safe Price**” means the price per share equal to the Valuation Cap divided by the Company Capitalization.

“**Company Capitalization**” means the sum, as of immediately prior to the Equity Financing, of: (1) all shares of Capital Stock (on an as-converted basis) issued and outstanding, assuming exercise or conversion of all outstanding vested and unvested options, warrants and other convertible securities, but excluding (A) this instrument, (B) all other Safes, and (C) convertible promissory notes; and (2) all shares of Common Stock reserved and available for future grant under any equity incentive or similar plan of the Company, and/or any equity incentive or similar plan to be created or increased in connection with the Equity Financing.

To express this clause in a formal way, and calculate its ramifications when an equity round occurs, we introduce a number of variables, listed in Figure 1. All these values can be presumed positive, since negative or zero values are unrealistic.

A number of these variables are explicit parameters of the SAFE contract, and their values are written into the contract when it is instantiated and signed: the Purchase Amount of the SAFE note $m_{\text{safe}}$, and the Valuation Cap $c$. The variable $p_{\text{safe}}$ represents the Safe Price, the effective price at which the SAFE holder’s money is converted into shares: it is defined in the “**Safe Price**” clause of the contract.

Others relate to the state of the company before and after the equity financing. We model a simple scenario in which the company has issued a single SAFE note, and no other forms of convertible promissory note. The variable $s_f$ represents the number of shares held by the founders before (and after) the equity round. We assume there are no other shareholders. The variables $s_{\text{safe}}$ represents the number of shares issued to the SAFE note holder in conversion of the SAFE note. We write $s_{\text{new}}$ for the number of shares purchased by the new investor(s) in the equity round, and $S_{\text{pre}}$ for the total number of shares before the equity round. The total number of shares issued after the equity round is denoted $S_{\text{post}}$ (if there were stock options, these would be accounted for here.) We will also denote the proportional post-money ownership of party $i = f, \text{safe}, \text{new}$ by $o_i$, defined to be $s_i/S_{\text{post}}$.

In practice, shares received by different parties may have different rights (e.g., in case of a liquidation), but as a simplification, we ignore the differences between share types. To avoid adding complexity to our formulas that is not pertinent to the main points we wish to make, we furthermore simplify the setting by assuming that there are no stock options, either already issued or authorized, or to be newly authorized for future issuance as part of the equity round.
• \( c \) = valuation cap of SAFE note
• \( m_{\text{new}} \) = dollar amount of new money raised
• \( m_{\text{safe}} \) = purchase amount of SAFE note
• \( s_f \) = the number of founders’ shares
• \( s_{\text{new}} \) = number of shares issued for new money
• \( s_{\text{safe}} \) = number of shares issued to the SAFE note holder in conversion of the SAFE note
• \( S_{\text{post}} \) = the total number of shares issued (or authorized) after the equity financing
• \( S_{\text{pre}} \) = the company capitalization immediately prior to equity financing
• \( o_f \) = the proportion of shares owned by the founders after the equity raise
• \( o_{\text{new}} \) = the proportion of shares owned by the equity investor after the equity raise
• \( o_{\text{safe}} \) = the proportion of shares owned by the SAFE holder after the equity raise
• \( p_{\text{new}} \) = the price of new shares for the equity investor
• \( p_{\text{safe}} \) = the price of shares for the SAFE note holder
• \( v_{\text{post}} \) = the post-money valuation of the company
• \( v_{\text{pre}} \) = the pre-money valuation of the company

Figure 1: Notation for variables related to SAFEs.

A final set of variables gives the details of the equity round. The new investor pays money \( m_{\text{new}} \), paying a price of \( p_{\text{new}} \) per share, and receiving in exchange their \( s_{\text{new}} \) newly issued shares in the company. The price per share may have been determined based on a pre-money valuation \( v_{\text{pre}} \) of the company, an assessment of its total value prior to the equity round. After the transaction, the company holds a larger amount of cash, so has a different valuation, the post-money valuation, which we denote by \( v_{\text{post}} \).

Using the above variables, we can write a formal representation of the key clauses of the SAFE contract described above. First, the “Safe Price” definition states that

\[
p_{\text{safe}} = \frac{c}{S_{\text{pre}}} \tag{1}
\]

In our concrete scenario, the company capitalization \( S_{\text{pre}} \) is \( s_f \). Hence we get a
Safe Price of
\[ p_{safe} = \frac{c}{s_f}. \]

As will become clearer from the discussion of Section 3, we can think of this as the price the SAFE investor would have paid had they purchased shares in a standard equity raise in which the company had a pre-money valuation equal to the cap \( c \).

Secondly, we can write the Equity Financing clause as follows:

1. If \( v_{pre} \leq c \), then \( s_{safe} = m_{safe}/p_{new} \).
2. If \( v_{pre} > c \), then \( s_{safe} = m_{safe}/p_{safe} \).

These clauses seem clear enough, so one might expect that, in practice, it is straightforward for the company to comply with the terms of this contract. We will see below that they have some consequences which mean that things are not as simple as they might appear to be.

### 3 Standard equity raise

For purposes of comparison with what follows, we first consider the calculations for an equity raise with no SAFE note in place. We use the same variable names as above, except that those relating to the SAFE note are not relevant in this section.

Suppose that the company, with outstanding shares \( S_{pre} = s_f \) raises extra capital \( m_{new} \) at a pre-money valuation of \( v_{pre} \). Let \( p_{new} \) be the price of the newly issued shares, and \( s_{new} \) the number of newly issued shares. The new money, price per share paid and number of new shares issued are related by the equation

\[ m_{new} = s_{new}p_{new}. \]  \hspace{1cm} (msp_{new})

One issue for the new investor is to determine the price per share that they are prepared to pay. There are multiple ways this price might be determined in practice, e.g., by negotiation with the company, taking into the account the price last paid by other investors, and the investor’s estimates of their expected returns, given their investment horizon. Another way is for the company and the investor to agree upon the pre-money valuation of the company. From this we can determine a value per share for the existing shares in the company. Reasoning that the price of the newly issued shares should be the same as the value per share of the existing shares, at the pre-money valuation, we get that the transaction implies the following equation relating the pre-money valuation, outstanding shares, and the price per share.

\[ v_{pre} = s_f p_{new}. \]  \hspace{1cm} (usp_{pre})

Having determined a price per share \( p_{new} \) using this equation, we get, using equation \((msp_{new})\) that \( s_{new} = m_{new}/p_{new} = m_{new}s_f/v_{pre} \) shares.
One can take several views on the valuation of the company after the equity round. One is to value the company based on the revised number of outstanding shares, each share valued at the price per share paid in the equity round. This leads to a post-money valuation \( v_{\text{post}} \) given by the equation
\[
v_{\text{post}} = p_{\text{new}} S_{\text{post}} .
\]

An alternate view is to consider the way that the transaction changes the company’s assets and liabilities. All that has changed is that the company now has an additional amount \( m_{\text{new}} \) of money in the bank; all its other assets and liabilities, valued at \( v_{\text{pre}} \), are unchanged. On this view, the pre-money valuation and post-money valuation are related by the equation
\[
v_{\text{post}} = v_{\text{pre}} + m_{\text{new}} .
\]

The number of post-money shares is \( S_{\text{post}} = s_f + s_{\text{new}} \), so we get that the amount of this post-money value per share after the raise is
\[
v_{\text{post}} / S_{\text{post}} = (v_{\text{pre}} + m_{\text{new}}) / (s_f + s_{\text{new}})
\]
by \( v_{\text{pre}} / s_f = p_{\text{new}} \)
i.e., the same as the pre-money value and price per share, as expected.\(^1\) Note that equation \( (v_{\text{sp}})_{\text{post}} \) also gives \( v_{\text{post}} / S_{\text{post}} = p_{\text{new}} \), so the two distinct ways of obtaining a post-money valuation expressed in equations \( (v_{\text{sp}})_{\text{post}} \) and \( (v_{\text{mp}})_{\text{pre,post}} \) are consistent.

We may also conclude from the fact that the post-money value per share is \( p_{\text{new}} \) that the new investor’s share of the post-money valuation is \( s_{\text{new}} p_{\text{new}} = m_{\text{new}} \). Thus, we also see that the investor neither gains nor loses by engaging in the transaction, they merely convert the form of their holding from cash to shares. In a similar sense, the founders also do not lose from the transaction: the value of their shares after the equity round is \( s_f p_{\text{new}} = s_f (v_{\text{pre}} / s_f) = v_{\text{pre}} \), i.e., the pre-money valuation.

Stated in terms of monetary value, the effect of the equity round on the proportional shareholdings in the company is that after the raise, the founder holds a fraction
\[
\frac{s_f}{s_f + s_{\text{new}}} = \frac{s_f}{s_f + m_{\text{new}} s_f / v_{\text{pre}}} = \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}}
\]
of the company, and the new investor holds
\[
\frac{m_{\text{new}}}{v_{\text{pre}} + m_{\text{new}}} .
\]

\(^1\)It would be reasonable to take the view that the post-money value per share should be higher on the grounds that the new money enables the company to proceed with its development plans whereas, without the new money, it may have to be liquidated for a lower return. However, if one takes the view that the pre-money valuation is based on the assumption that the equity round will proceed, the conclusion that the equity round should not change the value per share is reasonable.
For purposes of later comparison with the effects of SAFE notes, we note the effect of a sequence of two standard equity rounds (neither with convertible instruments in place), the first to an early investor for money $m_{safe}$ at valuation $c$, and the second to a new investor for money $m_{new}$ at valuation $v_{pre}$. Repeating the calculations of the present section, we obtain proportional shareholdings for the founders, early investor and new investor, respectively, of

$$\frac{c}{c + m_{safe}}, \frac{v_{pre}}{v_{pre} + m_{new}}, \frac{m_{safe}}{c + m_{safe}}, \frac{v_{pre}}{v_{pre} + m_{new}}, \frac{m_{new}}{v_{pre} + m_{new}}.$$ (2)

For the new investor this shareholding is worth $m_{new}$, as above, and the remaining value $v_{pre}$ after the second round is divided between the founders and the early investor in the proportions

$$\frac{c}{c + m_{new}}, \frac{m_{safe}}{c + m_{new}}$$

that result from the first equity round.

4 An Inconsistency

When convertible instruments, such as the SAFE contract, or other forms of convertible bond, are in place at the time of an equity round, they cause some fundamental changes to the properties of the round. Individually, each of the equations ($msp_{new}$), ($vsp_{pre}$), ($vsp_{post}$) and ($vm_{pre,post}$) governing a standard equity round is reasonable. However, taken together, they lead to an inconsistency when one of the consequences of the equity round is that convertible instruments convert into equity. In these situations, after the equity round, new shares have been issued not just to the new investor, but also to the holder(s) of the convertible instruments, but no additional money is paid for these shares. (Money was paid for the convertible instruments at an earlier time, but it may have already been spent by the time of the equity round.) This leads to a contradiction between the above equations, stated in the following proposition.

**Proposition 1** Consider an equity round in which the pre-money state of the company consists of the founders holding shares $s_f$, and in which the company has issued a convertible instrument to an early investor. Suppose that after the equity round, there are three shareholders, the founders, the early investor and the new investor, each holding a nonzero number of shares $s_f$, $s_{safe}$ and $s_{new}$, respectively, and new shares are issued in the round to the new investor at a non-zero price $p_{new}$ and at no cost to the early investor. Then equations ($msp_{new}$), ($vsp_{pre}$), ($vsp_{post}$) and ($vm_{pre,post}$) are inconsistent.

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2For convenience of later discussion, we subscript variables relating to the early investor here by “safe”, as if they were a SAFE note holder. However, the proof makes use of no information about the details of the SAFE contract, so the result applies more broadly to any equity round in which a convertible instrument converts to equity without yielding new money for the company.
**Proof:** From the assumption about the three post-money shareholders, we get \( S_{\text{post}} = s_f + s_{\text{safe}} + s_{\text{new}} \). Thus, using \((v_{\text{sp}})_{\text{post}}\), we have

\[
v_{\text{post}} = p_{\text{new}}s_f + p_{\text{new}}s_{\text{safe}} + p_{\text{new}}s_{\text{new}}.
\]

By \((v_{\text{mp}})_{\text{pre,post}}\), the left-hand side of this equation equals \( v_{\text{pre}} + m_{\text{new}} \); by \((v_{\text{sp}})_{\text{pre}}\), the first term on the right equals \( v_{\text{pre}} \), and by \((m_{\text{sp}})_{\text{new}}\), the rightmost term equals \( m_{\text{new}} \). Thus, we have

\[
v_{\text{pre}} + m_{\text{new}} = v_{\text{pre}} + p_{\text{new}}s_{\text{safe}} + m_{\text{new}},
\]

which is equivalent to \( p_{\text{new}}s_{\text{safe}} = 0 \). Since both \( p_{\text{new}} \) and \( s_{\text{safe}} \) have been assumed to be non-zero, this is a contradiction. □

It follows that any attempt to make sense of such a situation needs, for consistency, to clarify which of the above equations is abandoned in understanding the equity round. As we will see, various approaches exist which resolve this issue by making different choices about which equation to abandon.

A related issue is that after the equity round, according to equation \((v_{\text{mp}})_{\text{pre,post}}\), the post-money value per share is \( (v_{\text{pre}} + m_{\text{new}})/(s_f + s_{\text{safe}} + s_{\text{new}}) \), which is less than the amount \( (v_{\text{pre}} + m_{\text{new}})/(s_f + s_{\text{new}}) \) it would be in the standard equity raise. If the new investor receives the same number of shares for their money, as in a standard equity round, this means that the new investor’s shares are worth not \( m_{\text{new}} \), as in a standard equity round, but a lesser amount. Whereas a standard equity round preserves value for the new investor, issuance of shares to the early investor dilutes the value of the new investor’s shares, so that the new investor is left holding an immediate unrealised loss!

On the other hand, equation \((v_{\text{sp}})_{\text{post}}\) can be understood as stating that the post-money value per share is exactly equal to the price paid by the new investor, and it then follows by equation \((m_{\text{sp}})_{\text{new}}\) that the post-money value of the new investor’s shares is \( m_{\text{new}} \). This directly contradicts the conclusion from the previous paragraph.

The following sections consider the ramifications of these issues with respect to the SAFE contract with cap and no discount, which adds some further complexity because of its recursive nature.

## 5 Two Accounting Views

The previous section indicates that when convertible instruments are involved in an equity round, the usual equations concerning the notions of pre-money and post-money valuation may be in conflict. This suggests that these notions are not well-defined in such a situation, and additional information may be required to determine which characterization best captures the situation. One way to do so is to consider the accounting status of the convertible instrument. There are two ways that the convertible instrument might be accounted for in the pre-money state. One is to view it as akin to a loan, which makes it a liability.
Another is to account for it on the capitalisation table of the company, as an obligation to issue shares.

**Liability View:** We consider first the consequences of an accounting model where the instrument $C$ being converted is treated as a liability. Suppose the initial state of the company consists of assets $A$, and liabilities $L$ and $C$, and the cap table consists of shares $s_{\text{pre}}$. Let the valuation of the assets and liabilities be $v_A$, $v_L$ and $v_C$, respectively. (If $C$ is a loan then it is easily valued: $v_C$ is the outstanding principal and interest due. We will see below that the recursive nature of SAFE notes adds some complexities to the question of their valuation.)

Thus, prior to the transaction, the company has a valuation $v_{\text{pre}} = v_A - v_L - v_C$. Consider an equity round where $C$ is converted to shares at value equal to $v_C$ and a new investor buys new shares for money $m_{\text{new}}$. The current share price is $p_{\text{new}} = v_{\text{pre}} / s_{\text{pre}}$, and the number of new shares issued for the convertible instrument would therefore be $s_C = v_C / p_{\text{new}} = v_C s_{\text{pre}} / v_{\text{pre}}$. (We emphasize that here $v_C$ represents the value of the shares received by the convertible instrument holder at price $p_{\text{new}}$. This may be different from the value and price used for the actual conversion; case 2 of the Equity financing clause of the SAFE note is an example of this.) The number of shares issued to the new investor is given by equation $(m s_{\text{new}})$. The state of the company after the transaction consists of assets $A$ plus new money $m_{\text{new}}$, liabilities $L$, and the cap table contains $s_{\text{pre}}$, together with newly issued shares $s_C$ and $s_{\text{new}}$. Valuing the assets and liabilities, we have $v_{\text{post}} = v_A + m_{\text{new}} - v_L$. Thus, we have that

$$v_{\text{post}} = v_{\text{pre}} + v_C + m_{\text{new}}.$$  

Note that the price per share after the transaction is therefore

$$\frac{v_{\text{post}}}{s_{\text{pre}} + s_C + s_{\text{new}}} = \frac{v_{\text{pre}} + v_C + m_{\text{new}}}{s_{\text{pre}} + (v_C s_{\text{pre}} / v_{\text{pre}}) + (m_{\text{new}} s_{\text{pre}} / v_{\text{pre}})} = \frac{v_{\text{pre}}}{s_{\text{pre}}}$$

which is identical to the price before the transaction. In terms of assets and liabilities, the share price is $(v_A - v_L - v_C) / s_{\text{pre}}$. This analysis shows that equation $(vm_{\text{pre,post}})$ does not correctly state the relationship between the pre-money and post-money valuation of the company when the convertible instrument is treated as a liability. Instead, equation $(vmC_{\text{pre,post}})$ captures this relationship. However, we do have $v_{\text{post}} = v_{\text{pre}} + v_C + m_{\text{new}} = p_{\text{new}} s_{\text{pre}} + p_{\text{new}} s_C + p_{\text{new}} s_{\text{new}} = p_{\text{new}} S_{\text{post}}$, so equation $(usp_{\text{post}})$ does hold.

**Cap Table View:** However, particularly when $C$ is not debt, but a hybrid instrument like the SAFE note, there is another way to do the accounting: we could consider the instrument $C$ that will be converted to shares as already existing on the cap table of the company, rather than treated as a liability. On this view, the initial state of the company is given by assets $A$, liabilities $L$ and cap table consisting of $s_{\text{pre}}$ and $C$. The state after the equity round that converts $C$ to an actual number of shares consists of assets $A$ plus new money $m_{\text{new}}$, liabilities $L$ and cap table comprised of $s_{\text{pre}}$, $s_C$ and $s_{\text{new}}$. Thus, by
contrast with the situation above, we have, from an accounting point of view, that $v_{\text{pre}} = v_A - v_L$ and $v_{\text{post}} = v_A - v_L + m_{\text{new}} = v_{\text{pre}} + m_{\text{new}}$, so equation $(v_{m_{\text{pre,post}}})$ does hold on this view.

