is well defined and is a square integrable martingale, i.e.

$$\mathbb{E}\left[f^2(Z_1)\right] < \infty, \tag{2.6}$$

and $f(.)$ is an increasing function.

Assumption 2.2 *The variance of the firm value, $\Sigma_z(t) = \int_0^t \sigma_z^2(s)ds$, is finite for any t.*

Remark 2.3 *Since the final payoff of the stock is given by $f(Z_1)$, the above assumption implies that it is always possible to redefine the function f so that*

$$\sigma^2 = 1 - \Sigma_z(1). \tag{2.7}$$

In what follows, I will always assume that this equality holds.

3 The Markovian Equilibrium

In this section I address the problem of existence and uniqueness of an equilibrium given by Definition 2.3 in the case of Markovian pricing rule i.e. I consider $w(t) \equiv 1$. Before stating the main result of this section, I need to impose additional conditions on the model to insure that the problem is well-posed.

Assumption 3.1 *For any $t \in [0, 1)$ we have*

$$\int_0^t \left(\Sigma_z(s) + \sigma^2 - s\right)^{-2} ds < \infty \tag{3.1}$$

and either

$$\int_0^1 \left(\Sigma_z(s) + \sigma^2 - s\right)^{-2} ds < \infty \tag{3.2}$$

or

$$\lim_{t \to 1} \int_0^t \frac{1}{|\Sigma_z(s) + \sigma^2 - s|} ds = \infty \tag{3.3}$$