Review of

THE VALUE OF IMPUTATION CREDITS FOR REGULATORY PURPOSES

December 5 2005

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EXECUTIVE SUMMARY

Envestra has recently assessed the appropriate value for the parameter "gamma" in the Officer version of the CAPM. This parameter is the product of the utilisation rate for imputation credits and the ratio of distributed imputation credits to company tax paid. The value for gamma that is generally invoked by Australian regulators is .50, comprising a utilisation rate of .60 and a distribution rate of .80 (with rounding).

By contrast, Envestra argues for a gamma estimate of zero, along with an upper bound of .26, and these estimates rest on five intermediary conclusions. First, the distribution rate for imputation credits is .70. Second, the appropriate correction for timing delays in respect of distributing the credits is .75. Third, the appropriate utilisation rate for the regulated sector is zero, due to the price-setting investors being foreigners, and this implies an estimate for gamma of zero. Fourth, in so far as all investors are considered in determining the utilisation rate, application of appropriate utilisation rates to each investor group along with their market value weights yields an estimate for the utilisation rate of .30, and therefore an estimate for gamma of .21. Finally, and again in so far as all investors are considered in determining the utilisation rate, an alternative version of the last calculation is offered using weights for investors in the regulated sector rather than the market as a whole; this yields an estimate for the utilisation rate of .375, and therefore an estimate for gamma of .26.

All five of these intermediary conclusions are flawed as follows. Firstly, the relevant distribution rate is that for the individual firm rather than the market, although pragmatic considerations might support the use of an industry wide estimate. Envestra appears to recognise the problem in using a market-wide estimate. Second, and consistent with the way in which Envestra has estimated the distribution rate using imputation credit data from the same year as that of the tax payments, no timing correction is warranted. Third, the use of a utilisation rate of zero in accordance with the alleged price-setting role of foreign investors is inconsistent with the definition for this parameter as a value-weighted average over all investors, inconsistent with the use of the Officer version of the CAPM in recognising foreign investors, and inconsistent with the way in which investors trade-off expected return and risk in making portfolio decisions. Fourth, the estimate of U of .30 is flawed in ascribing a

utilisation rate to superannuation funds and insurance companies of .50 rather than 1, in including inter-corporate holdings of equity and foreigners in the analysis, and in overestimating the weight of government holdings of equity. Finally, the estimate of *U* of .375 is flawed in failing to adopt market-wide value weights in the averaging process in accordance with the definition of *U* in the Officer model.

Taking account of all of these points, an appropriate estimate of *U* is .92, and this is consistent with the conclusion reached in Lally (2004). Even in conjunction with Envestra's estimate of .70 for the distribution rate, the implied value for gamma is .64 rather than the values in the range of 0-.26 argued by Envestra.

1. Introduction

Envestra (2005) has recently assessed the appropriate value for the parameter "gamma" in the Officer (1994) version of the CAPM. This parameter is the product of the utilisation rate for imputation credits and the ratio of distributed imputation credits to company tax paid. The value for gamma that is generally invoked by Australian regulators is .50, comprising a utilisation rate of .60 and a distribution rate of .80 (with rounding). By contrast, Envestra argues for a gamma value of zero for the Australian gas and electricity distribution industry, arising from a utilisation rate of zero for foreign investors. However, they also acknowledge the possibility of the relevant utilisation rate being determined by all investors, and this leads to a utilisation rate of up to .375. In conjunction with an estimate for the distribution rate of .70, this yields an estimate for gamma of .26. So, their estimate for gamma ranges from zero to .26, with zero as the most likely value.

This paper seeks to review the analysis in Envestra (2005). Section 2 summarises their analysis. Section 3 critiques it, and section 4 concludes.

2. Envestra's Analysis

The Officer (1994) version of the CAPM is widely used in Australia for determining the cost of equity capital, and is universally employed by Australian regulators for that purpose. Inter alia, it displaces the statutory corporate tax rate by an effective rate, with the proportionate reduction (γ) being the proportion of company tax that is passed through to shareholders in the form of imputation credits *and* utilised by them, i.e.,

$$\gamma = \frac{IC}{TAX} U \qquad (1)$$

where IC is the level of credits distributed by the firm in question, TAX is the level of company tax paid by them, and U is the utilisation rate for the credits that are distributed net of a correction for timing delays.