It remains to determine a share price. Note that if we take the price to be $v_{\text{pre}}/s_{\text{pre}}$, and also assume that the transaction does not change the share price, we obtain the contradiction that the entirety of the final valuation $v_{\text{post}} = v_{\text{pre}} + m_{\text{new}}$ corresponds to the holder(s) of shares $s_{\text{pre}}$ and $s_{\text{new}}$, leaving no part of the valuation for the shares $s_C$. To escape this contradiction, we need to either assume that the share price decreases as a result of the transaction, or start with a different share price. The former would be unsatisfactory to the existing shareholders, so we consider the latter.

Suppose that the instrument $C$ is valued at $v_C$ at the time of the conversion to actual shares. To compute a share price that avoids the above paradox, we calculate this as if the shares $s_C$ to be issued in conversion have already been issued. Thus, we have a share price

$$p_{\text{pre}} = \frac{v_{\text{pre}}}{s_{\text{pre}} + s_C} \quad \text{(vs}Cp_{\text{pre}})$$

and the number of shares issued to the new investor, by equation $(m_{sp_{\text{new}}})$, satisfies $p_{\text{pre}}s_{\text{new}} = m_{\text{new}}$. Thus

$$p_{\text{pre}}s_{\text{post}} = p_{\text{pre}}(s_{\text{pre}} + s_C) + p_{\text{pre}}s_{\text{new}} = v_{\text{pre}} + m_{\text{new}} = v_{\text{post}} ,$$

so equation $(v_{sp_{\text{post}}})$ holds. We can write this as

$$p_{\text{pre}} = \frac{v_{\text{post}}}{s_{\text{post}}} ,$$

that is, the share price at which the transaction is conducted is equal to the value per share after the transaction.

Indeed, we can invert this reasoning, to show the following: under the assumptions that the values per share before and after the equity round are identical, that equation $(v_{m_{\text{pre,post}}})$ captures the relation between pre- and post-money valuations, and that $(m_{sp_{\text{new}}})$ describes the number of shares issued to the new investor, equation $(v_{C}p_{\text{pre}})$ captures the share price at which the equity round should be conducted.

Treating $v_C$ as the value of the shares $s_C$ received in exchange for $C$, at price $p_{\text{pre}}$, the number $s_C$ satisfies

$$s_C = \frac{v_C}{p_{\text{pre}}} = \frac{v_C}{v_{\text{pre}}} \cdot (s_{\text{pre}} + s_C) .$$

We can solve this equation for $s_C$ to get

$$s_C = \frac{v_CS_{\text{pre}}}{v_{\text{pre}} - v_C} .$$

Thus, we get the following further characterizations of the price per share:

$$p_{\text{pre}} = \frac{v_{\text{pre}}}{s_{\text{pre}} + s_C} = \frac{v_{\text{pre}}}{s_{\text{pre}} + v_Cs_{\text{pre}}/(v_{\text{pre}} - v_C)} = \frac{v_{\text{pre}} - v_C}{s_{\text{pre}}}$$
Table 1: Accounting Views related to equity round equations

<table>
<thead>
<tr>
<th>Accounting View</th>
<th>Equations Used</th>
<th>Equations True</th>
<th>Equations False</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liability</td>
<td>$msp_{new}, vsp_{pre}$</td>
<td>$vsp_{post}, vmC_{pre,post}$</td>
<td>$vm_{pre,post}$</td>
</tr>
<tr>
<td>Cap Table</td>
<td>$msp_{new}, vsC_{pre}$</td>
<td>$vsp_{post}, vmC_{pre,post}$</td>
<td>$vsp_{pre}, vmC_{pre,post}$</td>
</tr>
<tr>
<td>Cap Table (alternate)</td>
<td>$msp_{new}, vsp_{post}, vm_{pre,post}$</td>
<td>$vsC_{pre}$</td>
<td>$vsp_{pre}, vmC_{pre,post}$</td>
</tr>
</tbody>
</table>

From the last of these, we see that the value of shares $s_{pre}$ at price $p_{pre}$ is $v_{pre} - v_C$, where the value of shares $s_C$ at this price is $v_C$. Thus, this conversion price gives a coherent account of the impact of the conversion. The conclusion from this accounting view is that it is incorrect, pre-transaction, to view the valuation $v_{pre}$ of the company as the value of the shares $s_{pre}$. Instead, the valuation $v_{pre}$ should be discounted by the value $v_C$ to get the valuation of these shares. This discounted valuation is then preserved by the transaction, and the holder of $C$ receives shares worth $v_C$.

It is worth noting that on this “cap table” accounting view, the share price is

$$\frac{(v_{pre} - v_C)}{s_{pre}} = \frac{(v_A - v_L - v_C)}{s_{pre}},$$

which is exactly the same as the share price calculated for the liability view above. Thus, although the two views disagree on the meaning of the term “pre-money valuation”, they agree on the share price and yield the same number of shares issued. This suggests that share price is a more robust notion than “pre-money valuation”. On both views, we obtained $v_{post} = v_A - v_L + m_{new}$, so “post-money valuation” is also a robust notion.

These considerations suggest that there are two distinct coherent interpretations of the terms “pre-money valuation” in an equity round in which shares are issued to a new investor for money $m_{new}$, and the instrument $C$ is converted to shares. If we view $C$ as a liability, then we can calculate a share price using equation ($vsp_{pre}$), but ($vm_{pre,post}$) is false and instead the correct relationship is given by $v_{post} = v_{pre} + v_C + m_{new}$. On the other hand, if we view $C$ not as a liability, but as already represented on the cap table, then it is reasonable that ($vm_{pre,post}$) holds, but this view requires that rather than using equation ($vsC_{pre}$), the pre-money valuation should be discounted when determining a share price. The discount can be represented either using equation ($vsC_{pre}$) or equation (3). Whichever view is adopted, the determination of valuation should bear in mind what is being valued. In the case of the Liability view, the valuation should include a deduction for the value of $C$, whereas in the Cap Table view, the valuation should ignore $C$ or treat it as if already discharged. Table 1 summarises these relationships.

In the following sections, we apply the general model developed in the present section to the specific case of the SAFE note with cap and no discount. In practice, a number of approaches are used in the operation of convertible instruments. We relate these to the two accounting views of this section.
6 Pre-money SAFE: Standard Interpretation

We begin with an analysis of a literal interpretation of the SAFE contract, with the terms of the contract interpreted exactly as they would be in a standard equity round. We assume that the founders and the new investors agree upon a pre-money valuation $v_{pre}$ for the company, use this and equation ($vsp_{pre}$) to derive a price per share paid by the new investor, and use equation ($msp_{new}$) to determine the number of shares received by the new investor. Using the Equity Financing clause, we can calculate the share-holding of the SAFE investor.

We also derive the proportional shareholdings of the parties, and their values.

To avoid the contradiction from Section 4, we need to make a choice between equations ($vm_{pre,post}$) and ($vsp_{post}$). It appears from Colla [2] that equation ($vsp_{pre}$) is the most commonly used method to determine the price from valuation, and moreover, that investors frequently have the expectation that in setting a term sheet with pre-money valuation $v_{pre}$ and new money $m_{new}$, they are purchasing a proportion $m_{new}/(v_{pre} + m_{new})$ of the company, as in a standard equity round. In fact, as already noted, the conversion of SAFE shares dilutes the new investor, so that they hold less than this amount. We will argue that, moreover, if one adopts equation ($vm_{pre,post}$), the SAFE contract has some further unexpected consequences, and that the rationale for its design is not completely clear. However, this mode of operation is more rational with respect to equations ($vsp_{post}$) and ($vm_{C_{pre,post}}$), corresponding to the Liability accounting view.

For the analysis, we consider each of the cases of the pre-money valuation $v_{pre}$. We begin by calculating the proportional shareholding for each of the parties. We express this as a fraction of amounts of money, since this is informative for understanding the value of each shareholding. Note that from ($vsp_{pre}$) and ($msp_{new}$) we have $p_{new} = v_{pre}/s_f$ and $s_{new} = m_{new}s_f/v_{pre}$, as we would in a standard equity round.

**Case 1 ($v_{pre} \leq c$):** In this case we have $s_{safe} = m_{safe}/p_{new} = m_{safe}s_f/v_{pre}$. Thus,

$$S_{post} = s_f + s_{safe} + s_{new}$$

$$= s_f + (m_{safe}s_f/v_{pre}) + (m_{new}s_f/v_{pre})$$

$$= s_f (v_{pre} + m_{safe} + m_{new})/v_{pre}$$

We get that the proportional shareholding $q_i$ for $i = f, safe, new$, of the founders, SAFE investor and new investor, respectively, can be expressed in the forms

$$\frac{v_{pre}}{v_{pre} + m_{safe} + m_{new}}, \frac{m_{safe}}{v_{pre} + m_{safe} + m_{new}}, \frac{m_{new}}{v_{pre} + m_{safe} + m_{new}}$$

after multiplying numerator and denominator by $v_{pre}/s_f$. Interestingly, these are precisely the same proportions of the company that they would hold had they raised both the SAFE investor’s and the new investor’s money at valuation $v_{pre}$ in a single standard equity round.
If we were to assume that, as in the case of a standard equity raise, the price per share is the same immediately after the raise as the price at which the newly issued shares were sold, then, from the SAFE note investor’s point of view, the value of the shares they receive is $s_{\text{safe}}p_{\text{new}} = m_{\text{safe}}$. On this reasoning, the SAFE investor would be guaranteed in this case that, at the time of the equity round, they have not lost money on their investment. This calculation appears to be the motivation for the definition of case 1. The assumption that the pre-money and post-money share price are the same underlies the characterization of post-money valuation given by equation $(v_{\text{sp}})_{\text{post}}$, which gives $v_{\text{post}} = p_{\text{new}}S_{\text{post}} = v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}$ by the above calculations. On this view, the founders’, SAFE investor’s, and new investor’s shares are worth $v_{\text{pre}}, m_{\text{safe}}, m_{\text{new}}$, respectively. This is a rational outcome for each of the parties.

However, the actual situation is more complex for the other (apparently more common [2]) characterization of post-money valuation. According to $(vm_{\text{pre,post}})$, the post-money valuation is $v_{\text{pre}} + m_{\text{new}}$. This means that the value of the holding of the SAFE investor after the round is

$$o_{\text{safe}}(v_{\text{pre}} + m_{\text{new}}) = m_{\text{safe}} \cdot \frac{v_{\text{pre}} + m_{\text{new}}}{v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}} < m_{\text{safe}}.$$ 

Thus, in fact, the SAFE investor does not get quite their money back in this case. Similarly, the value of the new investor’s shares on this view of the post-money valuation is

$$o_{\text{new}}(v_{\text{pre}} + m_{\text{new}}) = m_{\text{new}} \cdot \frac{v_{\text{pre}} + m_{\text{new}}}{v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}} < m_{\text{new}}.$$ 

This is in agreement with the remarks in Section 4 concerning dilution of the new investor, since $o_{\text{new}}$ is less than the proportion $m_{\text{new}}/(v_{\text{pre}} + m_{\text{new}})$ that the new investor would hold after a standard equity round.

**Case 2 ($v_{\text{pre}} > c$):** In this case $p_{\text{safe}} = c/s_f < v_{\text{pre}}/s_f = p_{\text{new}}$, and the number of shares held by the founders, SAFE investor and new investor after the equity round are, respectively,

$$s_f, \quad m_{\text{safe}}s_f/c, \quad m_{\text{new}}s_f/v_{\text{pre}}.$$ 

This implies that the proportional holdings can be written in terms of monetary value in the form

\[
\begin{align*}
&\quad \frac{v_{\text{pre}}}{v_{\text{pre}} + \frac{v_{\text{pre}}m_{\text{safe}}}{c} + m_{\text{new}}}, \quad \frac{m_{\text{safe}}v_{\text{pre}}}{v_{\text{pre}} + \frac{v_{\text{pre}}m_{\text{safe}}}{c} + m_{\text{new}}}, \quad \frac{m_{\text{new}}}{v_{\text{pre}} + \frac{v_{\text{pre}}m_{\text{safe}}}{c} + m_{\text{new}}}.
\end{align*}
\]

As already noted above, also in Case 2, the new investor may receive shares of lesser post-money value than they paid for, if one takes equation $(vm_{\text{pre,post}})$ to describe the post-money valuation. On this understanding, the value of the
SAFE holder’s shares after the raise is

\[
\frac{v_{\text{pre}} + m_{\text{new}}}{s_f + s_{\text{safe}} + s_{\text{new}}} = \frac{m_{\text{safe}}}{p_{\text{safe}}} = \frac{v_{\text{pre}} + m_{\text{new}}}{s_f p_{\text{safe}} + s_{\text{safe}} p_{\text{safe}} + s_{\text{new}} p_{\text{safe}}}
\]

\[
= m_{\text{safe}} \cdot \frac{v_{\text{pre}} + m_{\text{new}}}{c + m_{\text{safe}} + (cm_{\text{new}}/v_{\text{pre}})}
\]

where the last step uses, respectively, the definition of \(p_{\text{safe}}\) in the SAFE contract, the Case 2 definition of \(s_{\text{safe}}\) in the SAFE contract, and equation \((v_{\text{sp}})\).

This means the SAFE investor makes an (unrealised) profit on the investment \(m_{\text{safe}}\) provided \(v_{\text{pre}} + m_{\text{new}} > c + m_{\text{safe}} + (cm_{\text{new}}/v_{\text{pre}})\). This is a quadratic constraint on \(v_{\text{pre}}\). Taking into account that we are in a case where \(v_{\text{pre}} \geq c\), this constraint can be shown\(^3\) to hold just when

\[
v_{\text{pre}} \geq \frac{c + m_{\text{safe}} - m_{\text{new}} + \sqrt{(m_{\text{new}} - c - m_{\text{safe}})^2 + 4m_{\text{new}} c}}{2}.
\]

This condition does not seem to have a strong rationale, particularly as it depends on the amount \(m_{\text{new}}\) of new money, whereas one might have expected a condition that depends just on the terms of the SAFE contract. A sufficient condition for this that does make some sense is \(v_{\text{pre}} \geq c + m_{\text{safe}}\). (In a scenario where the SAFE investor had made their investment of \(m_{\text{safe}}\) in a standard round at valuation \(c\), this would say that the company has not lost value from its post-money valuation \(c + m_{\text{safe}}\) by the time of the new equity round at valuation \(v_{\text{pre}}\).)

However, if we take the post-money valuation to be given by equation \((v_{\text{sp}})\), we have that

\[
v_{\text{post}} = p_{\text{new}} S_{\text{post}} = p_{\text{new}} s_f + p_{\text{new}} s_{\text{safe}} + p_{\text{new}} s_{\text{new}} = v_{\text{pre}} + (v_{\text{pre}} m_{\text{safe}}/c) + m_{\text{new}}
\]

and \(v_{\text{post}} o_{\text{safe}} = (v_{\text{pre}} + (v_{\text{pre}} m_{\text{safe}}/c) + m_{\text{new}}) o_{\text{safe}} = m_{\text{safe}} (v_{\text{pre}}/c)\). Since \(v_{\text{pre}} > c\) in this case, this is always a gain on the SAFE investors original

\[3\]The polynomial has zeros at

\[
v_{\text{pre}} = \frac{c + m_{\text{safe}} - m_{\text{new}} \pm \sqrt{(m_{\text{new}} - c - m_{\text{safe}})^2 + 4m_{\text{new}} c}}{2}.
\]

Prima facie, there may be two regions where the constraint is satisfied, to the left and right of these roots, but we have the further constraint that \(v_{\text{pre}} \geq c\). It is therefore convenient to work with a translation: write \(v_{\text{pre}} = c + x\), where \(x \geq 0\). The constraint then becomes

\[
x + \frac{x \cdot m_{\text{new}}}{c + x} > m_{\text{safe}}.
\]

Note that in the case \(x = 0\) this amounts to the practical absurdity \(0 > m_{\text{safe}}\), so cannot be a solution. The value \(x = 0\) therefore sits in the region where the polynomial is negative, and there is in fact only a single region satisfying both constraints, that to the right of the rightmost root.
investment. Additionally, \(v_{\text{post}} o_{\text{new}} = m_{\text{new}}\), and \(v_{\text{post}} o_f = v_{\text{pre}}\) so the values of the shares held by the new investor and founders are rational on this assumption.

In summary, in both cases of the SAFE note, we see that literal interpretation of the SAFE note using \((v_{\text{sp}}^\text{pre})\) and \((m_{\text{sp}}^\text{new})\) produces rational outcomes for the parties under the assumption that the post-money valuation is given by \((v_{\text{sp}}^\text{post})\), but is problematic when the post-money valuation is given by \((v_{\text{mp}}^\text{pre,post})\). This conclusion is consistent with the conclusions of Section 5: use of \((v_{\text{sp}}^\text{pre})\) corresponds to the Liability View of the SAFE note, which implies that \((v_{\text{sp}}^\text{post})\) and \((v_{\text{mp}}^\text{pre,post})\) describe the post-money valuation. From the above calculations, we see that the implied valuation \(v_{\text{safe}}\) of the SAFE note is

\[
v_{\text{safe}} = \begin{cases} 
  m_{\text{safe}} & \text{if } v_{\text{pre}} \leq c \\
  m_{\text{safe}} \cdot \frac{v_{\text{pre}}}{c} & \text{if } v_{\text{pre}} > c
\end{cases}
\]

on the Liability View.

7 Percent-Ownership Method

Notwithstanding the analysis of the previous section, on which the SAFE note is rational with respect to the Liability View of accounting, it appears from Colla [2], that equity round investors are interpreting term sheets stating pre-money valuation \(v_{\text{pre}}\) and new money \(m_{\text{new}}\) with the expectation (valid for standard equity rounds) that this delivers them a proportional shareholding of \(v_{\text{pre}}/(v_{\text{pre}} + m_{\text{new}})\). As shown above, for both cases of the SAFE note, the actual proportional shareholding is less than this when the standard method is applied.

One of the approaches used in response to this perceived dilution suffered by a new investor as a consequence of shares issued in conversion of a convertible note is called the percent-ownership method [2]. The idea is to construct the equity round so as to guarantee to the new investor an agreed upon share of the company on completion of the round. Having agreed upon this share, the other variables are calculated so as to deliver this outcome. This approach resolves the inconsistency of Section 4 by dropping equation \((v_{\text{sp}}^\text{pre})\) as a way to calculate \(p_{\text{new}}\) given \(v_{\text{pre}}\), and instead calculates the value of \(p_{\text{new}}\) using equations \((v_{\text{sp}}^\text{post})\) and \((v_{\text{mp}}^\text{pre,post})\). In our scenario, this works in two steps, as follows.

