Viable myocardium indicates dysfunctional left ventricular (LV) myocardium that has the potential to improve in contractile function after coronary revascularization. This thesis focuses on two main issues related to myocardial viability. First, why in patients with ischemic cardiomyopathy left ventricular ejection fraction (LVEF) does not always improve after revascularization, despite the presence of a substantial amount of viable myocardium? Second, could there be additional benefits of revascularization beyond improvement of LVEF? It appears that beside myocardial viability, also the extent of scar tissue, the severity of left ventricular dilatation and the timing of revascularization may affect improvement of LVEF after revascularization. In addition, this thesis shows that functional improvement is not the ideal gold-standard to evaluate successful revascularization, since additional benefits may be present. Beyond improvement in LVEF, coronary revascularization prohibits ongoing LV remodeling and improves contractile reserve, heart failure symptoms and long-term prognosis.