In respect of the distribution rate (*IC*/*TAX*), Envestra assesses this principally by examination of data from the Australian Tax Office (ATO). In particular, the aggregate level of distributed franking credits is determined and expressed as a proportion of the aggregate level of company tax paid, for each of the last 10 years (Envestra, 2005, Figure 5). The average here is .70 for the market as a whole. Envestra (ibid, section 4.1) offers a considerably lower estimate of .39 for the regulated sector, but they do not subsequently refer to it in their Conclusion.

In respect of the utilisation rate, Envestra argue for a timing correction in respect of investors who can fully utilise the credits. This arises from their belief that company tax paid during a year leads to dividends in subsequent years, as follows. Per $1 of company tax paid in a particular year (year 1) and subsequently distributed as imputation credits, $.30 would be paid during the second quarter of year 2, $.30 paid during the fourth quarter of year 2, $.12 paid in the second quarter of year 3, $.12 paid during the fourth quarter of year 3, $.08 paid during the second quarter of year 4 and $.08 paid in the fourth quarter of year 4. Envestra also argues for discounting these tax benefits at the cost of equity for a typical firm, and attribute a figure of .12 to this. So, the present value calculation is as follows.

$$PV = \frac{\$.30}{(1.12)^{1.5}} + \frac{\$.30}{(1.12)^{2}} + \frac{\$.12}{(1.12)^{2.5}} + \frac{\$.12}{(1.12)^{3}} + \frac{\$.08}{(1.12)^{3.5}} + \frac{\$.08}{(1.12)^{4}} = \$.77 \qquad (2)$$

This implies a utilisation rate for investors who can fully utilise the credits of 0.77, and this approximates the figure of 0.75 claimed by Envestra.

In respect of the utilisation rate prior to any timing correction, Envestra argue that foreign investors in the regulated sector are the “price-setters”, and that they are unable to utilise imputation credits. It follows that $U = 0$. Following equation (1), the estimate for gamma is then as follows.

$$\gamma = .70(0) = 0 \qquad (3)$$

Envestra acknowledge that some investors are able to utilise imputation credits, and further acknowledge that the utilisation rate might be a value weighted average over all investors. Australian individuals are clearly able to fully utilise the credits, subject to any timing adjustment, and they represent 15% of the ownership of Australian shares[1]. Envestra seem unclear on the question of whether corporations, pension funds and insurance companies are able to utilise the credits, and they accordingly select a mid-point utilisation rate of .50 (before adjustment for timing lags). These entities have a collective market weight of 51%. The remaining shareholder groups, comprising foreigners and government, are unable to utilise the credits and have a market weight of 34%. The estimate for *U*, net of the timing adjustment of .75, is then as follows.

$$U = .75[.15(1) + .51(.50) + .34(0)] = .30$$

Substitution of this estimate into equation (1), along with their estimate of .70 for the distribution rate, yields an estimate for gamma as follows.

$$\gamma = .70(.30) = .21 \qquad (4)$$

In their conclusion, Envestra suggest that the appropriate weights to utilise for the estimate of *U* in the penultimate equation above are those for the regulated sector rather than the market as a whole. Lacking such information about the sector, they speculate that the weight on investors who can fully utilise the credits in that sector is 50%, and this yields an estimate for *U* as follows.

$$U = .75[.50(1) + .50(0)] = .375$$

Substitution of this estimate into equation (1), along with their estimate of .70 for the distribution rate, yields an estimate for gamma as follows.

$$\gamma = .70(.375) = .26 \qquad (5)$$

[1] The full set of proportions is 18% for corporations, 9% for government entities, 33% for pension funds and Insurance companies, 25% for foreigners and 15% for Australian individuals (Envestra, 2005, Table 7).

Envestra also refer to work undertaken by a number of other authors, including Hathaway and Officer (2004) and Cannavan et al (2004). These papers, or earlier versions of them, have been critiqued in Lally (2004), and therefore are not commented upon here.

3. Critical Review

3.1 The Distribution Ratio

Envestra estimate the distribution rate at .70 principally through examination of aggregate market data from the ATO. Such a process is satisfactory for estimating a market average value for the distribution rate. However, within the Officer (1994) model, the distribution rate is a firm specific parameter rather than a market average parameter. Furthermore, within a regulatory context, the focus of attention is always upon the cost of equity capital for a particular firm. Consequently, the methodology used by Envestra is inappropriate within a regulatory context.