**Step 1:** We fix the post-money proportional ownership \(o_{\text{new}}\) of the new investor to the agreed upon value. To deliver this outcome, we need

\[
o_{\text{new}} = \frac{m_{\text{new}}}{v_{\text{post}}} \quad \text{(omv}_{\text{post}})
\]

in terms of monetary value, so using equation \((v_{\text{mp}}^\text{pre,post})\), we get

\[
o_{\text{new}}(v_{\text{pre}} + m_{\text{new}}) = m_{\text{new}}. \quad (5)
\]

We can then calculate the pre-money valuation as \(v_{\text{pre}} = m_{\text{new}}(1 - o_{\text{new}})/o_{\text{new}}\). We remark that, having determined \(v_{\text{pre}}\), the remainder of the calculation does
not need to treat $o_{new}$ as an input, but can rederive it using equations ($omv_{post}$) and ($vm_{pre,post}$). Thus, an equivalent starting point for Step 2 would be the assumption that $m_{new}$ and $v_{pre}$ are given, and that we seek to determine a price per share that yields a percentage ownership $o_{new}$ whose post-money value is $m_{new}$.

**Step 2:** An alternate way to express the post-money proportional ownership attained for the new investors is to formulate it in terms of number of shares:

$$o_{new} = \frac{s_{new}}{s_f + s_{safe} + s_{new}}.$$  \hspace{1cm} (os_{new})

Combining this with ($omv_{post}$) and ($vm_{pre,post}$), we get

$$\frac{s_{new}}{s_f + s_{safe} + s_{new}} = \frac{m_{new}}{v_{pre} + m_{new}}.$$  \hspace{1cm} (6)

From this, we derive

$$s_{new} = \frac{m_{new}}{v_{pre}} (s_f + s_{safe}).$$  \hspace{1cm} (7)

It is worth noting that this formula effectively states that the new shares are issued at a price

$$p_{new} = \frac{v_{pre}}{s_f + s_{safe}}$$

that assumes that the SAFE holder’s shares $s_{safe}$ have already been issued prior to the equity round at $v_{pre}$. This corresponds precisely to the Cap Table accounting view, with the SAFE note represented on the cap table as an obligation to issue shares. Equation ($v_{sp_{pre}}$) fails on this method, but it is consistent to use of ($vm_{pre,post}$) to determine the relationship between pre- and post-money valuations: since the SAFE note is not represented as a liability, all that changes with respect to valuation is to add $m_{new}$ to the assets of the company.

While equation ($v_{sp_{pre}}$) does not express the relationship between $p_{new}$ and $v_{pre}$, we note that we could use this equation to determine a valuation $v_{pre}^*$ that does satisfy this equation, namely,

$$v_{pre}^* = p_{new} s_f = \frac{v_{pre} s_f}{s_f + s_{safe}} = v_{pre} - \frac{v_{pre} s_{safe}}{s_f + s_{safe}} = v_{pre} - p_{new} s_{safe}.$$

The term $v_S = p_{new} s_{safe}$ can be understood as the valuation of the SAFE contract, so we have $v_{post} = v_{pre} + m_{new} = v_{pre}^* + v_S + m_{new}$. Thus, the relationship between $v_{pre}^*$ and $v_{post}$ is precisely what we would expect on the Liability View accounting model, where the SAFE note is represented as a liability that converts to shares in the course of the transaction at price $p_{new}$. Note moreover that

$$v_{post} = v_{pre}^* + v_S + m_{new} = p_{new} (s_f + s_{safe} + s_{new}) = p_{new} S_{post}$$

by equation ($msp_{new}$) and the definitions above, so that equation ($v_{sp_{post}}$) is derivable.

However, since we have not yet determined $s_{safe}$, which, according to the SAFE note, depends on $p_{new}$, we cannot yet calculate $p_{new}$. Instead, we apply
the definitions from the SAFE contract as additional constraints that together with equation (7) determine a value for $p_{\text{new}}$. The calculation is different in the two cases of the SAFE note.

**Case** $v_{\text{pre}} \leq c$: In this case the SAFE note requires that $s_{\text{safe}} = m_{\text{safe}}/p_{\text{new}}$. Since $s_{\text{new}} = m_{\text{new}}/p_{\text{new}}$, by ($msp_{\text{new}}$), we get from (7) that

$$\frac{m_{\text{new}}}{p_{\text{new}}} = \frac{m_{\text{new}}}{v_{\text{pre}}} (s_f + \frac{m_{\text{safe}}}{p_{\text{new}}}) .$$

We solve this for $p_{\text{new}}$ to get

$$p_{\text{new}} = \frac{v_{\text{pre}} - m_{\text{safe}}}{s_f} .$$

(Obviously, this price makes sense only if $m_{\text{safe}} < v_{\text{pre}}$, so this case actually can occur only in the stronger condition $m_{\text{safe}} < v_{\text{pre}} \leq c$.) This gives $s_{\text{safe}} = m_{\text{safe}}s_f/(v_{\text{pre}} - m_{\text{safe}})$. Since we have guaranteed that the post-money value per share is $p_{\text{new}}$, the SAFE holder’s shares are worth $p_{\text{new}}s_{\text{safe}} = m_{\text{safe}}$, so the SAFE holder is guaranteed not to lose money. The proportional holding for the SAFE holder, expressed in terms of money, is

$$o_{\text{safe}} = \frac{m_{\text{safe}}}{v_{\text{pre}} + m_{\text{new}}} .$$

We already have $o_{\text{new}}$ as given by equation (5), so the resulting founder share is

$$o_f = 1 - o_{\text{safe}} - o_{\text{new}}$$

$$= \frac{v_{\text{pre}} - m_{\text{safe}}}{v_{\text{pre}} + m_{\text{new}}} .$$

According to the formulation ($vm_{\text{pre, post}}$) of post-money value that we have used in this derivation, the post-money value of the founder, SAFE investor and new investor’s shares are, respectively, $v_{\text{pre}} - m_{\text{safe}}, m_{\text{safe}}$ and $m_{\text{new}}$. This case is therefore rational for the SAFE investor and the new investor, in that they get shares equivalent to their investment. Note also that the sum of these post-money amounts is $v_{\text{pre}} + m_{\text{new}}$, so they satisfy ($vm_{\text{pre, post}}$).

**Case** $v_{\text{pre}} > c$: Here we have $s_{\text{safe}} = m_{\text{safe}}/p_{\text{safe}} = m_{\text{safe}}s_f/c$, and we get from (7) that

$$s_{\text{new}} = \frac{m_{\text{new}}}{v_{\text{pre}}} (s_f + \frac{m_{\text{safe}}s_f}{c}) = m_{\text{new}} \frac{s_f}{v_{\text{pre}}} \frac{c + m_{\text{safe}}}{c} .$$

Thus, the new investor pays a share price

$$p_{\text{new}} = \frac{v_{\text{pre}} c}{s_f c + m_{\text{safe}}} .$$
rather than the expected $v_{pre}/s_f$. The SAFE holder’s share of the company in this case is

$$o_{safe} = \frac{m_{safe}s_f}{s_f + m_{safe}s_f + m_{new}v_{pre}c + m_{safe}c}$$

and the founder share is the balance

$$o_f = \frac{c}{c + m_{safe}} \cdot \frac{v_{pre}}{v_{pre} + m_{new}}.$$

Comparing this outcome with 2, we see that this case operates in the same way as two equity rounds, in the first of which the SAFE holder purchases shares at pre-money valuation $c$, and in the second of which the new investor purchases shares at pre-money valuation $v_{pre}$.

**Discounted Valuation Method**

It is worth remarking that there is an alternate viewpoint that leads to essentially the same conclusions as just derived. One way that the new investor might respond to their perceived dilution is to “game” the situation, by conducting the equity round at a “discounted” pre-money valuation that differs from their actual valuation of the company, and which is designed to deliver an equity holding that better accords with this actual valuation, once the consequences of the SAFE are taking into account. (We emphasize that the discount we refer to here is for the new investor, and different from the discount on the conversion price provided to the SAFE investor in some versions of the SAFE — we are still concerned with the SAFE with cap and no discount.)

Suppose that the new investor’s actual pre-money valuation of the company (ignoring the existence of a SAFE contract) is $v_{pre}$. We write $v_{pre}^{-}$ to denote the pre-money valuation at which the equity round is actually conducted – this variable is taken as an unknown, with its value to be derived. As in a standard equity round, we apply equation $(vsp_{pre})$ to determine a price per share from $v_{pre}^{-}$, and then determine the number of shares issued to the new investor using $(msp_{new})$ based on this price per share. For purposes of selecting the applicable case of the SAFE contract, we use $v_{pre}^{-}$ rather than $v_{pre}$. We first use $v_{pre}^{-}$ to calculate the number of shares issued to the SAFE investor and the new investor, but then calculate the value of those shares using $v_{pre}$ and characterization $(vm_{pre,post})$ of the post-money valuation. Assuming that the post-money valuation of the new investor’s shares should equal $m_{new}$ gives a constraint on $v_{pre}^{-}$ that we then use to derive a value for $v_{pre}^{-}$.

Since the equity round is conducted at valuation $v_{pre}^{-}$, based on existing shares $s_f$, we have $p_{new}s_f = v_{pre}^{-}$ by equation $(vsp_{pre})$ and $p_{new}s_{new} = m_{new}$ by equation $(msp_{new})$. After the equity round, using the actual valuation $v_{pre}$
and equation \((vm_{pre,post})\), the post-money valuation is \(v_{pre} + m_{new}\). Thus, the post-money price per share is

\[
\frac{v_{pre} + m_{new}}{s_f + s_{safe} + s_{new}}.
\]

In order for the new investor’s shares to still be valued at \(m_{new}\) in the post-money state, since we have \(p_{new}s_{new} = m_{new}\), this post-money price per share must equal \(p_{new}\). Hence, we need

\[
\frac{v_{pre} + m_{new}}{s_f + s_{safe} + s_{new}} = \frac{m_{new}}{s_{new}}
\]

from which we obtain

\[
v_{pre} + m_{new} = p_{new}(s_f + s_{safe} + s_{new}) = p_{new}s_f + p_{new}s_{safe} + p_{new}s_{new} = v_{pre}^- + p_{new}s_{safe} + m_{new}
\]

where we use equation \((vsp_{pre})\) for the first term and equation \((msp_{new})\) for the third term on the right. Thus, we conclude that \(v_{pre}^- = v_{pre} - s_{safe}p_{new}\) is a valuation that guarantees that the post-money valuation of the new investor’s shares will be \(m_{new}\). Note also that the left and right hand sides of (first line of) the above equation are just the two formulations of \(v_{post}\) of equations \((vm_{pre,post})\) and \((vsp_{post})\), so this approach will guarantee that these formulations are equivalent. Additionally, note that equation (8) is equivalent to equation (6), so we have reached the same constraint as above from a different perspective.

As above, we do not yet have actual values for \(v_{pre}^-, s_{safe}\) or \(p_{new}\), but we can obtain these by noting that the details of the SAFE contract provide additional constraints, and use these to derive the values of these variables. We obtain the same formulas for share price and proportional shareholding as above, and discounted valuations \(v_{pre}^- = v_{pre} - m_{safe}\) when \(v_{pre}^- \leq c\) and

\[
v_{pre}^- = v_{pre}^- \cdot \frac{c}{c + m_{safe}}
\]

otherwise.

The present perspective, of an equity round at the lower valuation \(v_{pre}^-\), does result one difference, however. Since the SAFE contract is invoked at valuation \(v_{pre}^-\) rather than \(v_{pre}\), the conditions under which the cases of the SAFE contract apply are different. Instead of the conditions \(v_{pre} \leq c\) and \(v_{pre} > c\) for the cases given above, we have conditions \(v_{pre}^- \leq c\) and \(v_{pre}^- > c\), or equivalently, \(v_{pre} - m_{safe} \leq c\) and \(v_{pre} - m_{safe} > c\).

It is possible for these case conditions to be different in the two approaches because, while the SAFE contract refers to both a pre-money valuation and a share price, it does not explicitly state how these should be related. One could take the view that it is an assumption of the contract that these variables are related to outstanding shares by equation \((vsp_{pre})\). The first approach of
this section, uses a price which, by equation \((v_{sp_{pre}})\), corresponds to the same discounted valuation \(v_{pre} - s_{safe}p_{new}\) as just derived. Thus, there is a reasonable argument that the case conditions used in the first approach should be the same as those used in the second approach of this section, making the two approaches completely equivalent.

If either \(v_{pre} \leq c\) (implying \(v_{pre} - m_{safe} \leq c\)) or \(v_{pre} - m_{safe} > c\) (implying \(v_{pre} > c\)), then the two approaches agree with respect to selection of the SAFE case. However, when \(c < v_{pre} \leq c + m_{safe}\), the first and second approaches yield for the SAFE investor proportional shareholdings of

\[
\frac{m_{safe}}{c + m_{safe}} \cdot \frac{v_{pre}}{v_{pre} + m_{new}} = \frac{m_{safe}}{v_{pre} + m_{new}} \cdot \frac{v_{pre}}{c + m_{safe}} \quad \text{and} \quad \frac{m_{safe}}{v_{pre} + m_{new}}
\]

respectively. Under the condition \(v_{pre} < c + m_{safe}\), the latter is the larger holding, so preferable to the SAFE investor. There is therefore a risk that, when \(c < v_{pre} < c + m_{safe}\), the SAFE holder may legally challenge the first approach on the grounds that it does not satisfy equation \((v_{sp_{pre}})\), and that this should be considered part of the implicit legal context of the SAFE contract, even if it is not explicitly stated. From the point of view of legal certainty, it may therefore be preferable to use the second approach. (It is a weakness of the SAFE contract that it allows uncertainty on this point.)

A further reason to prefer the second, Discounted Valuation, approach is that, intuitively, one expects that the market should be able to set any price for the company’s shares, but the first approach does not support this. On the first approach, in case \(v_{pre} \leq c\) and \(v_{pre} > m_{safe}\), we have that the price \(p_{new} = (v_{pre} - m_{safe})/s_f\) takes on any value in the interval \((0, (c - m_{safe})/s_f)\]. In case \(v_{pre} > c\), the price \(p_{new} = v_{pre}c/s_f(c + m_{safe})\) takes on any value in the interval \((c^2/s_f(c + m_{safe}), \infty)\]. This leaves prices in the interval \([(c - m_{safe})/s_f, c^2/s_f(c + m_{safe})]\) unattainable. (Note that the statement that the left value is less than the right value is equivalent to \(c^2 - m_{safe}^2 < c^2\), which holds provided \(m_{safe} > 0\) – we can safely assume that this is the case, else the SAFE note is inconsequential.) On the other hand, under the second approach, where the conditions for the two cases are \(v_{pre} - m_{safe} \leq c\) and \(v_{pre} - m_{safe} > c\), we obtain prices in the intervals \((0, c/s_f)\] and \((c/s_f, \infty)\], so all non-zero prices are attainable.

From an accounting perspective, since we have used equation \((vm_{pre, post})\), we should think of \(v_{pre}\) as a valuation of the company that does not include the SAFE note as a liability. Consistent with this, as already noted, equation (7) effectively states that the price for the new investor is determined assuming that the SAFE shares are already represented on the cap table. However, the post-money valuation can also be written as \(v_{pre}^- + p_{new} s_{safe} + m_{new}\). Taking \(v_{safe} = p_{new} s_{safe}\) to be the valuation of the SAFE note, we see that \(v_{pre}^-\) can be thought of as a valuation of the company on the assumption that the SAFE note is accounted for as a liability, which is discharged in the course of the equity round, so that the correct equation relating this interpretation of the pre-money valuation to the post-money valuation is \(v_{post} = v_{pre}^- + v_{safe} + m_{new}\). The analysis in this section is therefore consistent with both accounting methods.
Using the conditions from the second (discounted valuation) method, we obtain a valuation of the SAFE note given by

\[
v_{\text{safe}} = \begin{cases} 
  m_{\text{safe}} & \text{if } v_{\text{pre}} - m_{\text{safe}} \leq c \\
  m_{\text{safe}} \cdot \frac{v_{\text{pre}}}{c + m_{\text{safe}}} & \text{if } v_{\text{pre}} - m_{\text{safe}} > c 
\end{cases}
\]

Note that the second formulation, with case conditions expressed in terms of \(v_{\text{pre}}^{-1}\), corresponds directly to the valuation obtained from the Standard method with respect to the Liability View in Section 6.

8 Dollars Invested Method

Another approach that has been used in practice to deal with dilution of the new investor resulting from convertible bond conversion is the Dollars Invested method. According to Colla [2], this method is used to allay founder objections to the fact that the percent-ownership method results in them being diluted more than they expected when setting a term sheet with the new investors. As a compromise, the agreed pre-money valuation is used, but the post-money valuation is set to be equal to the pre-money valuation plus the new-money, plus the principal (and interest, if any) of the convertible bond. Based on this post-money valuation, a share price is calculated that results in the agreed ownership percentage for the new investor. That is, instead of equation \((v_{\text{pre}}, v_{\text{post}})\), we use the following:

\[
v_{\text{post}} = v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}.
\]

For the SAFE contract with cap and no discount, this might work as follows. In order to determine the price paid by the new investor, we equate the revised post-money valuation from equation \((v_{\text{mi,pre}}, v_{\text{post}})\) with the product of the price and the number of post-money shares, as per equation \((v_{\text{sp,post}})\), giving

\[
v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}} = p_{\text{new}}(s_f + s_{\text{safe}} + s_{\text{new}}) = p_{\text{new}}s_f + p_{\text{new}}s_{\text{safe}} + m_{\text{new}}\cdot (9)
\]

where we use equation \((m_{\text{sp, new}})\) to get the rightmost term. There are two cases for \(s_{\text{safe}}\), depending on \(v_{\text{pre}}\), the pre-money valuation.\footnote{We remark that a question arises as to whether we should use the value \(v_{\text{pre}}\) agreed in the term sheet, or \(v_{\text{pre}} + m_{\text{safe}}\), i.e., the post-money valuation being used in the calculation, minus the new money. The fact that we have \(p_{\text{new}} = v_{\text{pre}}/s_f\), exactly as in a standard equity round suggests the former, but the SAFE holder may possibly have a legal case to argue for the latter. The latter approach would yield the same formulas for the two cases, but shift the intervals over which they hold, so we do not treat this as a separate method.}

**Case** \(v_{\text{pre}} \leq c\): In this case \(s_{\text{safe}}p_{\text{new}} = m_{\text{safe}}\), so the equation (9) becomes \(v_{\text{pre}} = p_{\text{new}}s_f\), and we deduce \(p_{\text{new}} = v_{\text{pre}}/s_f\). (It is interesting to note that
here we have derived rather than assumed equation \((v_{sp_{pre}})\). However, it holds only in this case, and fails in the other case.) Dividing both sides of equation (9) by the left-hand side, we obtain the proportional shareholdings of the founders, SAFE investor and new investor, respectively, as

\[
\frac{v_{pre}}{v_{pre} + m_{safe} + m_{new}} \quad \frac{m_{safe}}{v_{pre} + m_{safe} + m_{new}} \quad \frac{m_{new}}{v_{pre} + m_{safe} + m_{new}}.
\]

This shareholding is the same as would have been produced had the SAFE holder and the new investor used their money to participate in a single equity round together, at pre-money valuation \(v_{pre}\).