Envestra appear to recognise this point, and offer an estimate for the regulated sector of .39 (ibid, Table 1). However, this estimate uses "tax expense" from financial accounting statements rather than tax paid, and significant differences can arise here primarily due to timing differences between tax depreciation and that used for financial accounting purposes. Accordingly, the estimate of .39 is not reliable. Envestra do not mention this figure of .39 in their Conclusion.

Having argued here for the desirability of a firm-specific estimate of the distribution rate, there are some practical difficulties in utilising the firm's actual rate. First, it raises the computational burden to the regulator. Secondly, it generates a further area of controversy in estimation. Finally, if the firm's rate is less than 1, then the firm will be motivated to raise its payout rate, and such behaviour may be undesirable at the very least because the valuation model employed does not capture all aspects relevant to dividend policy[2]. The first and last of these concerns can be mitigated by using the relevant industry average, and this compromise is then recommended.

[2] For example, one factor relevant to dividend policy is the extent to which capital gains are taxed less onerously than ordinary income. However, to simplify, the Officer model assumes that they are equally taxed.

3.2 Timing Corrections

Envestra estimates the utilisation rate at .75 even for investors who can fully utilise the credits, due to timing delays of at least a year between the payment of corporate taxes and the payment of associated dividends (with their attached imputation credits). As indicated in equation (2), Envestra allows for a delay of 1-2 years arising from their belief that credits cannot be attached until after the year in which the tax is paid, and they allow for further delays of up to two years. However, under Australian tax law, payments of corporate tax are *immediately* available for the delivery of imputation credits. Thus, Envestra have overestimated the delay in attaching credits by one year on account of this point.

In respect of the further timing delays of up to two years, Envestra present no evidence in support of this further adjustment. They suggest a possible explanation in the form of firms not paying sufficiently large dividends to immediately attach all imputation credits (ibid, section 5.2), but this is inconsistent with their process for estimating the distribution rate because the latter process precludes any allowance for delays in distributing credits. To illustrate this point, suppose that a firm commences operations at the beginning of year 1. From that point it pays corporate taxes of $2m per year and attaches imputation credits of $1m per year, with the shortfall of $1m due to the fact that dividends are insufficiently large to attach all tax payments within that year. In this situation, two possible approaches arise. The first possible approach is to define the imputation credits associated with the tax payment in a particular year to be the imputation credits attached in that year. In this case, the tax payment in each year is $2m and the associated imputation credits are $1m. Accordingly, the distribution rate would be 0.50 for each year and the timing delay would be zero. The second possible approach is to define the imputation credits associated with the tax payment in a particular year to be the credits that ultimately arise from that tax payment (even if they arise with a delay). The situation would then be as follows.

	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6
Attachment of Yr 1 Tax Payment	$1m	$1m				
Attachment of Yr 2 Tax Payment			$1m	$1m		
Attachment of Yr 3 Tax Payment					$1m	$1m

So, the tax payment in year 1 give rise to imputation credits in years 1 and 2 (with a delay of up to one year), the tax payment in year 2 gives rise to imputation credits in years 3 and 4 (with a delay of 1-2 years), the tax payment in year 3 gives rise to imputation credits in years 5 and 6 (with a delay of 2-3 years), etc. In this case, all tax payments eventually give rise to imputation credits. So, the distribution rate would be one and (progressively increasing) timing delays would arise.

Envestra's approach is neither of these. Instead it combines an estimate for the distribution rate from the first approach (.50) with recognition of timing delays as in the second approach. This is cherry picking, the result of which is to unjustifiably lower the estimate for gamma. As to which of the two admissible approaches is better, the first has the considerable advantage of computational simplicity and it is consistent with the way in which Envestra has estimated the distribution rate (although the estimate should be undertaken at the firm or industry level as previously discussed). In this case, the timing delay would be zero.

Notwithstanding the above analysis, there is a rationale for a timing delay in this area, in the form of the lag between companies attaching imputation credits to dividends and shareholders receiving the tax benefit, and Capital Research (2004) raise this issue. However, if a taxpayer were subject to provisional tax payments, the presence of imputation credits would lower these provisional payments, and therefore the tax benefit at the personal level would tend to coincide with the release of the imputation credits by companies. Furthermore, even if a shareholder did experience a delay of this kind on account of not being subject to provisional tax payments, the average delay would be only half of a tax year, i.e., six months. Since the tax benefit would be close to certain, the appropriate discount rate would be the risk free rate (of about .06), and this implies a reduction in U of only .03.[3]

In summary, and consistent with the way in which Envestra has estimated the distribution rate, the timing delay should be zero rather than as estimated by Envestra.

[3] Envestra (2005) invoke a discount rate equal to the cost of equity for an average firm, as shown in equation (2). However, this implies that the risk associated with the eventual realisation of the tax benefit is comparable to that for equities. This is not the case. The only risk associated with the tax benefit is the possibility of the ATO defaulting upon its obligations, and the risk here must be minimal.

3.3 Determination of the Price-Setting Investor

Envestra argue that foreign investors are the price-setters in the regulated sector, and that they are unable to utilise imputation credits. Accordingly, $U = 0$, and this leads to the estimate of $\gamma = 0$ in equation (3). Envestra's belief that foreign investors are the price-setters springs from their (reasonable) belief that they cannot utilise the credits and the observation that they are still significant investors in the regulated sector. These two points lead them to conclude that market prices could not impound the benefit of imputation credits to local investors, because the higher market price arising from impounding those imputation benefits to local investors would generate an expected return for foreign investors that was insufficient to cover their required rate of return, and this is inconsistent with their holdings of such assets.

This line of argument is subject to a number of difficulties, as follows. Firstly, within the Officer (1994) model, the utilisation rate U is a weighted average across the imputation utilisation rates of all investors in the market rather than only one group, and this remains true even if that one group dominates the ownership of a particular firm or industry[4]. This point is unclear in Officer's (1994) derivation of the model, but is clear from the CAPM development in Lally and van Zijl (2003), and the presence of U in the gamma derives from its presence in the CAPM. The fact that this utilization rate is a weighted average across investors implies that it is not the rate for one type of investor.

Secondly, Envestra's line of argument involves recognition of foreign investors. However, the Officer CAPM (like the standard CAPM) assumes that national equity markets are segmented. Consequently the use of an estimate for U that is potentially significantly influenced by the presence of foreign investors introduces an inconsistency into the model. One possible response to this might be to argue that the shortcoming from use of a model that fails to reflect the reality of international capital flows should not be compounded by using an estimate of U that also fails to reflect international investors. However the effect of recognising foreign investors only in

[4] This averaging is a consequence of aggregating over investors in order to obtain market equilibrium. In intuitive terms the explanation is that market prices are determined by investors in aggregate.

this one respect would be to lower the estimate for *U*, and therefore raise the output price allowed by the regulator. By contrast, the *overall* effect of internationalization is likely to warrant a lower output price, because the adverse effect upon the usability of imputation credits is likely to be more than offset by the impact of a lower CAPM risk premium. Thus, recognition of foreigners only in the estimate of *U* would push the allowed output price for a firm further away rather than closer to the "correct" answer, i.e., it leads to raising the output price allowed by the regulator when the appropriate direction is a lowering. Lally (2004, pp. 35-37) provides a detailed illustration of this point.

Thirdly, Envestra's line of argument presumes that investors choose assets on the basis of whether the expected rate of return perceived by them is at least as great as their "required return" (the expected return that just compensates for risk). This is not a plausible description of how investors select portfolios and it is completely inconsistent with the assumptions about investor behaviour that underlie all versions of the CAPM. Within the CAPM, investors are assumed to act in accordance with the Markowitz model (1952, 1959), i.e., they are concerned with expected return and risk at the portfolio level, and they trade off these two considerations in choosing a portfolio[5]. To illustrate this issue, suppose a market contains only two assets, with the same variance but different expected returns. In such a market an investor does not specify a "required rate of return" followed by choosing assets with expected returns that are at least as great as that. Instead, they will in general be willing to invest some money into the asset with the lower expected return because it lowers their portfolio risk, and this compensates for the reduction in the expected return of their portfolio. Furthermore, the more averse to risk they are, the higher the proportion of their portfolio will be invested in the asset with the lower expected return. These principles readily extend to the actions of foreign investors in the Australian market, i.e., even if Australian asset prices fully or even largely reflect the benefits of imputation credits to local investors, with the result that the expected return to foreign investors is lower