**Case** \(v_{pre} > c\): In this case, we have \(s_{safe} = m_{safe} s_f / c\). Thus equation (9) becomes

\[
v_{pre} + m_{safe} = p_{new} s_f + p_{new} \frac{m_{safe} s_f}{c}
\]

and we obtain

\[
p_{new} = \frac{c}{c + m_{safe}} \frac{v_{pre} + m_{safe}}{s_f}.
\]

Dividing both sides of equation (9) by the left-hand side, we obtain the proportional shareholdings of the founders, SAFE investor and new investor, respectively, as

\[
\frac{c}{c + m_{safe}} \quad \frac{v_{pre} + m_{safe}}{v_{pre} + m_{safe} + m_{new}} \quad \frac{m_{safe}}{c + m_{safe}} \quad \frac{v_{pre} + m_{safe}}{v_{pre} + m_{safe} + m_{new}} \quad \frac{m_{new}}{v_{pre} + m_{safe} + m_{new}}.
\]

Comparing with 2, this is exactly the same outcome as would have been obtained in two equity rounds, in the first of which the SAFE holder purchased shares at valuation \(c\), and in the second of which the new investor purchased shares at valuation \(v_{pre} + m_{safe}\).

The rationality of this method depends on the view one takes of the “actual” post-money valuation, and the assumptions on which the pre-money valuation \(v_{pre}\) was determined. If \(v_{pre}\) was calculated on the assumption that the SAFE note is not a liability, then the actual post-money valuation is \(v_{pre} + m_{new}\), and the new investor suffers a dilution, as they do in the standard method, though to a smaller extent.

From an accounting perspective, perhaps the best rationale that can be given for this method is by viewing the transaction as a two-stage process. Suppose the new investor starts by valuing the company on the basis that the SAFE note is represented as a liability with value \(m_{safe}\), determining \(v_{pre}\) as the valuation on this assumption. In the first stage, the liability is transferred to an obligation on the cap table, increasing the valuation to \(v_{pre} + m_{safe}\). The price per share \(p_{new}\) is then calculated on the assumption that the existing shares are \(s_f\), plus the obligation to issue shares \(s_{safe}\). This viewpoint yields the equation \(v_{pre} + m_{safe} = p_{new} (s_f + s_{safe})\), which is equivalent to the equation (9) used above, and supports the assumption that the post-money valuation
is $v_{pre} + m_{safe} + m_{new}$. However, this method disagrees with the discounted valuation method on the proper valuation of the SAFE note. The discounted valuation method takes this to be equal to $s_{safe}p_{new}$, which is equal to $m_{safe}$ in case $v_{pre} \leq c + m_{safe}$, but which equals the larger amount

$$m_{safe} : \frac{v_{pre}}{c + m_{safe}}$$

when $v_{pre} > c + m_{safe}$. Thus, the Dollars Invested method arguably undervalues the SAFE note.

### 9 Two Stage Approach

Some investors may respond to the perceived dilution they would suffer from the standard method, with post-money defined by equation $(vm_{pre,post})$, by simply refusing to invest until the SAFE note is extinguished by some means. One way this could be achieved is to conceptually structure the transaction in two stages. In the first stage, an artificial equity round is executed in which a minimal amount of new money is invested, simply in order to force conversion of the SAFE note into shares. Although it may not be legally feasible, in the limit, “minimal amount” is zero, so we assume for purposes of the analysis that no new money is invested in the first stage round. In the second stage, the new investor purchases shares at valuation $v_{pre}$ for money $m_{new}$, exactly as in a standard equity round. This purchase is free from dilution by the issuance of SAFE shares, so, by the argument of Section 3, the new investor receives a share $m_{new}/(v_{pre} + m_{new})$, as expected.

The SAFE investor may have legal grounds to challenge such an approach as being artificially constructed and prohibited by the terms of the SAFE. The text of the SAFE defines “Equity Financing” as a

>a bona fide transaction or series of transactions with the principal
purpose of raising capital, ...

and the SAFE investor might claim that the two stages constitute a single equity financing, or that the transactions are not “bona fide”. Nevertheless, this approach provides an interesting comparison with those already discussed.

We assume that the new investor is prepared to invest in stage 2 at valuation $v_{pre}$, and that this fact is known when constructing stage 1. In order to focus on the value of the SAFE investor’s original investment, we will assume here that the SAFE investor does not take up, at additional cost, any pro-rata rights that they might have in this second stage. The consequences of this two-stage approach depend on how the first stage is negotiated. There are two possibilities for the first stage:

**Discounted Valuation:** The new investor could allow the conversion terms to be agreed between the company and the SAFE investor. Whereas usually, the SAFE investor does not have rights to set the terms of the equity round,
the negotiation between the company and SAFE investor in this situation gives some power to the SAFE investor to set terms for the conversion. They are likely to insist on avoidance of any loss, where possible. One way to achieve this is to use the Discounted method. Using the results of Section 7 with $m_{new} = 0$, we get the proportional shareholdings for the founders and SAFE investor after stage 1 of

\[
\frac{v_{pre} - m_{safe}}{v_{pre}}, \quad \frac{m_{safe}}{v_{pre}}, \quad \frac{m_{new}}{v_{pre}}
\]

respectively, in case $m_{safe} < v_{pre} \leq c + m_{safe}$, and

\[
\frac{c}{c + m_{safe}}, \quad \frac{m_{safe}}{c + m_{safe}}, \quad \frac{m_{new}}{c + m_{safe}}
\]

in case $v_{pre} > c + m_{safe}$. In either case, the value of the SAFE investor’s shares is at least $m_{safe}$, so the SAFE investor has not lost.

In stage 2, these holdings are diluted by the new money in the same way that the founders are diluted in a standard equity round as discussed in Section 3. Thus, the proportional holdings become, for the founders, SAFE investor and new investor, respectively:

1. In case $m_{safe} < v_{pre} \leq c + m_{safe}$:

\[
\frac{v_{pre} - m_{safe}}{v_{pre} + m_{new}}, \quad \frac{m_{safe}}{v_{pre} + m_{new}}, \quad \frac{m_{new}}{v_{pre} + m_{new}}
\]

2. In case $v_{pre} > c + m_{safe}$:

\[
\frac{c}{c + m_{safe}}, \quad \frac{v_{pre}}{v_{pre} + m_{new}}, \quad \frac{m_{safe}}{c + m_{safe}}, \quad \frac{v_{pre}}{c + m_{safe}}, \quad \frac{m_{new}}{v_{pre} + m_{new}}
\]

Since we have used the Discounted Valuation method in the first round, the same remarks concerning accounting model appropriate to the method apply as in Section 7. The first round is consistent with both the treatment of the SAFE note as represented on the cap table, or (with respect to discounted valuation $v_{pre} - p_{new,safe}$) with the treatment of the SAFE note as a liability.

**Standard Method:** The Discounted Valuation method results in a lower proportional shareholding for the founders. In the interests of maximizing founder incentives, the new investor may prefer to ensure that the founders retain a larger share. The SAFE investor does not have bargaining rights in the construction of the equity round in which the SAFE note converts. The new investor can therefore construct the first stage using the standard method from Section 6, which delivers the founders a higher proportional shareholding.

There is the option to conduct this round at a valuation other than the new investor’s actual valuation $v_{pre}$, which will be used in the second round. The optimal valuation, from the founders’ point of view, is a round at valuation $c$ or greater, since this delivers them a share after the first round of $c/(c + m_{safe})$. 26
which is always greater than $v/(v + m_{safe})$ for $v < c$. However, this outcome differs from the result of a round at valuation $v_{pre}$ only if $v_{pre} < c$. The new investor does not have an incentive to conduct the first stage at a valuation greater than $v_{pre}$, since that may create a precedent for the founders to argue that the second round should also be conducted at such a higher valuation. Hence a first round valuation different from $v_{pre}$ lacks motivation.

Using the approach and results of Section 6 with $m_{new} = 0$, conducting the first round at valuation $v_{pre}$ leads to the following consequences after stage 1.

1. If $v_{pre} \leq c$, then founder and SAFE investor proportional shareholdings are

\[
\frac{v_{pre}}{v_{pre} + m_{safe}}, \quad \frac{m_{safe}}{v_{pre} + m_{safe}}
\]

respectively.

2. If $v_{pre} > c$, then founder and SAFE holder proportional shareholdings are

\[
\frac{c}{c + m_{safe}}, \quad \frac{m_{safe}}{c + m_{safe}}
\]

respectively. The SAFE investor receives a fixed share of the company in this case, equivalent to having purchased their shares at valuation $c$ in a standard equity round. They have made an unrealised gain in case this share of the valuation $v_{pre}$ is greater than $m_{safe}$, which holds if $v_{pre} > c + m_{safe}$.

In stage 2, these holdings are diluted by the new money in the same way that the founders are diluted in a standard equity round as discussed in Section 3. Thus, the proportional holdings become, for the founders, SAFE investor and new investor, respectively:

1. In case $v_{pre} < c$:

\[
\frac{v_{pre}}{v_{pre} + m_{safe}}, \quad \frac{v_{pre}}{v_{pre} + m_{new}}, \quad \frac{m_{safe}}{v_{pre} + m_{safe}}, \quad \frac{v_{pre}}{v_{pre} + m_{new}}, \quad \frac{m_{new}}{v_{pre} + m_{new}}
\]

2. In case $v_{pre} \geq c$:

\[
\frac{c}{c + m_{safe}}, \quad \frac{v_{pre}}{v_{pre} + m_{new}}, \quad \frac{m_{safe}}{c + m_{safe}}, \quad \frac{v_{pre}}{v_{pre} + m_{new}}
\]

The appropriate accounting approach for this method is the same as for the Standard method applied in stage 1, namely, the Liability view. However, we note that this yields a post-money valuation after stage 1 of $v_{pre} + v_{safe}$, which is less than the pre-money valuation $v_{pre}$ used for stage 2. Thus, the compromise that has effectively been made in the interest of the founders is to conduct the first stage at a higher pre-money valuation than is warranted by the new investors valuation of the company. This overvaluation is then corrected in a “down-round” in stage 2. This method is therefore not fully rational.
As already noted above, the SAFE investor may have grounds to argue that the approaches of the present section are prohibited by the terms of the SAFE contract. Particularly in case the first round applies the Standard Method, the SAFE investor has a case that they were disadvantaged as a result of the artificial construction used.

10 Post-money SAFE

Thus far in the paper, we have been focused on an original version of the SAFE (with cap and no discount). Y Combinator introduced a “post-money SAFE” as its new standard deal in late 2018 [5], supplanting the previous SAFE versions. Like the previous “pre-money” SAFE, there are four distinct versions of this new contract, allowing a choice to be made on whether to include a cap and/or a discount. There are differences from the original in several key regards, including the equity financing clause that is our focus in this paper. In this section we compare the post-money (with cap and no discount [10]) SAFE’s handling of Equity Financing with that of the pre-money SAFE, and analyse the post-money SAFE with respect to the same scenario as treated above, in which a single SAFE note has been issued.

In essence, the post-money SAFE is more explicit with respect to the method of its operation. Like the pre-money SAFE, it has a Purchase Amount and a cap, which is called the “Post-Money Cap”. The Equity Financing clause of the post-money SAFE states the following:

**Equity Financing.** If there is an Equity Financing before the termination of this Safe, on the initial closing of such Equity Financing, this Safe will automatically convert into the greater of: (1) the number of shares of Standard Preferred Stock equal to the Purchase Amount divided by the lowest price per share of the Standard Preferred Stock; or (2) the number of shares of Safe Preferred Stock equal to the Purchase Amount divided by the Safe Price.

One apparent difference is that whereas the Equity Financing clause in the pre-money SAFE makes explicit reference to both pre-money valuation and price, this clause refers only to price. Thus, the issue we raised above, whether equation \( vsp_{pre} \) governs the relationship between pre-money valuation and price for purposes of the Equity Financing clause, has been obviated. The clauses defining “Safe Price” also contain modifications. First of all, we have

“**Safe Price**” means the price per share equal to the Post-Money Valuation Cap divided by the Company Capitalization.

which is similar to the corresponding clause of the pre-money SAFE except that it uses the term “Post-money Valuation Cap” for the cap. More significant is that “Company Capitalization” is defined by

“**Company Capitalization**” is calculated as of immediately prior to the Equity Financing and (without double-counting):
• Includes all shares of Capital Stock issued and outstanding;
• Includes all Converting Securities;
• Includes all (i) issued and outstanding Options and (ii) Promised Options;
• Includes the Unissued Option Pool; and
• Excludes, notwithstanding the foregoing, any increases to the Unissued Option Pool (except to the extent necessary to cover Promised Options that exceed the Unissued Option Pool) in connection with the Equity Financing.

Whereas, in the pre-money SAFE, company capitalization was defined to exclude the SAFE note, the new definition explicitly includes it, amongst “Converting Securities”, defined by

“Converting Securities” includes this Safe and other convertible securities issued by the Company, including but not limited to: (i) other Safes; (ii) convertible promissory notes and other convertible debt instruments; and (iii) convertible securities that have the right to convert into shares of Capital Stock.

We may note the resemblance of this definition to a particular stance on the accounting status of the SAFE note - that the SAFE note is not a liability, but is represented on the cap table. We argue below that this view yields the more felicitous interpretation of the post-money SAFE.

In the case of the pre-money SAFE, we argued that the contract implicitly introduces a circularity into the definition of pre-money valuation. There is similarly a circularity in the post-money SAFE: in case (2), the number of SAFE shares issued depends on the Safe Price, which depends on the Company capitalization, which in turn depends on the number of SAFE shares issued.\(^5\) Some have consequently questioned the mathematical soundness of the post-money SAFE [1]. We show here that the recursion can be resolved for our simple scenario in which a single post-money SAFE has been issued. (The situation is somewhat more complex in situations where multiple SAFEs have been issued, where the SAFEs place more complex constraints on the conditions under which an equity round can be conducted. We discuss the more general case in Appendix C.)

We first characterize the outcomes of the Post-Money SAFE in terms of price, and consider their relation to valuation below. We use the same variable names as above. The post-money SAFE note directly specifies the Purchase Amount of the SAFE note \(m_{\text{safe}}\), and the Post-money Valuation Cap \(c\). The number of founder shares \(s_f\) is also fixed. At the time of the equity round, the new money raised \(m_{\text{new}}\), and the price per share \(p_{\text{new}}\) are given. As usual, we assume that equation \(m_{\text{new}}p_{\text{new}}\) is used to determine the number of shares \(s_{\text{new}}\) received by the new investor.

\(^5\)Given their name, perhaps it is not surprising that Y Combinator has a tendency to recursive contracts. “Y combinator” is a term from lambda calculus, concerned with recursion.
As above, we assume that Common Stock, Safe Preferred Stock and Standard Preferred Stock are essentially the same, but in fact there are differences (liquidation preference, anti-dilution protection, dividend rights) that would need to be addressed in a more detailed analysis. We also assume a single equity investor, so that the “lowest price per share of the Standard Preferred Stock” unambiguously refers to $p_{new}$.

By the Equity Financing clause, on equity financing, we have that the number $s_{safe}$ of shares issued to the SAFE investor satisfies

$$s_{safe} = \max\{m_{safe}/p_{new}, m_{safe}/p_{safe}\}$$

By the definition of Safe Price,

$$p_{safe} = c/S_{pre}$$

where $S_{pre}$ is the Company Capitalization. Since this has been defined to include all shares of capital stock and all SAFE notes, in our simple scenario, we have

$$S_{pre} = s_f + s_{safe}$$

Substituting, we get the equation

$$s_{safe} = \max\{m_{safe}/p_{new}, m_{safe}(s_f + s_{safe})/c\}$$

which explicitly displays that the SAFE gives a circular definition of $s_{safe}$. We have two cases, depending on which argument of the maximum is greater.

**Case 1:** $m_{safe}/p_{new} \geq m_{safe}(s_f + s_{safe})/c$. Equivalently, $s_{safe} \leq \frac{c}{p_{new}} - s_f$. In this case $s_{safe} = m_{safe}/p_{new}$. Consequently, the condition for this case is equivalent to

$$0 < p_{new} \leq \frac{c - m_{safe}}{s_f}$$

**Case 2:** $m_{safe}/p_{new} \leq m_{safe}(s_f + s_{safe})/c$. In this case, $s_{safe}$ is defined by the recursive equation $s_{safe} = m_{safe}(s_f + s_{safe})/c$. Solving for $s_{safe}$, we get

$$s_{safe} = \frac{m_{safe}s_f}{c - m_{safe}}$$

Obviously, we need the constraint $m_{safe} < c$ for this solution to make sense, else we have an undefined or negative number of shares. This constraint is reasonable, if we treat the cap $c$ as analogous to a post-money valuation for the SAFE investor’s investment. (We will see below, when discussing the proportional shareholding outcomes, that this analogy makes sense.) Substituting for $s_{safe}$ in the inequality and reorganising, we get the following formulation of the condition for this case:

$$p_{new} \geq \frac{c - m_{safe}}{s_f}$$

Note that this is the complement of the condition for Case 1.
When both cases apply, we have $p_{new} = (c - m_{safe})/s_f$. In this case, the SAFE note does not specify whether the SAFE investor receives Standard or Safe Preferred Stock, and it is also not made explicit that the investor has a choice. As the apparent intent of the clause is to deliver the maximum benefit to the SAFE investor, one expects that this question would be resolved in case of a legal dispute by the SAFE investor receiving whichever class of shares gives the greatest benefit. The details of the shareholder rights with respect to Liquidity, Dissolution and Dividend events would need to be taken into account to make a determination on this point. For simplicity, and uniformity with the pre-money SAFE, we assume that SAFE preferred stock is preferable, so that the conditions for the two cases are $p_{new} \leq (c - m_{safe})/s_f$ and $p_{new} > (c - m_{safe})/s_f$.

Assuming that the transaction does not change the share price, we can deduce monetary values for the resulting shareholdings of the founders, SAFE investor and new investor, respectively, by multiplying these by $p_{new}$, resulting in the following:

Case 1:
\[ sp_{new}, \quad m_{safe}, \quad m_{new} \]

Case 2:
\[ sp_{new}, \quad m_{safe} - \frac{sp_{new}}{c - m_{safe}}, \quad m_{new} \]

On this assumption the new investor is guaranteed a shareholding equivalent in value to their investment, as is the SAFE investor in case 1. In case 2, since we have $p_{new} > (c - m_{safe})/s_f$, the monetary value of the SAFE investor’s shares is greater than $m_{safe}$. Thus, the contract guarantees that the SAFE investor does not suffer a loss, on this view.

We now characterize these outcomes in terms of valuation. The pre- and post-money valuations are not defined in the Post-Money SAFE. Indeed, the text contains the following definition:

“Equity Financing” means a bona fide transaction or series of transactions with the principal purpose of raising capital, pursuant to which the Company issues and sells Preferred Stock at a fixed valuation, including but not limited to, a pre-money or post-money valuation.

This suggests that, although the Safe Price is calculated using the Discounted method, the document has been deliberately designed to be ambiguous with respect to the conversion method.\(^6\) We therefore analyze the equity round transaction from the point of view of the two accounting methods, corresponding to different ways to relate price and valuation.

\(^6\)On the other hand, in the context of a discussion of tax treatment of the SAFE, the Post-Money SAFE Users Guide [9] states “we’ve always intended and believed the safe (original safe or new safe) to be an equity security.” A contract can of course be treated differently for valuation and taxation purposes, but consistency would therefore indicate treatment of the SAFE on the cap table for valuation purposes also.
Cap Table Accounting: Note that the definition of Safe Price as $c/(s_f + s_{safe})$ suggests that in case this price is applied, the SAFE note is being converted at valuation $c$ using cap table accounting, so it is reasonable to treat the new investor’s money in the same way (though at a different valuation). Let the pre-money valuation of the company on Cap Table accounting be $v_{pre}$, so $v_{pre} = p_{new}(s_f + s_{safe})$. In Case 1, we have

$$v_{pre} = (s_f + s_{safe})p_{new} = (s_f + m_{safe}/p_{new})p_{new} = s_fp_{new} + m_{safe}$$

so we can characterize $p_{new}$ in terms of $v_{pre}$ as $p_{new} = (v_{pre} - m_{safe})/s_f$. In Case 2,

$$v_{pre} = (s_f + s_{safe})p_{new} = (s_f + \frac{m_{safe} sf}{c - m_{safe}})p_{new} = \frac{c}{c - m_{safe}} \cdot s_fp_{new}$$

so

$$p_{new} = \frac{(c - m_{safe})}{c} \cdot \frac{v_{pre}}{s_f}.$$  

In both cases, $p_{new} \leq (c - m_{safe})/s_f$ exactly when $v_{pre} \leq c$, so the conditions for the two cases are $v_{pre} \leq c$ and $v_{pre} > c$.

On cap table accounting, the post-money valuation is $v_{pre} + m_{new}$, so the proportional shareholdings of the founders, SAFE investor and new investor, respectively, in the two cases are as follows.

**Case 1: ($v_{pre} \leq c$)**

$$\frac{v_{pre} - m_{safe}}{v_{pre}} \cdot \frac{v_{pre}}{v_{pre} + m_{new}}, \quad \frac{m_{safe}}{v_{pre}} \cdot \frac{v_{pre}}{v_{pre} + m_{new}}, \quad \frac{m_{new}}{v_{pre}} \cdot \frac{v_{pre} + m_{new}}{v_{pre} + m_{new}}$$

**Case 2: ($v_{pre} > c$)**

$$\frac{c - m_{safe}}{c} \cdot \frac{v_{pre}}{v_{pre} + m_{new}}, \quad \frac{m_{safe}}{c} \cdot \frac{v_{pre}}{v_{pre} + m_{new}}, \quad \frac{m_{new}}{c} \cdot \frac{v_{pre} + m_{new}}{v_{pre} + m_{new}}$$

Intuitively, in both cases, the new investor is guaranteed a shareholding equivalent to their money. Case 1 is equivalent to a two stage process in which the SAFE investor first purchase shares worth $m_{safe}$ in a standard equity round at valuation $v_{pre} - m_{safe}$, followed by the new investor buying shares worth $m_{new}$ at valuation $v_{pre}$. The outcome of Case 2 is equivalent to that of a two stage process in which the SAFE investor first buys shares worth $m_{safe}$ at valuation $c - m_{safe}$ in a standard equity round, followed by the new investor buying shares worth $m_{new}$ at valuation $v_{pre}$. (As suggested above, on this view, $c$ is analogous to the post-money valuation at which the SAFE investor’s investment is made.) We remark that the first stage of this process is always less advantageous to the founders, and more favourable to the SAFE investor, than a first stage investment of $m_{safe}$ at pre-money valuation $c$, as was essentially involved in several cases of the analysis of the pre-money SAFE above.
Liability Accounting: If the Post-money SAFE is treated as a Liability, then we relate the price and pre-money valuation by equation \((vs_{\text{pre}})\), i.e., \(p_{\text{new}} = \frac{v_{\text{pre}}}{s_f}\). In this case we have \(v_{\text{post}} = v_{\text{pre}} + v_{\text{safe}} + m_{\text{new}}\). The cases of the SAFE note correspond to the condition \(p_{\text{new}} = \frac{v_{\text{pre}}}{s_f} \leq \frac{(c - m_{\text{safe}})}{s_f}\), which is equivalent to \(v_{\text{pre}} \leq c - m_{\text{safe}}\). The post-money values of the shareholdings of the founders, SAFE holder and new investor are

**Case 1.** \((v_{\text{pre}} \leq c - m_{\text{safe}})\)

\[v_{\text{pre}}, \ m_{\text{safe}}, \ m_{\text{new}}\]

**Case 2.** \((v_{\text{pre}} > c - m_{\text{safe}})\)

\[v_{\text{pre}}, \ \frac{v_{\text{pre}}}{c - m_{\text{safe}}} m_{\text{safe}}, \ m_{\text{new}}\]

Thus, we derive that the valuation of the SAFE note is

\[v_{\text{safe}} = \begin{cases} m_{\text{safe}} & v_{\text{pre}} \leq c - m_{\text{safe}} \\ \frac{v_{\text{pre}}}{c - m_{\text{safe}}} m_{\text{safe}} & v_{\text{pre}} > c - m_{\text{safe}} \end{cases}\]

The proportional shareholdings are the above monetary values divided by \(v_{\text{pre}} + v_{\text{safe}} + m_{\text{new}}\). With respect to a view (fitting Liability accounting of the SAFE) that equations \((vs_{\text{post}})\) and \((vm_{\text{pre}, \text{post}})\) describe the post-money valuation, this implies that neither the SAFE investor nor the new investor loses value as a result of the transaction.

## 11 Comparison

In the previous sections, we have discussed a variety of methods by which two forms of SAFE contract may be converted to shares at the time of the equity round. Factors distinguishing these methods are two distinct interpretations of the term “Pre-money Valuation”, as well as the accounting stance that one takes. Table 2 summarises our conclusions, showing for each method an accounting stance on which it makes sense. Some of the methods have some limitations that makes their rationality questionable; we refer to the relevant sections for an explanation of the issues mentioned in the “Limitations” column.

We now compare the outcomes of these contracts and conversion methods to determine which is more favourable to each of the players. There are two ways that one can undertake such an analysis.

1. **Rational Methods:** One can suppose that the founders, SAFE investor and new investors start with clarity about the interpretation of “Pre-money Valuation”. In this case, only conversion methods appropriate to that interpretation should be considered, and the negotiation of a value for \(v_{\text{pre}}\) can take into account the selected meaning.
<table>
<thead>
<tr>
<th>SAFE Operation Method</th>
<th>Consistent Accounting View</th>
<th>Limitations</th>
</tr>
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<tbody>
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<tr>
<td>Percent Ownership</td>
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<td>Dollars Invested</td>
<td>Liability (wrt $v_{pre}$)</td>
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<td>Two Stage (discounted)</td>
<td>Cap Table (wrt $v_{pre}$)</td>
<td></td>
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<tr>
<td>Two stage (standard)</td>
<td>Liability (wrt $v_{pre}$)</td>
<td></td>
</tr>
<tr>
<td>Post-Money</td>
<td>Cap Table (wrt $v_{pre}$)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Accounting Methods Consistent with SAFE Operation Methods
2. **Deferred Interpretation**: One can suppose that the new investors, SAFE investors and the founders failed to distinguish between the two interpretations of “pre-money valuation”. In particular, the interpretation had not been decided at the time the founders negotiated with the new investors a term sheet stating a pre-money valuation. (This seems to be not infrequently the case, according to [2]!) In such a situation \(v_{\text{pre}}\) is fixed, but the parties may still select a method for calculating \(p_{\text{new}}\). All the methods should be compared in this case.

There is a game theoretic dimension to the situation, in the form of a two-round game. In round 1, the founder and SAFE investor negotiate and choose a form for the SAFE investor’s investment: either a standard equity round (to be followed later by a standard round with the new investor), a pre-money SAFE contract, or a post-money SAFE contract. In the second round, the founders and the new investor negotiate and choose a method to conduct the equity round. We analyze this game to determine the optimal strategy for the players.

**Rational Methods**

We consider first the cases where the participants have started with clarity about the interpretation of pre-money valuation and the accounting method, and use one of the conversion methods that the analysis above shows to be appropriate for that interpretation. The game in this case proceeds in the following steps:

1. The founders and SAFE investor choose a form of contract: standard round for money \(m_{\text{safe}}\) at valuation \(c\), Pre-Money SAFE for money \(m_{\text{safe}}\) and cap \(c\), or Post-Money SAFE for money \(m_{\text{safe}}\) and cap \(c\).

2. The new investor chooses an inherent valuation of the company, i.e., a valuation \(v_I = v_A - v_L\) where \(v_A\) and \(v_L\) are the valuations of the company assets \(A\) and liabilities \(L\), excluding the SAFE contract.

3. The founders and new investor negotiate a conversion method and an associated interpretation and value of the pre-money valuation \(v_{\text{pre}}\). The choices are the following: Standard method with Liability View, Discounted Valuation Method with Cap Table View, Two Stage method with either Liability or Cap Table View, and the Post-Money SAFE with either Liability or Cap Table View.\(^7\)

We first determine a valuation \(v_{\text{safe}}\) for the SAFE contract at time of the equity round for each of the conversion methods considered. Using this, we

\(^7\)We omit the Dollars Invested method here because it is a less clearly rational compromise, and arguably motivated by the confusion concerning the meaning of “Pre-Money Valuation”. As we will see, this motivation disappears as a result of the analysis that follows. The Percent Ownership differs from the the Discounted Valuation method only the case conditions. It is also omitted since it has a price gap and may be legally challenged: we assume that the Discounted Valuation method is the correct implementation of the Percent Ownership conversion idea.
will later derive a value for \( v_{\text{pre}} \) for each method and compute the resulting distribution of shareholdings of the parties.

In case of the Standard method with the Liability View, we have the following valuation of the SAFE:

\[
v_{\text{safe}} = \begin{cases} 
    m_{\text{safe}} \cdot \frac{v_{\text{pre}}}{c + m_{\text{safe}}} & v_{\text{pre}} \leq c \\
    m_{\text{safe}} \cdot \frac{v_{\text{pre}}}{c + m_{\text{safe}}} & v_{\text{pre}} > c
\end{cases}
\]

On the Liability view, the SAFE is a liability that has not yet been accounted for in the inherent valuation \( v_I \), so we have that the correct pre-money valuation is \( v_{\text{pre}} = v_I - v_{\text{safe}} \). Thus, the above analysis has not yet escaped from the circularity of the SAFE. However, we may solve the equations resulting from the two cases to get

\[
v_{\text{safe}} = \begin{cases} 
    m_{\text{safe}} \cdot \frac{v_I - m_{\text{safe}}}{c + m_{\text{safe}}} & v_I - m_{\text{safe}} \leq c \\
    m_{\text{safe}} \cdot \frac{v_I - m_{\text{safe}}}{c + m_{\text{safe}}} & v_I - m_{\text{safe}} > c
\end{cases}
\]  

(10)

which gives a formulation of the valuation of the SAFE in terms of the inherent valuation \( v_I \) of the company.\(^8\)

The Two Stage method, with Discounted Valuation method in the first stage, interpreted with respect to the Cap Table View, gives

\[
v_{\text{safe}} = \begin{cases} 
    m_{\text{safe}} \cdot \frac{v_{\text{pre}}}{c + m_{\text{safe}}} & v_{\text{pre}} - m_{\text{safe}} \leq c \\
    m_{\text{safe}} \cdot \frac{v_{\text{pre}}}{c + m_{\text{safe}}} & v_{\text{pre}} - m_{\text{safe}} > c
\end{cases}
\]

The Discounted Valuation method, with Cap Table View, gives precisely the same formulation of \( v_{\text{safe}} \). Under the Cap Table View, we have \( v_{\text{pre}} = v_I \), and after substituting, we obtain exactly equation (10). Thus, these two methods also give the same result as the Standard method.

In case of the Two Stage method, with Standard method in the first stage, interpreted using the Liability view, we have

\[
v_{\text{safe}} = \begin{cases} 
    m_{\text{safe}} \cdot \frac{v_I}{c + m_{\text{safe}}} & v_I - m_{\text{safe}} \leq c \\
    m_{\text{safe}} \cdot \frac{v_I}{c + m_{\text{safe}}} & v_I - m_{\text{safe}} > c
\end{cases}
\]

which \textit{prima facie} seems different from the above case. However, we should note that in the Two Stage method, regardless of the approach used in the first stage, \( v_{\text{pre}} \) represents the valuation of the company at which the new investor is prepared to invest, \textit{once the SAFE liability has been discharged}. Thus, the appropriate value for \( v_{\text{pre}} \) in this case is the inherent valuation \( v_{\text{pre}} = v_I \). Substituting, we obtain

\[
v_{\text{safe}} = \begin{cases} 
    m_{\text{safe}} \cdot \frac{v_I}{c + m_{\text{safe}}} & v_I \leq c \\
    m_{\text{safe}} \cdot \frac{v_I}{c + m_{\text{safe}}} & v_I > c
\end{cases}
\]  

(11)

\(^8\)Note that the case condition for the second case \( v_{\text{pre}} = v_I - v_{\text{safe}} > c \) is

\[
v_I - m_{\text{safe}} : \frac{v_I}{c + m_{\text{safe}}} > c,
\]

which is equivalent to \( v_I - m_{\text{safe}} > c \).
which is the same as equation (10) in case $v_I \geq c + m_{\text{safe}}$, but differs otherwise.

For the Post-Money SAFE, with Liability View, the SAFE is valued at

$$v_{\text{safe}} = \begin{cases} \frac{m_{\text{safe}}}{v_{\text{pre}}} & v_{\text{pre}} \leq c - m_{\text{safe}} \\ \frac{m_{\text{safe}}}{v_{\text{pre}}} \cdot \frac{v_I}{c} & v_{\text{pre}} > c - m_{\text{safe}} \end{cases}$$

Again, we have a circularity, so substituting $v_{\text{pre}} = v_I - v_{\text{safe}}$ and solving for $v_{\text{safe}}$, we get

$$v_{\text{safe}} = \begin{cases} m_{\text{safe}} & v_I \leq c \\ m_{\text{safe}} \cdot \frac{v_I}{c} & v_I > c \end{cases}$$

(12)

This has the same case conditions as the Two Stage method with first stage interpreted using the Liability View, but in the second case, the divisor is the smaller number $c$ rather than $c + m_{\text{safe}}$. Thus, this method gives a higher valuation to the SAFE in this case.

The Post-Money SAFE, with Cap table View, gives

$$v_{\text{safe}} = \begin{cases} m_{\text{safe}} & v_{\text{pre}} \leq c \\ m_{\text{safe}} \cdot \frac{v_{\text{pre}}}{c} & v_{\text{pre}} > c \end{cases}$$

Substituting $v_{\text{pre}} = v_I$ as is appropriate to the Cap Table View, we get exactly equation (12), so this method gives the same valuation to the SAFE as the Post-Money SAFE, with Liability View.

Using the above derivations of the values of $v_{\text{safe}}$, we obtain solutions for $v_{\text{pre}}$ in terms of the inherent company valuation $v_I$ for each approach (for the Cap Table View approaches, this is simply $v_I$). Substituting into the corresponding characterizations of proportional shareholdings for each of the methods, and noting that in all cases we have post-money valuation equal to $v_I + m_{\text{new}}$, we get the post-money values, in terms of $v_I$ for each of the shareholders given in Table 3. (Dividing by $v_I + m_{\text{new}}$ gives the proportional holdings.) The table uses the following abbreviations for the approaches: 2R is two standard equity rounds, the first for money $m_{\text{safe}}$ at valuation $c$, the second for money $m_{\text{new}}$ at valuation $v_I$; S(L) is the Standard method with Liability View; D(C) is the Discounted Valuation method with Cap Table View, ZR(C) is the Two-Stage (the first stage a Zero Round, i.e., for zero money) method with Cap Table View; and ZR(Standard) is the Two Stage method with the first stage, for zero new money, using the Standard method. As just noted, the Post-Money SAFE produces the same results for both the Liability and Cap Table views.

From the point of view of the new investor, the outcome of each of these methods is the same. Any choice between these methods is therefore only of concern between the founders and the SAFE investor. We consider the ordering between the post-money values for the SAFE investor - since the total post-money valuation is the same in all cases, this is the inverse of the ordering for the founders.

In case $v_I \geq c + m_{\text{safe}}$, all the Pre-Money SAFE methods also produce exactly the same result as the Two-Round method. Note that the condition $v_I \geq c + m_{\text{safe}}$ essentially says that the inherent valuation of the company has
Approach & Condition & Founders & SAFE & New
\[ 2R \] & \text{True} & \frac{c}{c + m_{\text{safe}}} \cdot (v_I) & \frac{m_{\text{safe}}}{c + m_{\text{safe}}} \cdot (v_I) & m_{\text{new}} \\
\text{ZR(Standard)} & v_I \leq c & \frac{v_I}{v_I + m_{\text{safe}}} \cdot (v_I) & \frac{m_{\text{safe}}}{v_I + m_{\text{safe}}} \cdot (v_I) & m_{\text{new}} \\
 & v_I > c & \frac{c}{c + m_{\text{safe}}} \cdot (v_I) & \frac{m_{\text{safe}}}{c + m_{\text{safe}}} \cdot (v_I) & m_{\text{new}} \\
\text{S(L), D(C), ZR(C)} & v_I - m_{\text{safe}} \leq c & v_I - m_{\text{safe}} & m_{\text{safe}} & m_{\text{new}} \\
 & v_I - m_{\text{safe}} > c & \frac{c}{c + m_{\text{safe}}} \cdot (v_I) & \frac{m_{\text{safe}}}{c + m_{\text{safe}}} \cdot (v_I) & m_{\text{new}} \\
\text{Post – Money} & v_I \leq c & v_I - m_{\text{safe}} & m_{\text{safe}} & m_{\text{new}} \\
\text{(C or L)} & v_I > c & \frac{v_I - m_{\text{safe}}}{c - m_{\text{safe}}} \cdot (v_I) & \frac{m_{\text{safe}}}{c} \cdot (v_I) & m_{\text{new}} \\

Table 3: Value of shareholdings from standard equity rounds and rational SAFE approaches (ordered by increasing preference for SAFE holder and decreasing preference for founders)

not fallen below the post-money valuation of a standard round for money \( m_{\text{safe}} \) at valuation \( c \). Thus, the differences between the Pre-Money SAFE approaches emerge only in case the equity round for the new investor’s money is effectively a “down-round” from this post-money valuation.