[5] The concept of a required rate of return is nevertheless a well-established concept in financial economics. However, it relates to investment decisions by corporations rather than portfolio decisions by investors; the required rate is the discount rate used in determining the present value of an investment project, and the CAPM is generally invoked in specifying this discount rate. Thus, investors choose portfolios on the basis of Markowitz portfolio theory, this leads to the CAPM, and the latter is the generally employed source of the discount rate used for investment decisions by corporations.

than otherwise, foreigners may still be willing to invest because of the risk reductions available to them. In fact, the risk reductions available to them are even greater than for Australian investors because the returns on Australian assets are less highly correlated with foreign assets than with Australian assets.

Finally, Envestra's conclusion is that both types of investors will hold the asset in question and the market value of the asset will reflect the tax circumstances of the investors who experience the tax disadvantage (foreigners). Lally (2004, Appendix) presents a detailed analysis of this type of situation, in which one class of investors enjoys tax benefits that are not available to the other class. Two possible scenarios arise. The first of them is consistent with the structure of the Officer (1994) form of the CAPM, involves both types of investors holding the asset, and implies that asset prices average over the tax circumstances of *all* investors in a market (as noted earlier). The second possible scenario is not consistent with the structure of the Officer CAPM, involves only those investors experiencing the tax advantage on the asset holding it (with other investors short-selling it), and implies that the price for the asset in question fully reflects the tax circumstances of the investors who experience the tax advantage from the asset. Neither of these two scenarios corresponds to Envestra's belief that both types of investors hold the asset and the market value of the asset will reflect the tax circumstances of the investors who experience the tax disadvantage.

In summary, Envestra's belief that $U = 0$ and therefore $\gamma = 0$, as reflected in equation (3), is unjustified.

3.4 Averaging Utilisation Rates Across Investor Groups

We turn finally to Envestra's analysis reflected in equations (4) and (5). The latter estimate of 0.26 is not consistent with the definition of U within the Officer model as a market-wide value-weighted average over all investor groups, rather than an average over those in a particular sector, and is therefore rejected. In respect of the estimate of 0.21 in equation (4), this arises from Envestra's analysis in their Table 7, and involves consideration of the tax circumstances of all major holders of Australian equities

(comprising corporations, government, pension funds/insurance companies, foreigners, and individuals).

In respect of the market value weights for these groups of investors, Envestra draw upon information from the Australian Bureau of Statistics (2004, Table 26.15), and their figures include unlisted equities. By contrast, the market portfolio proxy adopted in estimating other CAPM parameters, most particularly the market risk premium and beta, is listed equity. Consistency requires the same proxy, and the weights arising for listed equity in this Table 26.15 are 40% for foreigners, 24% for pension funds and insurance companies, 21% for individuals, 11% for corporations, and 4% for government.

In respect of foreigners, section 3.3 here argues that the consideration given to these shareholders in respect of tax issues but not otherwise is inconsistent, and induces upward biases in determining allowed output prices. Consequently, foreign investors should be disregarded in assessing the market-wide utilisation rate for imputation credits.

In respect of corporate holdings of shares in other companies, inclusion of them would lead to double counting, and this suggests that they be ignored. Nevertheless, if companies were subject to tax treatment on the dividends received from other companies that had the effect of changing the utilisation rate on credits for the ultimate recipients of those dividends, then the assessment of the utilisation rate for the ultimate recipients would need to reflect this. However, companies are not taxed on dividend income, and the dividends pass through with no effect upon the utilisation rate in respect of the ultimate recipients. Consequently, this potential complication is absent. Corporate holdings of equity should then be ignored.