The comparison between 2R and ZR(Standard) is straightforward. In case \( v_I \leq c \), the ZR(Standard) value for the SAFE investor is larger because the term in the denominator is larger in case of 2R. Thus the SAFE investor always prefers ZR(Standard) over 2R.

If \( m_{\text{safe}} < v_I \leq c \), then the Pre-Money SAFE approaches S(L), D(C) and ZR(C) agree that the SAFE investor effectively gets their money \( m_{\text{safe}} \) back in the form of shares. Approach ZR(Standard) gives the SAFE investor a lesser value in this case, and the founders a correspondingly greater value. Thus, the SAFE investor always prefers S(L), D(C) and ZR(C) over ZR(Standard). As we noted above, ZR(Standard) might be selected by the new investor and founders in order to favour the founders, but if the SAFE investor holds the stronger bargaining position when in a negotiation with the founders concerning the conversion method, ZR(Standard) is not likely to be selected. However, we note that the S(L), D(C) and ZR(C) require that \( m_{\text{safe}} < v_I \) in order to be applied. In case \( v_I \leq m_{\text{safe}} \), approach ZR(Standard) might still be applied to resolve this impasse.

When comparing the Post-Money result with S(L), D(C) and ZR(C) we see both yield the SAFE investor value \( m_{\text{safe}} \) when \( v_I \leq c \) (implying \( v_I - m_{\text{safe}} \leq \)}
c). In case $v_I - m_{\text{safe}} > c$ (implying $v_I > c$), the expression for $S(L)$, $D(C)$ and $ZR(C)$ has the larger denominator, so the Post-money SAFE is preferable. When $v_I \in (c, c + m_{\text{safe}}]$, the Post-Money SAFE yields $\frac{m_{\text{safe}}}{c} \cdot (v_I)$ which is greater than the $S(L)$, $D(C)$ and $ZR(C)$ yield $m_{\text{safe}}$ because $v_I > c$ in this case. Thus the Post-money SAFE is always preferable for the SAFE investor.

In effect, as indicated by the name, the Post-Money SAFE treats $c$ as analogous to a post-money valuation, rather than a pre-money valuation, as we see from the equivalence of the Pre-Money SAFE methods with the 2R method in case $v_I > c + m_{\text{safe}}$. Consider a Post-Money SAFE with cap $c' = c + m_{\text{safe}}$ and money $m_{\text{safe}}$. Substituting $c'$ for $c$ and simplifying, we get the value outcomes for the founders, SAFE investor and new investor respectively, of

$$v_I - m_{\text{safe}}, \quad m_{\text{safe}}, \quad m_{\text{new}}$$

in case $v_I \leq c + m_{\text{safe}}$, and

$$\frac{c}{c + m_{\text{safe}}} \cdot (v_I), \quad \frac{m_{\text{safe}}}{c + m_{\text{safe}}} \cdot (v_I), \quad m_{\text{new}}$$

in case $v_I > c + m_{\text{safe}}$. This is precisely the same outcome in all cases as the Pre-Money SAFE with methods $S(L)$, $D(C)$ or $ZR(C)$. Thus (assuming only one SAFE will be issued) if the founders and SAFE investor are fully rational, we expect that a negotiation on the terms of a Pre-Money SAFE or a Post-Money SAFE will yield an instrument with the same effective consequences at the time of the equity round in either case. From this point of view, there is not a reason to prefer one over the other.

Both the Pre-Money SAFE (with method $S(L)$, $D(C)$ or $ZR(C)$) and the Post-Money SAFE, have the disadvantage of not being convertible when $v_I < m_{\text{safe}}$, however, since they imply a negative shareholding for the founders in this case. The Pre-Money SAFE has the fallback method of $ZR(\text{Standard})$ in this case, but it is less clear how the Post-Money SAFE should be handled. This issue becomes more complicated in the case the company has issued multiple Post-Money SAFEs, where there may be multiple valuation intervals in which the SAFE cannot be converted. We discuss this more general case in Appendix C.

In summary, it can be argued that when the Pre-Money SAFE and Post-Money SAFE are interpreted rationally by all the players, the values for $c$ and $m_{\text{safe}}$ that will be negotiated will be such that all rational methods of execution, with an appropriate method of accounting, other than $ZR(\text{Standard})$, yield equivalent results. The latter is better for the founders but worse for the SAFE investor, and may be needed as a fallback to enable conversion in case of a low valuation that prevents the other methods being applied.

**Deferred Interpretation**

Next, we consider the situation when the interpretation of “Pre-Money Valuation” is deferred until after the term sheet has been signed. While this order of events may not be fully rational, it appears that this situation is not just theoretical. Feld [3] writes
Most notes are ambiguous as to whether they convert on a pre-money or a post-money basis. This can be especially confusing, and ambiguous, when there are multiple price caps. There are also some law firms whose standard documents are purposefully ambiguous to give the entrepreneur theoretical negotiating flexibility in the first priced round.

If the entrepreneur knows this and is using it proactively so they get a higher post-money valuation, that’s fair game. But if they don’t know this, and they are negotiating terms with a VC who is expecting the notes to convert in the pre-money, it can create a mess after the terms are agreed to somewhere between the term sheet stage and the final definitives. This mess is especially yucky if the lawyers don’t focus on the final cap table and the capitalization opinion until the last few days of the process. And, it gets even messier when some of the angels start suggesting that the ambiguity should work a certain way and the entrepreneur feels boxed in by the demands of his convertible note angels on one side and priced round VC on the other.

The game in this case is played as follows:

1. The founders and the SAFE investor negotiate a form of contract.
2. The new investor chooses $v_{pre}$ and $m_{new}$.
3. The founders and new investor choose a conversion method.

The choices of contract forms are “Two-Rounds” (i.e., two equity rounds, in the first of which the SAFE investor purchases shares at valuation $c$, and in the second of which the new investor purchases shares at valuation $v_{pre}$), a Pre-Money SAFE (with cap $c$ and money $m_{safe}$) and a Post-Money SAFE.

An issue with respect to the Post-Money SAFE is the choice of parameters. We argued above that a single Post-Money SAFE with cap $c + m_{safe}$ and money $m_{safe}$ is equivalent to the Pre-Money SAFE with cap $c$ and money $m_{safe}$ for fully rational players. Thus, to avoid an unfair comparison, we should choose these equivalent parameter values for the Post-Money SAFE. However, the outcomes for each conversion method would then give the same result as the Pre-Money SAFE, making it redundant to include the Post-Money SAFE as an option. We therefore consider just the Pre-Money version of the SAFE.

As above, for the Pre-Money SAFE the choices of conversion method are the Standard method, Discounted Valuation method, the Two Stage (Zero Round) method based on either Standard or Discounted method. We also include the Dollars Invested method since we are now not dealing with fully rational players.

Tables 4 and 5 summarise the relative shareholdings derived for each of the parties on the two forms of SAFE contracts and these models of their operation. In each case, each column gives the outcomes on the different approaches for one of the three parties. In the case of the Discounted Valuation method, we use the given pre-money valuation $v_{pre}$ to state the relative shareholdings, but the
Proportional shareholdings, case of $v_{pre} \leq c$:

<table>
<thead>
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<th>Founders</th>
<th>SAFE investor</th>
<th>New investor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-Rounds</td>
<td>$\frac{c}{c + m_{safe}} \cdot \frac{v_{pre}}{v_{pre} + m_{new}}$ (1)</td>
<td>$\frac{m_{safe}}{c + m_{safe}} \cdot \frac{v_{pre}}{v_{pre} + m_{new}}$ (4)</td>
<td>$\frac{m_{new}}{v_{pre} + m_{new}}$ (1)</td>
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<td>Standard</td>
<td>$\frac{v_{pre}}{v_{pre} + m_{safe} + m_{new}}$ (2)</td>
<td>$\frac{m_{safe}}{v_{pre} + m_{safe} + m_{new}}$ (2)</td>
<td>$\frac{m_{new}}{v_{pre} + m_{safe} + m_{new}}$ (2)</td>
</tr>
<tr>
<td>Discounted</td>
<td>$\frac{v_{pre} - m_{safe}}{v_{pre} + m_{new}}$ (5)</td>
<td>$\frac{m_{safe}}{v_{pre} + m_{safe} + m_{new}}$ (1)</td>
<td>$\frac{m_{new}}{v_{pre} + m_{safe} + m_{new}}$ (1)</td>
</tr>
<tr>
<td>Dollars Invested</td>
<td>$\frac{v_{pre}}{v_{pre} + m_{safe} + m_{new}}$ (2)</td>
<td>$\frac{m_{safe}}{v_{pre} + m_{safe} + m_{new}}$ (2)</td>
<td>$\frac{m_{new}}{v_{pre} + m_{safe} + m_{new}}$ (2)</td>
</tr>
<tr>
<td>Zero-Round (Disc)</td>
<td>$\frac{v_{pre} - m_{safe}}{v_{pre} + m_{new}}$ (5)</td>
<td>$\frac{m_{safe}}{v_{pre} + m_{safe} + m_{new}}$ (1)</td>
<td>$\frac{m_{new}}{v_{pre} + m_{safe} + m_{new}}$ (1)</td>
</tr>
<tr>
<td>Zero-Round (Standard)</td>
<td>$\frac{v_{pre}}{v_{pre} + m_{safe} + m_{new}}$ (3)</td>
<td>$\frac{m_{safe}}{v_{pre} + m_{safe} + m_{new}}$ (3)</td>
<td>$\frac{m_{new}}{v_{pre} + m_{safe} + m_{new}}$ (1)</td>
</tr>
</tbody>
</table>

Table 4: Pre-Money SAFE; Proportional shareholdings from different conversion methods.

case of the SAFE contract used is determined using the discounted valuation $v_{pre}$. Consequently, we need to split the analysis into three cases rather than two.

As well as the proportional shareholding, we indicate the preference order of the outcome for that party, with (1) indicating the most preferred outcome (i.e., the largest proportional holding). Working for the comparisons is given in Appendix C. Note that these rankings are valid only within each of the cases, they are not intended for comparisons across cases. In some cases (e.g., the case for the founders in the Two-Round method with $v_{pre} \leq c$) the preference order also depends on the value of $m_{new}$. Rather than further fragment the number of cases, we give a range of rankings in this case.

One immediate observation is that for the SAFE investor, the outcome for the Pre-Money SAFE is always at least as good as the outcome for the Two-Round method. The SAFE investor is likely to hold the stronger negotiating position than the founders, so the Pre-Money SAFE is likely to be the instrument selected in the first step of the game. We may therefore focus the analysis on the Pre-Money SAFE.

The three cases for $v_{pre}$ give the following conclusions for the conversion method chosen at the final step of the game. In the analysis, we assume first that the final move is decided by negotiation between the founders and the new investor. The preferences of the founders and new investor turn out to be at odds in all cases, so we discuss two possible resolutions: (a) the founders yielding and accepting one of the new investor’s first preferences but selecting one that is the founders’ most preferred among that set, and (b) the new investors yielding to one of their next best preference and the founders again selecting their best preference amongst those. Strictly, the SAFE investor does not have legal standing in setting the terms of the equity round. However, we also consider the potential for them to form a coalition with one of the other players to strengthen their position in the negotiation.

1. ($v_{pre} \leq c$): Here the founders and new investor do not have a common best
Proportional shareholdings, case of $c < v_{\text{pre}} \leq c + m_{\text{safe}}$:

<table>
<thead>
<tr>
<th>Approach</th>
<th>Founders</th>
<th>SAFE investor</th>
<th>New investor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-Rounds</td>
<td>$\frac{c}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}}$ (3)</td>
<td>$\frac{m_{\text{safe}}}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}}$ (6)</td>
<td>$\frac{m_{\text{new}}}{v_{\text{pre}} + m_{\text{new}}}$ (1)</td>
</tr>
<tr>
<td>Standard</td>
<td>$\frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}}$ (1)</td>
<td>$\frac{m_{\text{safe}}}{v_{\text{pre}} + m_{\text{new}}}$ (2)</td>
<td>$\frac{m_{\text{new}}}{v_{\text{pre}} + m_{\text{new}}}$ (3)</td>
</tr>
<tr>
<td>Discounted</td>
<td>$\frac{v_{\text{pre}} - m_{\text{safe}}}{v_{\text{pre}} + m_{\text{new}}}$ (4)</td>
<td>$\frac{m_{\text{safe}}}{v_{\text{pre}} + m_{\text{new}}}$ (1 - 5)</td>
<td>$\frac{m_{\text{new}}}{v_{\text{pre}} + m_{\text{new}}}$ (1)</td>
</tr>
<tr>
<td>Dollars Invested</td>
<td>$\frac{c}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}} + m_{\text{safe}}}{v_{\text{pre}} + m_{\text{new}}}$ (2)</td>
<td>$\frac{m_{\text{safe}}}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}} + m_{\text{safe}}}{v_{\text{pre}} + m_{\text{new}}}$ (4)</td>
<td>$\frac{m_{\text{new}}}{v_{\text{pre}} + m_{\text{new}}}$ (2)</td>
</tr>
<tr>
<td>Zero-Round (Disc)</td>
<td>$\frac{v_{\text{pre}} - m_{\text{safe}}}{v_{\text{pre}} + m_{\text{new}}}$ (4)</td>
<td>$\frac{m_{\text{safe}}}{v_{\text{pre}} + m_{\text{new}}}$ (1 - 5)</td>
<td>$\frac{m_{\text{new}}}{v_{\text{pre}} + m_{\text{new}}}$ (1)</td>
</tr>
<tr>
<td>Zero-Round (Standard)</td>
<td>$\frac{c}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}}$ (3)</td>
<td>$\frac{m_{\text{safe}}}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}}$ (6)</td>
<td>$\frac{m_{\text{new}}}{v_{\text{pre}} + m_{\text{new}}}$ (1)</td>
</tr>
</tbody>
</table>

Proportional shareholdings, case of $c + m_{\text{safe}} < v_{\text{pre}}$:

<table>
<thead>
<tr>
<th>Approach</th>
<th>Founders</th>
<th>SAFE investor</th>
<th>New investor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-Rounds</td>
<td>$\frac{c}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}}$ (3)</td>
<td>$\frac{m_{\text{safe}}}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}}$ (3)</td>
<td>$\frac{m_{\text{new}}}{v_{\text{pre}} + m_{\text{new}}}$ (1)</td>
</tr>
<tr>
<td>Standard</td>
<td>$\frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}}$ (1)</td>
<td>$\frac{m_{\text{safe}}}{v_{\text{pre}} + m_{\text{new}}}$ (1)</td>
<td>$\frac{m_{\text{new}}}{v_{\text{pre}} + m_{\text{new}}}$ (3)</td>
</tr>
<tr>
<td>Discounted</td>
<td>$\frac{c}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}}$ (3)</td>
<td>$\frac{m_{\text{safe}}}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}}$ (3)</td>
<td>$\frac{m_{\text{new}}}{v_{\text{pre}} + m_{\text{new}}}$ (1)</td>
</tr>
<tr>
<td>Dollars Invested</td>
<td>$\frac{c}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}} + m_{\text{safe}}}{v_{\text{pre}} + m_{\text{new}}}$ (2)</td>
<td>$\frac{m_{\text{safe}}}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}} + m_{\text{safe}}}{v_{\text{pre}} + m_{\text{new}}}$ (2)</td>
<td>$\frac{m_{\text{new}}}{v_{\text{pre}} + m_{\text{new}}}$ (2)</td>
</tr>
<tr>
<td>Zero-Round (Disc)</td>
<td>$\frac{c}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}}$ (3)</td>
<td>$\frac{m_{\text{safe}}}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}}$ (3)</td>
<td>$\frac{m_{\text{new}}}{v_{\text{pre}} + m_{\text{new}}}$ (1)</td>
</tr>
<tr>
<td>Zero-Round (Standard)</td>
<td>$\frac{c}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}}$ (3)</td>
<td>$\frac{m_{\text{safe}}}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}}$ (3)</td>
<td>$\frac{m_{\text{new}}}{v_{\text{pre}} + m_{\text{new}}}$ (1)</td>
</tr>
</tbody>
</table>

Table 5: Pre-Money SAFE ; Proportional shareholdings from different conversion methods.
choice: the founders prefer the Standard or Dollars Invested method, and the new investor prefers any of the other options.

(a) If the new investor holds firm, the founders would select the Zero-Round(Standard) method, which is only their third preference. However, the Zero-Round methods do carry the risk of a legal dispute by the SAFE investor. To avoid this, the founders would select the Discounted method, which is their least preferred option.

(b) If the new investor is prepared to yield, their second best options are the Standard or Dollars Invested methods, which are precisely the preferred options of the founders. Thus, the outcome is this case is either the Standard or Dollars Invested method.

However, the SAFE investor would prefer, depending on $m_{\text{new}}$, either the Discounted or Zero-Round(Discounted) options, which are amongst the most preferred options of the new investor. So they have an incentive to form a coalition with the new investor to argue for one of these options, most likely the Discounted method, in view of the legal questionability of the Zero-Round options.

Thus, the outcome of this case depends on $m_{\text{new}}$, the negotiation strength of the parties, and their tolerance of legal risk, and could be any of the Standard, Discounted, Dollars Invested or Zero-Round(Standard) methods.

2. \( c < v_{\text{pre}} \leq c + m_{\text{safe}} \): Again there is no common best option for the founders and new investor. The founders prefer the Standard method, and the new investor prefers the Discounted, Zero-Round(Discounted) or Zero-Round(Standard) options.

(a) If the new investor holds firm, the founders would select the Zero-Round(Standard) option again, or their least preferred Discounted option in case they are averse to legal risk.

(b) If the new investor yields, their second preference is the Dollars Invested method, which is also the second preference of the founders.

The stability of this case with respect to the SAFE investor is complex, since the SAFE investor’s ranking is variable within this case. Depending on $m_{\text{new}}$, their interests may be aligned with the new investor by most preferring the Discounted or Zero-Round(Discounted) method, but their most preferred option may be also be aligned with the founders by preferring the Standard method. The Dollars Invested method is either the second or third preference of the SAFE investor.

Thus, in this case, again the selection of either the Standard, Discounted, Dollars Invested or Zero-Round(Standard) methods is conceivable.

3. \( c + m_{\text{safe}} < v_{\text{pre}} \): In this case the rankings of the founders and new investor are once again in conflict, but the situation is somewhat simpler
than the previous case. The founders and the SAFE investor both prefer the Standard method, which is the third and lowest preference of the new investor. Conversely, the new investor prefers the Discounted and the two Zero-Round methods, which are all the third and lowest preference of the founders and SAFE investor.

(a) If the new investor holds firm, both the founders and the SAFE investor are indifferent amongst the new investor’s first choices. The outcome is likely to be the Discounted method since it involves only a single equity round and is free from legal risk.

(b) If the new investor is prepared to compromise, the Dollars Invested method, which is the unique second preference of all parties, is a stable compromise position.

In case the SAFE investor and the founders together have the strongest bargaining position, they may be able to get the new investor to accept the Standard method, but this is their least preferred option, so the case for this would need to be very strong (e.g., the prospects for the company are perceived to be so strong that the new investor is prepared to accept a much weaker deal than they might otherwise.)

Thus, in this case, the Standard, Discounted or Dollars Invested methods, are conceivable selections,

In summary, as Feld suggests, the best answer to the question of what outcome can be expected for this version of the game is that “it’s complicated”. Depending on the parameters, negotiating strengths of the players, and attitude to legal risk, the ultimate selection of any of the conversions methods is conceivable. Table 6 summarises the outcomes for the three possible assumptions with respect to negotiating position: new investor holds, new investor yields, and SAFE forms a dominant coalition. (Since the new investor holds the money, we do not expect the founders to hold the strongest position on their own.) The complexity of the negotiation scenarios resulting from a deferred interpretation of “Pre-Money Valuation” suggests that it would be more rational for all parties to set a clear policy for conversion of the SAFE, based on a clearly stated accounting status of the SAFE.

We have not attempted to factor into the above analysis any assumptions about the probability of $v_{pre}$ falling into the above cases, since it is unclear what the appropriate distribution should be. Some data on ability of companies to meet their SAFE caps by the time of an equity round could in principle be

<table>
<thead>
<tr>
<th>Case</th>
<th>New holds</th>
<th>New yields</th>
<th>SAFE Coalition</th>
</tr>
</thead>
<tbody>
<tr>
<td>$v_{pre} \leq c$</td>
<td>ZR(Stand) or Disc</td>
<td>Stand or DI</td>
<td>Disc or ZR(Disc)</td>
</tr>
<tr>
<td>$c &lt; v_{pre} \leq c + m_{safe}$</td>
<td>ZR(Stand) or Disc</td>
<td>DI</td>
<td>Disc or ZR(Disc) or Stand</td>
</tr>
<tr>
<td>$c + m_{safe} &lt; v_{pre}$</td>
<td>Disc</td>
<td>DI</td>
<td>Stand</td>
</tr>
</tbody>
</table>

Table 6: Game Outcomes by assumptions about $v_{pre}$ and negotiation position.
obtained. A factor in such empirical results may be that founders will prefer to defer an equity round (possibly by raising additional SAFE investments) until they are able to obtain a valuation that is to their benefit, given the SAFE issued. Some weighting of the distribution towards the case $v_{pre} > c$ therefore seems likely. Against this, the failure rate of startups is high, so many SAFEs will ultimately be resolved by dissolution or sale of the company rather than an equity round. We have not attempted in this paper to deal with the Dissolution and Liquidity clauses that cover such an eventuality.

12 Conclusion

We have considered Pre-Money and Post-Money forms of the SAFE note with cap and no discount, and noted that there is an ambiguity in the term “Pre-Money Valuation”. This leaves open a variety of conversion methods at the time of the equity round, discussed in Sections 6-9 for the Pre-Money SAFE and in Section 10 for the Post-Money SAFE. Our analysis in Section 11 compares these conversion methods, both for a scenario where the players are fully rational, and in a scenario where they defer resolution of the conversion method until after a pre-money valuation has been fixed. The fully rational players correctly apply one of two accounting methods, Liability accounting and Cap Table accounting. This turns out to guarantee that the same distribution of shares will be reached in almost all cases in our simple scenario. From this perspective, the Dollars invested method appears as a compromise made by players who are not fully rational. With an adjusted interpretation of the cap, in this scenario the Post-Money SAFE can also be seen to be equivalent to the Pre-Money SAFE for fully rational players.

In either case, there is a circularity that needs to be resolved in the process of conversion, when the value of the convertible instrument depends on the valuation of the company or the price of its shares. Cap Table accounting requires that the share price be calculated knowing the number of shares to be issued for the convertible instrument, which in turn depends on the company valuation and/or share price. Liability accounting requires that, in order to value the company to determine a share price, the convertible instrument be valued first, but this in turn requires a valuation for the company and/or the share price. In both cases, the circularity can be resolved by expressing it in equational form and solving.

The primary focus of our analysis was the (Pre-Money) SAFE note, with cap and no discount. In the course of the analysis, we identified a number of fine points concerning the terms of this contract. This SAFE note uses Pre-Money Valuation $v_{pre}$, Price $p_{new}$ and Company Capitalization ($s_f$, in the scenario we analyze) as input variables to define the number of shares issued in conversion, but it does not actually state that $v_{pre}$ and $p_{new}$ are related to $s_f$ by equation ($v_{sp_{pre}}$). This leaves it open for the equity round to be constructed so as to violate this equation. Our treatment of the Percent Ownership method in Section 7 in fact starts with values for $v_{pre}$ and $s_f$ and derives a price $p_{new}$ that does
not satisfy this equation. We argued, however, that for this reason, this method might be legally questionable. It is also economically questionable because it leaves open a price gap - a range of prices at which the SAFE is not convertible. Moreover, if one takes the point of view that the Equity Financing clause is intended to deliver the maximum number of shares to the SAFE investor, then we get the constraints between $v_{\text{pre}}$ and $p_{\text{new}}$ that

- $v_{\text{pre}} \leq c$ implies $p_{\text{new}} \leq c/s_f$, and
- $v_{\text{pre}} > c$ implies $p_{\text{new}} > c/s_f$.

There are many relationships between $p_{\text{new}}$ and $v_{\text{pre}}$ that satisfy this, but $p_{\text{new}} = v_{\text{pre}}/s_f$, i.e., equation (vsp$_{\text{pre}}$) is arguably the simplest one, so there is a case that the SAFE contract was designed with the intention that this constraint be satisfied. This argument would be supportive of any legal claim that the equity round should be conducted so as to satisfy equation (vsp$_{\text{pre}}$).

The SAFE contract could have avoided the issue of the previous point by writing the Equity Financing clause using only the price $p_{\text{new}}$, replacing the other variable by its value derivable using $s_f$ by (vsp$_{\text{pre}}$). We have argued that price is a more stable notion than “Pre-money Valuation”, so it is unclear why this was not done. Indeed, the Post-Money SAFE uses only $p_{\text{new}}$, although it also moves to what is effectively Cap Table accounting with respect to calculation of the “SAFE price” $p_{\text{safe}}$. (Nevertheless it still remains open to use either Cap Table or Liability accounting to determine $p_{\text{new}}$.)

On the other hand, the fact that the Pre-Money SAFE is constructed in a way that suggests use of equation (vsp$_{\text{pre}}$), which corresponds to Liability accounting, is not coherent with the statement in the SAFE primer [8] that

A safe is not a debt instrument... Debt instruments have requirements — including regulations, interest accrual, maturity dates, the threat of insolvency and in some cases, security interests and subordination agreements. These requirements can have unintended negative consequences... an outstanding safe would be referenced on the company’s cap table like any other convertible security (such as a warrant or an option)

The Post-Money SAFE seems more coherent from this point of view, by relying only on a price (but still leaving it open how this is determined).

We have considered only the SAFE with cap and no discount, which is just one of the four forms available for each of the Pre-Money SAFE and Post-Money SAFE. The issue concerning use of both $v_{\text{pre}}$ and $p_{\text{new}}$ does not arise for the other variants. The Pre-Money SAFE [6] without a valuation cap (discount only or MFN (most favoured nation) no cap, no discount and the SAFE with both a valuation cap and a discount convert at a price which depends on $p_{\text{new}}$ but not on $v_{\text{pre}}$. The other Post-Money SAFEs [4] are also free from this issue. To that extent, they appear to be better constructed than the Pre-Money SAFE we have considered here.
We expect that analysis of these other instruments will yield similar general conclusions with respect to the other points we have raised. The diversity of convertible instruments, and the potential for multiple instances of such instruments with different parameters to be combined on a company’s cap table, suggests that an automated analysis that takes as input a formal description of the contracts would be beneficial, and presents a direction that could be interesting to pursue in future work.

Acknowledgements: Thanks to Franck Cassez and Peter Hoefner for discussions at early stages of this work.

References


A Working for Comparisons of Proportional Shareholding

In this appendix we justify the rankings of outcomes of proportional shareholdings for the three parties given in Section 11. We calculate the relationship between the outcomes for each party in each of the three cases. In each case, there are just two possible outcomes for the new investor, and it is easy to see that the standard SAFE calculation never gives them the best outcome. We use the following abbreviations: Two-Round = 2R, Standard = S, Discounted = D, Dollars Invested = DI, Zero-Round (Standard) = ZR(S), Zero-Round (Discounted) = ZR(D).

- **Assumption**: $v_{pre} < c$. Here, we have the following comparisons for the Founders:

  \[ 2R \text{ versus } S \]
  \[
  \frac{c}{c + m_{safe}} \cdot \frac{v_{pre}}{v_{pre} + m_{new}} \text{ versus } \frac{v_{pre}}{v_{pre} + m_{safe} + m_{new}}
  \]
  \[
  \equiv c \cdot (v_{pre} + m_{safe} + m_{new}) \text{ versus } (c + m_{safe}) \cdot (v_{pre} + m_{new})
  \]
  \[
  \equiv cv_{pre} + cm_{safe} + cm_{new} \text{ versus } cv_{pre} + cm_{new} + m_{safe}v_{pre} + m_{safe}m_{new}
  \]
  \[
  \equiv cm_{safe} \text{ versus } m_{safe}v_{pre} + m_{safe}m_{new}
  \]
  \[
  \equiv c \text{ versus } v_{pre} + m_{new}
  \]

  This may be in either order, depending on $m_{new}$.

  \[ S \text{ versus } ZR(S) \]
  \[
  = \frac{v_{pre}}{v_{pre} + m_{safe} + m_{new}} \text{ versus } \frac{v_{pre}}{v_{pre} + m_{safe}} \cdot \frac{v_{pre}}{v_{pre} + m_{new}}
  \]
  \[
  = (v_{pre} + m_{new})(v_{pre} + m_{safe}) \text{ versus } v_{pre}(v_{pre} + m_{safe} + m_{new})
  \]
  \[
  = m_{new}m_{safe} \text{ versus } 0
  \]

  so $S > ZR(S)$. 

ZR(S) versus $D$

$$= \frac{v_{pre}}{v_{pre} + m_{safe}} \cdot \frac{v_{pre}}{v_{pre} + m_{new}} \text{ versus } \frac{v_{pre} - m_{safe}}{v_{pre} + m_{new}}$$

$$= v_{pre}^2 \text{ versus } (v_{pre} + m_{safe})(v_{pre} - m_{safe})$$

$$= v_{pre}^2 \text{ versus } v_{pre}^2 - m_{safe}^2$$

so $ZR(S) > D$.

$2R$ versus $D$

$$= \frac{c}{c + m_{safe}} \cdot \frac{v_{pre}}{v_{pre} + m_{new}} \text{ versus } \frac{v_{pre} - m_{safe}}{v_{pre} + m_{new}}$$

$$= cv_{pre} \text{ versus } (v_{pre} - m_{safe})(c + m_{safe})$$

$$= 0 \text{ versus } v_{pre}m_{safe} - m_{safe}c - m_{safe}^2$$

$$= c + m_{safe} \text{ versus } v_{pre}$$

SO $2R > D$ since $v_{pre} < c$.

For $2R$ versus $ZR(S)$, the rightmost terms are identical, so

$2R$ versus $ZR(S)$

$$= \frac{c}{c + m_{safe}} \cdot \frac{v_{pre}}{v_{pre} + m_{new}}$$

$$= cv_{pre} + cm_{safe} \text{ versus } cv_{pre} + v_{pre}m_{safe}$$

$$= c \text{ versus } v_{pre}$$

So $2R > ZR(S)$ in this case.

In this case, $D = ZR(D)$ and $DI = S$ by inspection. So, for the founders, we have $D = ZR(D) < ZR(S) < DI = S$, and $D < 2R$ but the relation of $2R$ to $ZR(S)$ and $S$ depends on $m_{new}$ and $m_{safe}$.

In case of the SAFE investor, we have $2R < ZR(S) < D$ and $DI = S < D$ by inspection.

$S$ versus $ZR(S)$

$$= \frac{m_{safe}}{v_{pre} + m_{safe} + m_{new}} \text{ versus } \frac{m_{safe}}{v_{pre} + m_{safe}} \cdot \frac{v_{pre}}{v_{pre} + m_{new}}$$

$$= (v_{pre} + m_{safe})(v_{pre} + m_{new}) \text{ versus } (v_{pre} + m_{safe} + m_{new})v_{pre}$$

$$= v_{pre}^2 + v_{pre}m_{new} + v_{pre}m_{safe} + m_{safe}m_{new} \text{ versus } v_{pre}^2 + v_{pre}m_{safe} + v_{pre}m_{new}$$

$$= m_{safe}m_{new} \text{ versus } 0$$

so $S > ZR(S)$.

So the SAFE investor order on outcome values is $2R < ZR(S) < S = DI < D$. 49
• **Assumption:** \( c \leq v_{\text{pre}} < c + m_{\text{safe}} \).

For the founders: we have the following comparisons. By inspection \( 2R = ZR(S) \) and \( D = ZR(D) \).

\[
\begin{align*}
D \text{ versus } 2R & = \frac{v_{\text{pre}} - m_{\text{safe}}}{v_{\text{pre}} + m_{\text{new}}} \text{ versus } \frac{c}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}} \\
& = (v_{\text{pre}} - m_{\text{safe}})(c + m_{\text{safe}}) \text{ versus } cv_{\text{pre}} \\
& = v_{\text{pre}}c + v_{\text{pre}}m_{\text{safe}} - m_{\text{safe}}c - m_{\text{safe}}^2 \text{ versus } cv_{\text{pre}} \\
& = v_{\text{pre}}m_{\text{safe}} \text{ versus } m_{\text{safe}}c + m_{\text{safe}}^2 \\
& = v_{\text{pre}} \text{ versus } c + m_{\text{safe}}
\end{align*}
\]

so we have \( D < 2R \) by the assumption.

\[
\begin{align*}
2R \text{ versus } DI & = \frac{c}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}} \text{ versus } \frac{c}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}} + m_{\text{safe}}}{v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}} \\
& = \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}} \text{ versus } \frac{v_{\text{pre}} + m_{\text{safe}}}{v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}} \\
& = v_{\text{pre}}(v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}) \text{ versus } (v_{\text{pre}} + m_{\text{safe}})(v_{\text{pre}} + m_{\text{new}}) \\
& = v_{\text{pre}}m_{\text{new}} \text{ versus } (v_{\text{pre}} + m_{\text{safe}})m_{\text{new}} \\
& = 0 \text{ versus } m_{\text{safe}}m_{\text{new}}
\end{align*}
\]

so we have \( 2R < DI \)

\[
\begin{align*}
DI \text{ versus } S & = \frac{c}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}} + m_{\text{safe}}}{v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}} \text{ versus } \frac{v_{\text{pre}}}{v_{\text{pre}} + \frac{v_{\text{pre}}m_{\text{safe}}}{c} + m_{\text{new}}} \\
& = c(v_{\text{pre}} + m_{\text{safe}})(v_{\text{pre}} + \frac{v_{\text{pre}}m_{\text{safe}}}{c} + m_{\text{new}}) \text{ versus } v_{\text{pre}}(c + m_{\text{safe}})(v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}) \\
& = cv_{\text{pre}}^2 + v_{\text{pre}}^2m_{\text{safe}} + cv_{\text{pre}}m_{\text{new}} + cm_{\text{safe}}v_{\text{pre}} + m_{\text{safe}}^2v_{\text{pre}} + cm_{\text{safe}}m_{\text{new}} \\
& \quad \text{versus } v_{\text{pre}}^2c + v_{\text{pre}}cm_{\text{safe}} + v_{\text{pre}}cm_{\text{new}} + v_{\text{pre}}^2m_{\text{safe}} + v_{\text{pre}}m_{\text{safe}}^2 + v_{\text{pre}}m_{\text{safe}}m_{\text{new}} \\
& = cm_{\text{safe}}m_{\text{new}} \text{ versus } v_{\text{pre}}m_{\text{safe}}m_{\text{new}} \\
& = c \text{ versus } v_{\text{pre}}
\end{align*}
\]

Hence we have \( DI < S \) using assumption \( c \leq v_{\text{pre}} \).

So, for the founders, we have \( D = ZR(D) < 2R = ZR(S) < DI < S \) in this case.
For the SAFE investor, we have $2R = ZR(S)$ and $D = ZR(D)$. 

The outcome for $2R$ can be written as

\[ \frac{m_{\text{safe}}}{v_{\text{pre}} + m_{\text{new}}} \cdot \frac{v_{\text{pre}}}{c + m_{\text{safe}}} \]

which is the outcome for $D$ times a number not larger than 1, by assumption. Hence $2R < D$

The outcome for $S$ can be written as

\[ \frac{m_{\text{safe}}v_{\text{pre}}}{v_{\text{pre}}c + v_{\text{pre}}m_{\text{safe}} + m_{\text{new}}c} \]

which has the same numerator as $2R$. The denominator of $2R$ multiplies out to the larger number $v_{\text{pre}}c + v_{\text{pre}}m_{\text{safe}} + m_{\text{new}}m_{\text{safe}}$, so we have $2R < S$.

To compare $D$ with $S$, we multiply the denominator and numerator of $D$ by $v_{\text{pre}}$, so that we get

\[ D \text{ versus } S = \frac{v_{\text{pre}}c + v_{\text{pre}}m_{\text{safe}} + m_{\text{new}}c}{v_{\text{pre}}c + v_{\text{pre}}m_{\text{safe}} + m_{\text{new}}c} \text{ versus } \frac{v_{\text{pre}}^2 + v_{\text{pre}}m_{\text{new}}}{v_{\text{pre}}^2 + m_{\text{new}}(v_{\text{pre}} - c)} \]

Since, by assumption, we have $c \leq v_{\text{pre}} < c + m_{\text{safe}}$, we have $v_{\text{pre}}^2 < v_{\text{pre}}(c + m_{\text{safe}})$ and $0 \leq v_{\text{pre}} - c$. Hence the order between these expressions depends on $m_{\text{new}}$.