In respect of superannuation funds and insurance companies, Envestra seems unsure as to whether they are able to utilise the credits. They argue that these entities pay more tax now than previously, as a result of a number of tax changes including imputation. Accordingly, they argue that these entities have not benefited from imputation, and their utilisation rate must therefore be zero. Envestra appear to be arguing that the issue of whether these entities can utilise imputation credits cannot be

assessed in the usual fashion by consideration of the tax rules relating to imputation, and can only be assessed by considering *all* tax changes relating to them over some (undefined) period around the introduction of imputation. By extension, if individuals were granted the right to use imputation credits and were also subject to increased statutory tax rates at around the same time, Envestra would have to argue for reducing the utilisation rate available to them (possibly to the point of being negative). Similarly, if individuals were granted the right to use imputation credits and were also subject to lower statutory tax rates at around the same time, Envestra would have to argue that this group enjoyed even greater benefits from imputation credits, i.e., a utilisation rate in excess of 1. Such conclusions would be perverse. Accordingly, Envestra's line of argument here is rejected.

This still leaves the question of whether these entities are able to fully utilise the credits. Since they are taxed at 15% on all income, and are able to offset imputation credits on the dividends received by them against this taxable income, the possibility arises of the imputation credits available to them being in excess of the taxes otherwise payable by them. If this occurred, their tax payment would be zero and the effective utilisation rate on the credits would be less than 1. However, Envestra (2005, section 5.6.3) note that these entities are making (substantial) tax payments, and this implies full utilisation of the credits received by them (subject to any timing adjustments).

In summary, with the omission of foreign shareholders and inter-corporate shareholdings, the only remaining groups are superannuation funds/insurance companies, individuals, and government. Invoking the market weight statistics presented above, and rescaling for the omission of foreigners and corporate holdings, the market weights of these three remaining groups are 49%, 43% and 8%.[6] As argued above, the utilisation rate for the first group is 1, and the applicable rates for the second and third groups are 1 and 0[7]. These rates are potentially subject to timing adjustments. However, as argued in section 3.2, any timing adjustment would be

[6] These market value weights differ from those in Lally and van Zijl (2003), and drawn from ASX information, but the divergence has no material effect upon the resulting estimate for *U*.

[7] The last two utilisation rates are not disputed by Envestra.

trivial. So, the value-weighted average over the utilisation rates of these three groups is as follows.

$$U = .49(1) + .43(1) + .08(0) = .92$$

Substitution of this estimate into equation (1), along with Envestra's estimate of .70 for the distribution rate, then yields an estimate for gamma of

$$\gamma = .70(.92) = .64$$

This estimate is markedly higher than even the upper bound of .26 suggested by Envestra. However, as noted previously, the estimate of .70 for the distribution rate may not be appropriate because it is derived from market-wide information rather than that for the relevant firm or industry.

4. Conclusion

Envestra argues for a gamma estimate of zero, along with an upper bound of .26, and these estimates rest on five intermediary conclusions. First, the distribution rate for imputation credits is .70. Second, the appropriate correction for timing delays in respect of distributing the credits is .75. Third, the appropriate utilisation rate for the regulated sector is zero, due to the price-setting investors being foreigners, and this implies an estimate for gamma of zero. Fourth, in so far as all investors are considered in determining the utilisation rate, application of appropriate utilisation rates to each investor group along with their market value weights yields an estimate for the utilisation rate of .30, and therefore an estimate for gamma of .21. Finally, and again in so far as all investors are considered in determining the utilisation rate, an alternative version of the last calculation is offered using weights for investors in the regulated sector rather than the market as a whole; this yields an estimate for the utilisation rate of .375, and therefore an estimate for gamma of .26.

All five of these intermediary conclusions are flawed as follows. Firstly, the relevant distribution rate is that for the individual firm rather than the market, although pragmatic considerations support the use of an industry wide estimate. Envestra

appears to recognise the problem in using a market-wide estimate. Second, and consistent with the way in which Envestra has estimated the distribution rate using imputation credit data from the same year as that of the tax payments, no timing correction is warranted. Third, the use of a utilisation rate of zero in accordance with the alleged price-setting role of foreign investors is inconsistent with the definition for this parameter as a value-weighted average over all investors, inconsistent with the use of the Officer version of the CAPM in recognising foreign investors, and inconsistent with the way in which investors trade-off expected return and risk in making portfolio decisions. Fourth, the estimate of *U* of .30 is flawed in ascribing a utilisation rate to superannuation funds and insurance companies of .50 rather than 1, in including inter-corporate holdings of equity and foreigners in the analysis, and in overestimating the weight of government holdings of equity. Finally, the estimate of *U* of .375 is flawed in failing to adopt market-wide value weights in the averaging process in accordance with the definition of *U* in the Officer model.

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