**ZR(S) versus DI**

\[ \frac{m_{\text{safe}}}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}} \text{ versus } \frac{m_{\text{safe}}}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}} + m_{\text{new}}}{v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}} \]

\[ = \frac{v_{\text{pre}}}{v_{\text{pre}} + m_{\text{new}}} \text{ versus } \frac{v_{\text{pre}} + m_{\text{new}}}{v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}} \]

\[ = v_{\text{pre}}(v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}) \text{ versus } (v_{\text{pre}} + m_{\text{new}})(v_{\text{pre}} + m_{\text{safe}}) \]

\[ = v_{\text{pre}}^2 + v_{\text{pre}}m_{\text{safe}} + v_{\text{pre}}m_{\text{new}} \text{ versus } v_{\text{pre}}^2 + v_{\text{pre}}m_{\text{safe}} + m_{\text{new}}v_{\text{pre}} + m_{\text{new}}m_{\text{safe}} \]

\[ = 0 \text{ versus } m_{\text{new}}m_{\text{safe}} \]

So ZR(S) < DI

**DI versus D**

\[ \frac{m_{\text{safe}}}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}} + m_{\text{safe}}}{v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}} \text{ versus } \frac{m_{\text{safe}}}{v_{\text{pre}} + m_{\text{new}}} \]

\[ = (v_{\text{pre}} + m_{\text{new}})(v_{\text{pre}} + m_{\text{safe}}) \text{ versus } (c + m_{\text{safe}})(v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}) \]

\[ = v_{\text{pre}}^2 + v_{\text{pre}}m_{\text{safe}} + m_{\text{new}}v_{\text{pre}} + m_{\text{new}}m_{\text{safe}} \]

\[ \text{versus } c(v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}) + m_{\text{safe}}v_{\text{pre}} + m_{\text{safe}}^2 + m_{\text{safe}}m_{\text{new}} \]

\[ = v_{\text{pre}}^2 + m_{\text{new}}v_{\text{pre}} \text{ versus } c(v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}) + m_{\text{safe}}^2 \]

\[ = (v_{\text{pre}} - c)(v_{\text{pre}} + m_{\text{new}}) \text{ versus } (c + m_{\text{safe}})m_{\text{safe}} \]
All terms on the last line are positive since we are in a case where \( c \leq v_{\text{pre}} \). Choice of \( m_{\text{safe}} \) can result in either order, so these terms are not directly comparable without further information.

\[
\begin{align*}
DI \text{ versus } S &= \frac{m_{\text{safe}}}{c + m_{\text{safe}}} \cdot \frac{v_{\text{pre}} + m_{\text{safe}}}{v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}} \text{ versus } \frac{m_{\text{safe}} v_{\text{pre}}}{v_{\text{pre}} + \frac{v_{\text{pre}} m_{\text{safe}}}{c} + m_{\text{new}}} \\
&= c(v_{\text{pre}} + m_{\text{safe}})(v_{\text{pre}} + \frac{v_{\text{pre}} m_{\text{safe}}}{c} + m_{\text{new}}) \text{ versus } v_{\text{pre}}(c + m_{\text{safe}})(v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}}) \\
&= cv_{\text{pre}}^2 + m_{\text{safe}} v_{\text{pre}}^2 + cv_{\text{pre}} m_{\text{new}} + cv_{\text{pre}} m_{\text{safe}} + m_{\text{safe}} v_{\text{pre}}^2 + cm_{\text{safe}} m_{\text{new}} \\
&\quad \text{versus} \quad cv_{\text{pre}}^2 + cv_{\text{pre}} m_{\text{safe}} + cv_{\text{pre}} m_{\text{new}} + v_{\text{pre}} m_{\text{safe}} + v_{\text{pre}} m_{\text{safe}}^2 + v_{\text{pre}} m_{\text{safe}} m_{\text{new}} \\
&= cm_{\text{safe}} m_{\text{new}} \text{ versus } v_{\text{pre}} m_{\text{safe}} m_{\text{new}} \\
&= c \text{ versus } v_{\text{pre}}
\end{align*}
\]

Since we are in a case where \( c \leq v_{\text{pre}} \) we have \( DI < S \).

Thus, for the SAFE investor, we have \( 2R = ZR(S) < DI < S \) and \( 2R = ZR(S) < D = ZR(D) \), with the order between \( D = ZR(D) \) and each of \( DI \) and \( S \) possibly either way.

Since we are in a case where \( c < v_{\text{pre}} \), we have \( v_{\text{pre}} + m_{\text{new}} \leq v_{\text{pre}} + m_{\text{safe}} + m_{\text{new}} \leq v_{\text{pre}} + \frac{v_{\text{pre}} m_{\text{safe}}}{c} + m_{\text{new}} \) so the order for the new investor is straightforwardly \( 2R = D = ZR(D) = ZR(S) < DI < S \).

- **Assumption** \( c + m_{\text{safe}} \leq v_{\text{pre}} \): The table in this case differs from that for the case \( c \leq v_{\text{pre}} < c + m_{\text{safe}} \) only in the rows for \( D \) and \( ZR(D) \), and the assumption \( c \leq v_{\text{pre}} \) used in a number of the comparisons for that case continues to hold. Hence there is no change from the previous case in the ordering of any of the rows other than \( D, ZR(D) \). By inspection, we have \( 2R = D = ZR(D) = ZR(S) \) for all agents in this case. Thus, for the founders, the outcomes are ordered \( 2R = D = ZR(D) = ZR(S) < DI < S \) and for the SAFE investor the outcomes are ordered \( 2R = D = ZR(D) = ZR(S) < DI < S \).

### B Discounted Valuation Method: Multiple Pre-Money SAFEs

The body of the paper considers only a scenario in which the company has issued only one SAFE by the time of the equity round. In this appendix we show that the Discounted Valuation method can also be applied in a scenario where multiple Pre-Money SAFEs have been issued. We suppose that \( k \) SAFE contracts have been issued with the \( i \)-th having cap \( c_i \) and price \( m_i \).

We suppose that the new investor’s actual pre-money valuation of the company (ignoring the existence of SAFE contracts) is \( v_{\text{pre}} \). As before, we write
\( v_{\text{pre}} \) as the pre-money valuation at which the equity round is conducted. We use \( v_{\text{pre}} \) and equation \((v_{\text{sp,pre}})\) to calculate the price of shares for the new investor, and equation \((m_{\text{sp,new}})\) to determine their number. We use the same price to execute the SAFE, and for purposes of selecting the applicable case of the SAFE contracts, we use \( v_{\text{pre}} \) rather than \( v_{\text{pre}} \). We then calculate the value of those shares using actual pre-money valuation \( v_{\text{pre}} \).

After the equity round, using the actual valuation \( v_{\text{pre}} \), the post-money valuation is \( v_{\text{pre}} + m_{\text{new}} \). We define \( S_{\text{post}} = s_f + s_{\text{new}} + \sum_i s_i \) to be the total number of shares post the equity round, where \( s_i \) is the number of shares issued to SAFE investor \( i \) and \( s_{\text{new}} \) is the number of shares issued to the equity round investor. The new investor’s shares are worth

\[
\frac{s_{\text{new}}}{S_{\text{post}}} \frac{v_{\text{pre}} + m_{\text{new}}}{p_{\text{new}}} = \frac{m_{\text{new}}}{S_{\text{post}}} v_{\text{pre}} + m_{\text{new}}
\]

\[
= m_{\text{new}} \cdot \frac{v_{\text{pre}} + m_{\text{new}}}{v_{\text{pre}} + m_{\text{new}} + \sum_i s_i p_{\text{new}}}
\]

Thus, the new investor avoids an immediate loss provided

\[
v_{\text{pre}} + m_{\text{new}} \geq v_{\text{pre}} - \sum_i s_i p_{\text{new}}
\]

i.e., \( v_{\text{pre}} \leq v_{\text{pre}} - \sum_i s_i p_{\text{new}} \). If this inequality is strict, then the new investor makes an immediate unrealised gain on their investment \( m_{\text{new}} \), but an increase in this gain corresponds to decreasing \( v_{\text{pre}} \), which implies an increased dilution of the founders. A reasonable outcome of a negotiation on this point, acceptable to both the founders and the new investor (assuming that they are both happy to apply this valuation model and agree on \( v_{\text{pre}} \)), is to take \( v_{\text{pre}} = v_{\text{pre}} - \sum_i s_i p_{\text{new}} \). This makes the new investor’s shareholding worth exactly \( m_{\text{new}} \), and their proportional holding of the company equal to \( \frac{m_{\text{new}}}{v_{\text{pre}} + m_{\text{new}}} \), exactly as for a standard equity raise, so this outcome is likely to be satisfactory for the new investor.

We remark that we also get in this case that

\[
\frac{v_{\text{pre}}}{s_f} = p_{\text{new}} = \frac{v_{\text{pre}} + m_{\text{new}}}{S_{\text{post}}}
\]

This already suffices to calculate some consequences for the value of the SAFE investors’ shares in the post-money state. There are two cases for each investor \( i \):

\[
\text{(13)}
\]
• Case 1: \( v_{\text{pre}}^- \leq c_i \). In this case, investor \( i \)'s shares are worth
\[
\frac{s_i v_{\text{pre}}^+ + m_{\text{new}}}{S_{\text{post}}} = \frac{m_i s_j v_{\text{pre}}^+ + m_{\text{new}}}{v_{\text{pre}}^+ S_{\text{post}}}
\]
by the SAFE
\[
= \frac{m_i s_j v_{\text{pre}}^-}{v_{\text{pre}}^+}
\]
\[
= m_i
\]
Thus, in this case, the SAFE investor avoids a loss, and receives shares of value equivalent to their original investment.

• Case 2: \( v_{\text{pre}}^- > c_i \). In this case, investor \( i \)'s shares are worth
\[
\frac{s_i v_{\text{pre}}^+ + m_{\text{new}}}{S_{\text{post}}} = \frac{m_i s_j v_{\text{pre}}^-}{c_i}
\]
by the SAFE
\[
= \frac{m_i s_j v_{\text{pre}}^-}{s_j}
\]
\[
= m_i \cdot \frac{v_{\text{pre}}^-}{c_i}
\]
\[
> m_i
\]
Here, the SAFE investor makes a gain on their investment, depending on the amount by which \( v_{\text{pre}}^- \) exceeds the cap \( c_i \) of the SAFE.

Both cases are easily understood, and are likely to be acceptable to the SAFE investor.

We have not yet determined an actual value for \( v_{\text{pre}}^- \). There is a circularity in the equation \( v_{\text{pre}}^- = v_{\text{pre}} - \sum_i s_i p_{\text{new}} \), because the expression \( s_i p_{\text{new}} \) may depend on \( v_{\text{pre}}^- \). We have \( s_i p_{\text{new}} = \frac{m_i}{\min(p_{\text{post}}, p_{\text{safe}})} \cdot \frac{v_{\text{pre}}^-}{s_j} = \frac{m_i}{\min(v_{\text{pre}}, c_i)} \cdot v_{\text{pre}}^- \). Thus, we need to solve
\[
v_{\text{pre}} = v_{\text{pre}}^- + \sum_{i : v_{\text{pre}}^- < c_i} m_i + \sum_{i : v_{\text{pre}}^- \geq c_i} \frac{m_i}{c_i} \cdot v_{\text{pre}}^-
\]
for \( v_{\text{pre}}^- \). Since we need \( v_{\text{pre}}^- \geq 0 \) (else we get a negative price per share), we must have \( v_{\text{pre}}^- \geq \sum_i m_i \) in order for this to be solvable. Note that the right hand side of this equation is continuous, piecewise linear and increasing in \( v_{\text{pre}}^- \), since
\[
m_i = \frac{m_i}{c_i} \cdot v_{\text{pre}}^- \quad \text{when} \quad v_{\text{pre}}^- = c_i.
\]
Hence, in case \( v_{\text{pre}}^- \geq \sum_i m_i \), we get a unique solution for \( v_{\text{pre}}^- \) in terms of \( v_{\text{pre}} \). To express this, order the distinct SAFE caps amongst the \( c_i \) as \( c_1' < c_2' < \ldots < c_k' \), and let \( c_0' = 0 \). These correspond to the points \( C_0, \ldots, C_k \) on the \( v_{\text{pre}} \) axis, defined by
\[
C_j = c_j' + \sum_{i : c_i' < c_j} m_i + \sum_{i : c_i' \geq c_j} \frac{m_i}{c_i} \cdot c_j'.
\]
Note \( C_0 = \sum_i m_i \). Then we solve for \( v^-_{\text{pre}} \) by

\[
v^-_{\text{pre}} = \frac{v_{\text{pre}} - \sum_{i: c'_j < c_i} m_i}{1 + \sum_{i: c'_j \geq c_i} \frac{m_i}{c_i}}
\]  

(14)

where \( j \) is the least number such that \( v_{\text{pre}} \geq C_j \), or equivalently, \( v^-_{\text{pre}} \geq c_j \).

\section{C \ Multiple Post-Money SAFEs}

The calculations for multiple post-money SAFE\( s \) with cap, but no discount work as follows:

Suppose that the company has issued post-money SAFE\( s \) to \( k \) investors, with investor \( i = 1 \ldots k \) purchasing a SAFE for price \( m_i \) at post-money cap \( c_i \).

Then the company capitalization (pre the equity round, and inclusive of the SAFE shares) is

\[
S_{\text{pre}} = s_f + \sum_{i=1}^{k} s_i
\]

where \( s_i \) is the number of shares that will be issued to SAFE investor \( i \).

The Post-Money SAFE states that the number of shares for each SAFE investor is given by

\[
s_i = \frac{m_i}{p r_i} = \frac{m_i S_{\text{pre}}}{v_i}
\]

where

\[
p r_i = \frac{v_i}{S_{\text{pre}}}
\]

is the price per share at which the conversion is made, and \( v_i \) is the valuation at which investor \( i \)'s SAFE note converts. This is given by \( v_i = \min(c_i, v_{\text{pre}}) \), where \( v_{\text{pre}} \) is the pre-money valuation at which the new investor purchases shares (since minimizing the price is what maximizes the number of shares the investor receives, as per the Equity Financing clause (a)).

Substituting the value for the number of SAFE shares \( s_i \) for each investor into the equation for \( S_{\text{pre}} \), we get

\[
S_{\text{pre}} = s_f + \sum_{i=1}^{k} \frac{m_i S_{\text{pre}}}{v_i}
\]

This equation has a unique solution for \( S_{\text{pre}} \) as

\[
S_{\text{pre}} = \frac{s_f}{1 - \sum_{i=1}^{k} \frac{m_i}{v_i}}
\]

using which we can also solve uniquely for the number of shares for each SAFE investor as

\[
s_i = \frac{m_i s_f}{v_i (1 - \sum_{i=1}^{k} \frac{m_i}{v_i})}.
\]
Note that in order for these expressions to be finite and positive, we need that
\[ 1 > \sum_{i=1}^{k} \frac{m_i}{v_i}. \]  
(15)

This can be understood by noting that the proportion of the company that SAFE investor \( i \) receives, pre the dilution by the new investor’s money, is
\[ \frac{s_i}{S_{\text{pre}}} = \frac{m_i}{v_i}. \]

Hence inequality (15) says that the total share of the company controlled by the SAFE investors pre the new investor’s money should be less than 100%. (Some amount needs to be left over to account for the founder shares \( s_f \).)

A significant point here is that there are several ways in which this constraint can be violated.

1. The company may issue a set of SAFE notes with
\[ \sum_{i=1}^{k} \frac{m_i}{c_i} \geq 1. \]
Since always \( v_i \leq c_i \), this would imply that inequality (15) is violated. There is therefore an implicit obligation on the company not to issue excess SAFE notes in this way: doing so would render the company unable to meet its explicit obligations to the SAFE holders in the event of an Equity Financing.

On the other hand, if
\[ \sum_{i=1}^{k} \frac{m_i}{c_i} < 1 \]
then for any valuation \( v_{\text{pre}} \) greater than or equal to the largest cap of any of the SAFE notes, we have \( v_i = c_i \) for all \( i \), so inequality (15) is satisfied and the numbers \( s_i \) are well defined.

2. The new investor offer may imply a pre-money valuation \( v_{\text{pre}} \) that is lower than some of the SAFE caps. Let the SAFE caps be ordered as \( c_1 \leq \ldots \leq c_k \), and suppose that \( c_{j-1} \leq v_{\text{pre}} < c_j \). Then we have \( v_i = c_i \) for \( i < j \) and \( v_i = v_{\text{pre}} \) for \( i \geq j \), so inequality (15) amounts to
\[ 1 > \sum_{i=1}^{j-1} \frac{m_i}{c_i} + \sum_{i=j}^{k} \frac{m_i}{v_{\text{pre}}}, \]
which requires that
\[ v_{\text{pre}} > \frac{\sum_{i=j}^{k} m_i}{1 - \sum_{i=1}^{j-1} \frac{m_i}{c_i}}. \]  
(16)
SAFE Parameters: \((m_1, c_1) = (1, 3), (m_2, c_2) = (1, 5), (m_3, c_3) = (2, 20)\)

\[ v_{pre} = 4.4 \]

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<td>T</td>
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</table>

SAFE Parameters: \((m_1, c_1) = (1, 3), (m_2, c_2) = (1, 4), (m_3, c_3) = (2, 20)\)

\[ v_{pre} = 4.4 \]

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<tr>
<td>(16) holds</td>
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Table 7: Numerical examples of Post-money SAFE convertibility with \(v_{pre}\) in cap intervals \([c_{j-1}, c_j)\).

Depending on the values of the SAFE caps \(c_i\) and prices \(m_i\), this may not be possible for all values of \(v_{pre}\) in the interval \([c_{j-1}, c_j)\). Thus, even if the company has taken care not to exceed granting over a 100% share to the SAFE investors, as calculated using the SAFE caps, there may yet be pre-money valuations at which the SAFE contracts can never be converted. Note that both the numerator and denominator in the expression on the right hand side of the inequality 16 increase as \(j\) descends from \(k\) to 1 (i.e., as \(v_{pre}\) decreases through the range of SAFE cap values). The value of this expression behaves non-monotonically, so the set of intervals within which the SAFE cannot be converted is complex. Some numerical value to illustrate this are given in Table 7.

In particular, note that it is never possible to convert the SAFEs in an Equity round at a valuation \(v_{pre} \leq \min(c_1, \sum_{i=1}^{k} m_i)\), since in this case inequality (15) amounts to

\[
1 > \sum_{i=1}^{k} \frac{m_i}{v_{pre}}
\]

which directly contradicts \(v_{pre} \leq \sum_{i=1}^{k} m_i\).

With respect to value of shares received by the parties, the post-money SAFE is more satisfactory than the original pre-money SAFE contract. The value of the SAFE shares after the conversion (with the company having pre-money valuation \(v_{pre}\)) is

\[ v_{pre} \frac{m_i}{v_i} \geq m_i \]

(since \(v_i \leq v_{pre}\)) and this value is preserved by the Equity round, so the SAFE investor is guaranteed to avoid a loss in an Equity round. Similarly, since the new investor’s money comes in after the SAFE shares are issued, from their
point of view, the Equity round is a standard equity round, in which they receive shares valued at equal to their investment.